Decision Makers' Guide to Enterprise Intelligent Assistants *(2019 Edition)*

The most comprehensive assessment of today's leading providers in natural language processing, machine learning, AI & analytics that power automated virtual agents and digital self-service solutions.

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Decision Makers' Guide to Enterprise Intelligent Assistants *(2019 Edition)*

In its fourth installment, **Opus Research** provides an evaluation detailing 16 leading solution providers for enterprise intelligent assistants.

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Opus Research presents a comprehensive assessment of enterprise-grade Intelligent Assistant solution providers bringing natural language processing, machine learning, AI & analytics and customer management integration to power digital self-service solutions. In its fourth installment, the 2019 Decision Makers' Guide reflects the dynamics for a rapidly changing market as enterprises navigate how to incorporate conversational technologies into the critical path for customer care and employee productivity. The report evaluates 16 firms to better understand enabling platforms & technologies, integration points & scalability, track record and future vision for enterprise-scale Conversational AI.

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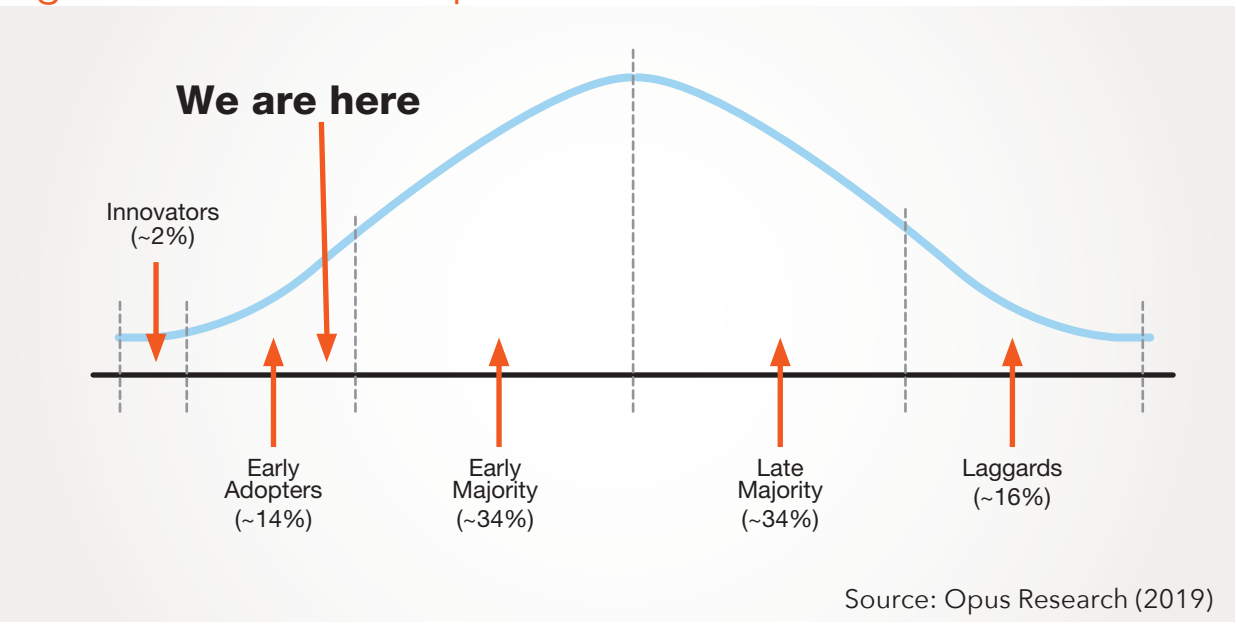
Tracking Developments in the Intelligent Assistance Solution Stack

In 2015, Opus Research began producing the Decision Makers' Guide to Enterprise Intelligent Assistants" to describe how "NLP-powered, automated self-service resources can offer consistent answers and responses to queries or instructions on behalf of brands or enterprise companies." That definition encapsulates the selection criteria we applied to assist the self-selecting group of project managers that were bringing IAs into the talk paths between brands and their customers or prospects.

The community of solution providers under investigation at that time were predominantly "pure-plays". They were relatively small firms that specialized in building platforms for designing, launching, training and administering dedicated Intelligent Assistants (IAs). On the buy side, the biggest influencers were in the Innovation or "Digital Transformation" Groups, primarily in large companies. In the classic bell-shaped adoption curve for new technologies, these were the "Innovators."

The market for Enterprise Intelligent Assistants (EIA) solutions is following a classic adoption curve for emerging technologies. The first offerings appealed to "the 2% percent" of decision-makers, depicted in Figure 1 below, characterized as "Innovators." These are the largest companies in select verticals with wherewithal and staff chartered to invest in emerging technologies that deliver on the promise of a better digital experience that leads, ultimately, to competitive advantage.

Figure 1: The EIA Adoption Curve



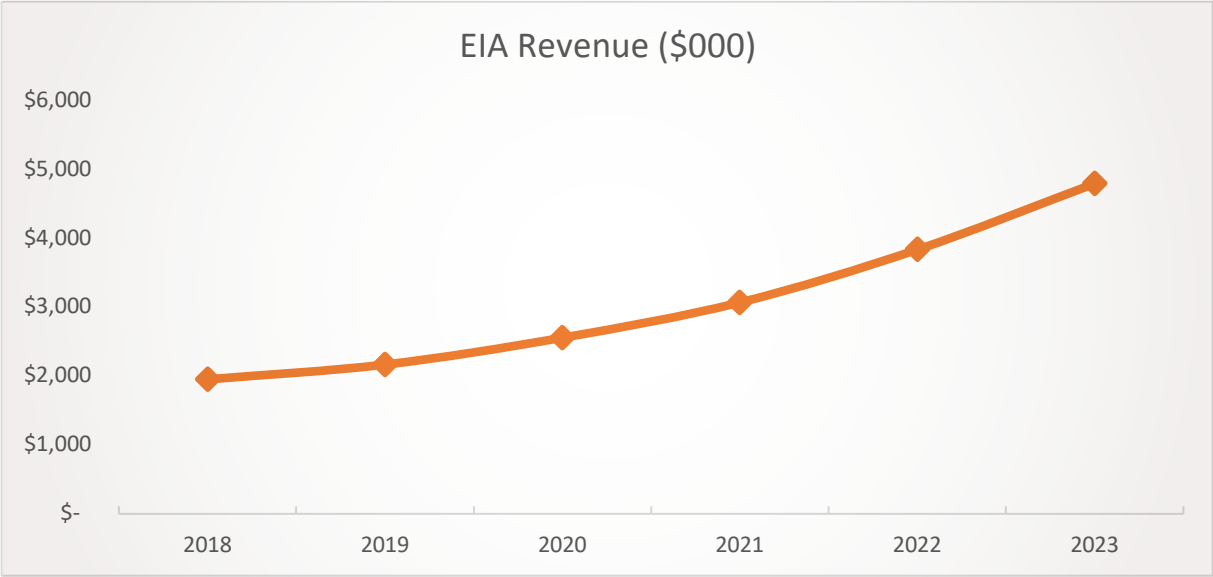
Source: Opus Research (2019)

As this year's assessment of solution providers demonstrates, succeeding in the "Innovation Phase" of market development has been a mixed blessing. It required a set of skills, services and product attributes that served as "starter kits" to support engagement models that included a good deal of bespoke consulting and system integration. Initiatives in this phase, as well as the "Early Adopter" era, were often regarded as "sandbox projects" or "proof-of-concepts" that have yet to be incorporated into the critical path of customer care or employee productivity.

A Pause Marks the Threshold of "Early Majority"

As Figure 1 also depicts, the current state of the market reflects a transition from Innovators and Early Adopters before achieving popularity among an Early Majority of implementers. Such a transition is not trivial. Managers in Marketing, Customer Experience or Digital Transformation have developed an awareness and taken stock of the initiatives in the Innovation Group. They have assessed the relative merits of Proof of Concepts (PoCs) as well as a handful of initiatives launched at the business unit level. They attach a premium of solutions that fulfill their specific business objectives.

Figure 2: Forecast Spending on EIA



Source: Opus Research (2019)

This year's revenue forecast (Figure 2 above) reflects Opus Research's assessment of enterprise spending on Enterprise Intelligent Assistant platforms and services. We

estimate spending in 2018 to be $1.9 billion and expect it to grow to $4.7 billion by 2023, representing a Compound Average Annual Growth Rate (CAAGR) of 19.86%. It is a significant reduction from our previously published outlook. "Innovators" tended to pay top dollar for their solution platforms and a premium for professional services. They also had projects that employed multiple vendors in operation simultaneously, resulting in geometric growth in overall spending.

When Opus Research published the first "Decision Makers' Guide to Enterprise Intelligent Assistants" in August 2015, it was a time of exuberance for an emerging set of technology providers. The document included evaluations of 13 firms, which can now be considered Enterprise Intelligent Assistants (EIA) "pure plays." They were specialists offering tools, platforms and professional services that made it possible of enterprises to develop, deploy and administer automated Intelligent Assistance, primarily for customer support.

The document featured a rosy assessment and forecast for EIA solution providers, observing:

> …Opus Research estimates that they generated approximately $230 million in revenues in software licensing and services revenue in 2014. Enterprise spending on their solutions is growing at roughly 28% annually and should exceed $500 [million] by 2017 on its way to a billion-dollar opportunity in 2020.

A year and a half later (February 2017), the number of firms under investigation exploded to 28, and the Decision Makers' Guide to EIAs included this note on enterprise spending that exceeded our initial assessment:

> The past year has witnessed explosive growth in enterprise spending on licenses, services and platforms. Investment was roughly $750 million in 2015, which was more than double the $350 million originally forecasted by Opus Research in 2013. At this rate, Opus Research foresees explosive growth of the industry poised to blast through $1 billion in 2016, on the way to $4.5 billion globally by 2021

The (up)beat went on and was displayed in the forecast in last year's Decision Makers' Guide (June 2018), where the number of firms under review fell slightly (to 26) but

the empirical observations of the growth in bots and IAs in enterprise settings led to highly positive assessments:

> Based on information provided by respondents, the number of companies [brands] offering some flavor of chatbot, virtual agent or intelligent assistant has grown to 2,100 from the 1,200 reported in our last survey, representing a 75% growth rate. At the same time, the number of claimed implementations [bots in service] approaches 4,000… enterprise spending on IA has kept pace with spending in excess of $1.2 billion in 2017 on its way to $5.5+ billion in 2021.

As we enter 2020, the growth rate is tempered by price reductions that are natural to maturing technologies. A robust marketplace for APIs and microservices that perform Discovery, Categorization, Natural Language Understanding, Translation, image recognition and other popular IA functions is taking shape. Features and functions that used to be prohibitively expensive are on the path to becoming commodities that the emerging majorities will bake into conversational workflows that improve customer experience and employee productivity alike.

Banks and Telecoms Continue to Lead the Way

As part of the data and information gathering for this report, Opus Research asked respondents to list the industries included in their installed base. Not all responded in detail, but we were able to extrapolate a view of the market that reflects the relative distribution by vertical. The unit of measure is determined by "number of customers," and it may not map to revenue mix, but it remains a valid snapshot of the relative importance and perhaps future potential of identified industries.

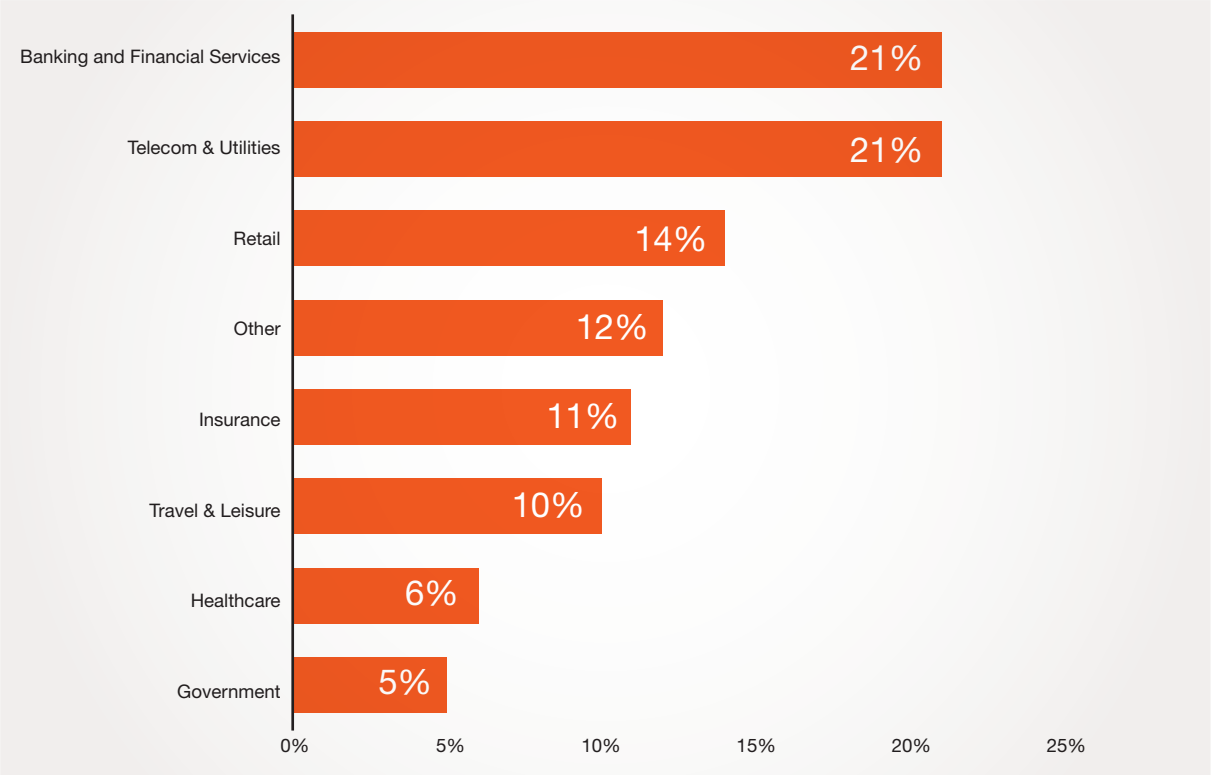
As depicted in Figure 3 below, Banking & Financial Services (21%), Telecom & Utilities (21%), and Retail (14%) represent the largest percentage of citations. Our empirical observation is that banks and brokerage houses were among the first companies to be able to justify investment in IAs as part of their mobile strategy and will continue to do so. Telecommunications carriers and other utilities were quick to recognize the value of Automated Virtual Assistants appearing on the "Contact Us" page of their websites, and were able to handle the vast majority of queries in topics such as initiating or canceling services, tracking orders and bill-related inquiries.

Retail will continue to have a strong presence, driven by stepped up spending in selected micro-segments. There are impressive implementations in cosmetics and

fashion, but there is an emerging role for Intelligent Assistants to play in comparison shopping, fulfillment and order status across categories.

Travel and Leisure can be expected to continue to have a high profile as airlines and hotel chains incorporate IAs into their concierge-like strategies. Government and Healthcare keep their "sleeping giant" status. There are security, privacy, regulatory and budgeting issues that must be dealt with for full-on geometric growth in these domains. Also it should be noted that horizontal applications, such as part of IT Help Desk or Service Desk, are likely represented across each of the verticals.

Figure 3: Vertical Distribution of EIA Deployments

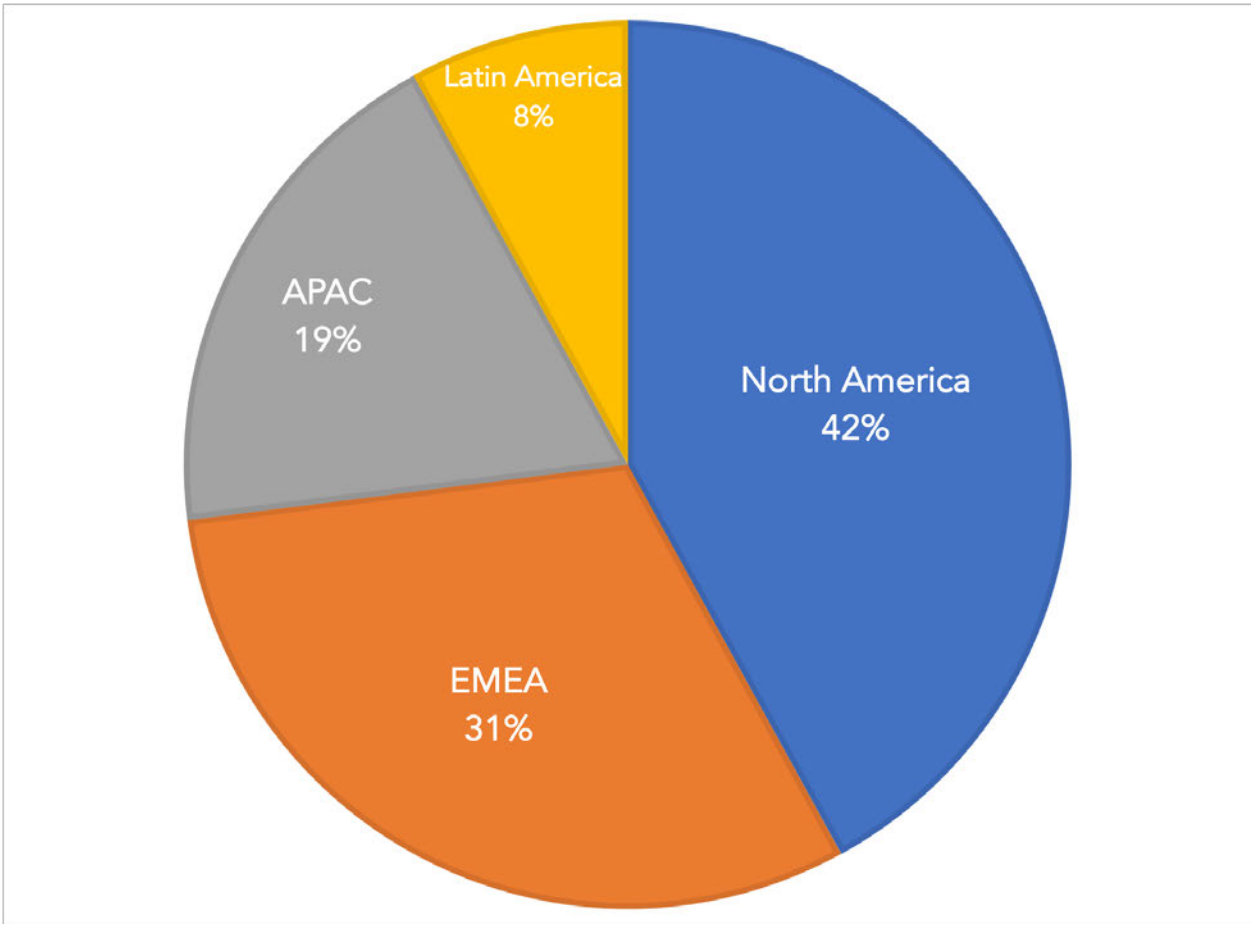


Source: Opus Research (2019)

The Majority of Implementations are in North America

In Figure 4 below, we see the geographical distribution of enterprise intelligent assistant deployments mainly represented in North America (42%) and EMEA (33%). Still, Latin America is becoming a greenfield opportunity for a number of use cases for chatbots, IAs and digital self-service.

Figure 4: Geographic Distribution of EIA Deployments



Source: Opus Research (2019)

Selection Criteria for Today's Solution Providers

In assessing successful investment in intelligent strategies, Opus Research has found a path to reasonable success based on a set of proven guidelines. These decision rules are designed to enhance the prospects for success and avoid the inevitable waste of investment and resources that occur when a company has multiple, duplicate efforts to bring so-called "Conversational AI" into their customer care conversations.

In order to do things right, enterprise success is necessitated with a holistic approach for Enterprise Intelligent Assistants. Among the best practices include:

- **Choose a high-impact use case**: A company is well-counseled to choose a use case whose value will resonate across departments while relying on information from a multiplicity of sources
- **Build a compelling business case**: Brands are paying increasing attention to the lifetime value of their targeted customers
- **Avoid stranded investment**: Think about what can be leveraged from existing solutions that have well served live contact center and webchat agents.
- **Promote high quality conversations**: Recognize tangible differences among all modes of communications and a focus on creating a compelling customer experience
- **Make sure you can measure success**: New tools and platforms help companies define their customers and prospects' digital experiences

Many brands across multiple industries have stepped up to challenges as a natural evolution for the Intelligent Assistance community. More and more, successful initiatives have reduced dependence on third-party "outsourcers" to build expertise in-house as internal staff has the intimate, visceral understanding of company data and vital business processes.

Solution providers from the Enterprise Intelligent Assistance domain bring the Predictive, Analytic, and Cognitive elements of Machine Learning and Natural Language Processing along with their own corpora of categories, intents, utterances and chat transcripts to simplify the processes involved with building a good bot and shorten the time it takes to get results with positive impact on business objectives.

Key Considerations for 2019 EIA Evaluation

The 2019 Edition of the Decision Makers' Guide is driven by the following observations and assumptions:

- 16 firms under investigation: A reduction in the number of firms under study from past years reflects market maturity and consolidation.

- Specialist firms that offer only a small set of features and functions have been removed (e.g. Botanic, FaceMe, Flamingo, Verbio) and firms that no longer specialize in IA (e.g. Aspect Software, Jacada) were omitted from this report. As well, firms who were unresponsive to the questionnaire were not included.

- IBM and Salesforce are included because decision makers already exhibit great interest in development and deployment initiatives around Watson and Einstein, respectively. Much the same can be said about Genesys' KATE, which is more of a framework for conversational customer care using its customer interaction and intelligent routing infrastructure.

Platforms for a Rapidly Changing Market

The community of solutions providers has both grown and changed significantly, in response to market demand. "Pure-Plays" are less predominant and some giants in the cloud computing and CRM worlds are having a huge impact. This, in turn, puts selection criteria in a new light.

The practices associated with enterprises launching a couple dozen bots (for such things as customer support, billing, sales, package tracking and fulfillment, scheduling, etc.) from a couple dozen vendors are giving way to purpose-driven deployments of "Conversational AI" to serve specific, high-impact and profitable use cases.

The decision criteria that are most relevant to the teams responsible for bringing automated virtual agents into the mainstream at scale, differ significantly from those of Innovation groups. A premium is attached to tools and administration consoles for a team of diverse subject matter experts, computational linguists, dialog designers and other specialties that run far afield of common job descriptions for customer care or contact center administrators.

A Balancing Act

Today, the solution providers that promote "openness" and connections to a multiplicity of resources (both proprietary and third-party) that support speed to deploy robust Intelligent Assistants that provide consistently accurate information from a multiplicity of sources are the distinct winners. Yet these selection criteria must be qualified by several reality-based constraints. Some evergreen examples, include:

- **Replacement vs. Augmentation:** Should solutions replace humans (which is the basis of many ROI-based justifications) or augment their performance (a marketed value of many solution providers under investigation here).

- **Bespoke Professional Services versus Out-of-the-Box Capabilities:** Do solution providers pursue a layered approach with core capabilities, plus sufficient support services to assure success.

- **Commodity (Off-the-Shelf) versus Proprietary Resources:** The solution providers promise improved results based on their experience and investments in NLP, ML, predictive analytics and the like are challenged by new competitors who provide speedy access to similar resources form household name third parties like Microsoft, Amazon and Google.

Solution providers differentiated themselves by building accelerators or resources and knowledge bases of industry argot to shorten the time it takes to train a decent Intelligent Assistants. Another differentiator includes support of multiple channels and modalities to extend the IA's reach to increasingly mobile and message-based end-users. Multi-language support is also key to grow use cases across geographies. Finally, reporting and administrative consoles are critical to show whether the IA was achieving key performance indicators (KPIs) or emerging metrics that determined the viability of individual IAs, "chatbots" or proof-of-concepts.

Meanwhile, at the corporate planning level, decision makers seek solutions that promise to take an "open" approach that leverages existing investments in mobile, Web, and contact center infrastructure and personnel, and can augment resources that support knowledge management, analytics and CRM. They are looking to minimize start-up costs and integration expenses while crafting a platform to achieve the often-repeated goal of offering consistently correct actions or recommendation at large scale.

Understanding the Evaluation Criteria

The old guard "pure plays" are pitted against the household name solutions providers in this year's Decision Makers Guide. Here are the fundamentals to interpreting the results. We've retained the same categories from previous years which, distill the criteria as follows:

- **Enabling Platforms & Technologies:** What tools are provided? Core NLU, service creation, data & design, dialog management, AI & machine learning, process automation & knowledge management.

- **Integration Points & Scalability:** What works out of the box ("zero-day functionality")? Modalities and channels supported, customer interaction management, IVR integration & live agent support, level of human-assisted involvement, analytics & reporting, authentication & security.

- **Track Record & Enterprise IA Maturity**: Market presence, highlighted customer deployments, customer engagement strategy, success metrics.

- **Future Plans & Vision:** Vision for enterprise-scale Conversational AI, strategy & technology roadmap, key differentiators.

Therefore, Opus Research has organized a comparison matrix that looks at each of the respondents according to these four overall categories and assigns values according to the following guidelines. This format supports understanding of what each vendor does well. Each business organization should attach its own level of importance (or weights) to these criteria.

Figure 5: EIA Companies Under Review

- **[24]7.ai**
- **Artificial Solutions**
- **Avaamo**
- **Creative Virtual**
- **Genesys**
- **Haptik**
- **IBM Watson**
- **Inference Solutions**
- **Interactions**
- **IPsoft**
- **LivePerson**
- **LogMeIn**
- **Nuance**
- **Omilia**
- **Salesforce**
- **Verint**

Below Opus Research has developed a solution provider comparison chart to help decision-makers evaluate how current enterprise solutions fulfill the requirements of Intelligent Assistance. Using a "Harvey Ball" rating system, Opus Research assesses each vendor's product offerings within the following criteria: Enabling Platforms &

Technologies; Integration Points & Scalability; Track Record & Enterprise IA Maturity; Future Plans & Vision. *[Further criteria definition is detailed below.]*

EDITOR'S NOTE: The 2019 accompanying dossiers contain information provided by the vendors under evaluation in response to a questionnaire and guidelines provided by Opus Research. While the information is directly from vendors, we have made an effort to normalize the responses in order to support comparison by prospective implementers in light of criteria that Opus Research has deemed important based on feedback from decision makers.

Figure 6: EIA Solution Provider Comparisons

	In Brief	Enabling Platforms & Technologies	Integration Points & Scalability	Track Record	Future Plans & Vision
[24]7.ai	AIVA supports of agent-based and automated support, sales and marketing				
Artificial Solutions	Teneo Platform focuses on "enterprise-grade" Conversational AI				
Avaamo	Applies deep-learning software to address high-impact problems				
Creative Virtual	V-Person platform supports omni-channel service and support				
Genesys	Positions Kate as customer's personal guide using AI				
Haptik	Close alliance with Reliance Jio brings impressive opportunity to scale				
IBM Watson	Organic demand for Watson API's defining Watson Assistant				
Inference Solutions	Impressive inventory of pre-packaged assistants				
Interactions	Human-Assisted Adaptive Intelligence				
IPsoft	Amelia supports self-service, conversational RPA, agent assist				

	In Brief	Enabling Platforms & Technologies	Integration Points & Scalability	Track Record	Future Plans & Vision
LivePerson	AI-powered chatbots focus on business objectives				
LogMeIn	Acquired Nanorep; now integrated into Bold 360ai				
Nuance	Solutions span virtual assistance, chat, messaging & authentication				
Omilia	Impressive client base for Conversational Customer Care				
Salesforce	Einstein adds Conversational AI to Service Cloud and Partner offers				
Verint	Alme Enterprise Solutions leverage NextIT & add Verint capabilities				

Source: Opus Research (2019)

Figure 7: Evaluation Criteria Descriptions

Column 1: Brief description of Company, capture Opus Research's POV

Column 2: Enabling Platforms & Technologies: What tools are provided? (Core NLU, service creation, data & design, dialog management, AI & machine learning, process automation & knowledge management)

 - Prepackaged domain expertise including out-of-the-box ability to understand and categorize intents based on aggregation of conversations for "high-impact" business applications

 - "Democratizes IA" easy to use tools for monitoring performance, refining responses; incorporating input from business unit executives

 - Some domain knowledge for limited number of verticals, heavy reliance on PS

 - Reliance on 3rd party resources for core NLU and ML and offers tools for branding and other forms of customization

Column 3: Integration Points & Scalability: What works out of the box? Modalities and channels supported, customer interaction management, IVR integration & live agent support, level of human-assisted involvement, analytics & reporting, authentication & security.

- Support of multiple devices, channels and modalities; minimization of human supervision, superior integration, support of authentication

- Demonstrates ability to add categories and intents quickly; has framework for human assistance and supervision; augmented by analytics; integration with customer service stack

- Integrates of 3rd party resources for ML, cognition, NLU into coherent package

- Largely reliant on 3rd party solutions to solve specific problems

Column 4: Track Record & Enterprise IA Maturity: Market presence, highlighted customer deployments, customer engagement strategy, success metrics.

- Longevity, customer base, documented use cases and case studies

- Multiple deployments, operating history, references

- Limited number of use cases, references

- Just getting started, much in development, largely proof of concepts

Column 5: Future Plans & Vision: Vision for enterprise-scale Conversational AI, key differentiators, roadmap

- Takes a comprehensive end-to-end approach to intelligent assistance and customer journey from search to shopping cart.

- Vision encompasses the latest DNN, ML, NLU, conversation development resources. Fosters growth and longevity through coherent vision

- Focus on results, plans growth through additional geographic areas, verticals or languages

- Specialist with well-developed technologies for point solutions.

APPENDIX A: Company Dossiers

[24]7.ai

Enabling Platforms & Technologies	Enterprise IA Maturity	Track Record	Future Plans & Vision
●	●	●	◔

[24]7.ai
Headquarters: San Jose, CA
Date founded: April 2000
Number of employees: 10,000+
Revenue: private company
Website: www.247.ai/

FIRMAGRAPHICS

- Year business started: April 2000
- Investment/Funding: No recent funding. The company is profitable and self-sustaining
- Number of employees: 12000+
- Revenue (either estimated or publicly available): Privately held company

BRIEF COMPANY DESCRIPTION:

The next generation of customer engagement platform, [24]7.ai AIVA is an industry-leading virtual agent that personalizes effective customer self-service. Already used by Fortune 500 companies in digital and conversational IVR configurations, AIVA is built on a unified platform so that clients can build once, then deploy anywhere across digital and voice channels in multiple configurations. AIVA is the only solution to deliver unified self-service from simple FAQ's to complex, conversational issues and online transactions, all with one end-to end virtual agent.

AIVA is powered by AI, machine learning, and deep neural networks blended with multiple levels of human learning. It leverages predictive, intent-driven personalization for a user-friendly CX that leverages deeper understanding of true customer intent to increase FCR, containment, and NPS. AIVA combines security, scalability and simple integration to other applications and customizable tools for clients that desire more UX control to present a full-scale, enterprise-grade self-service solution.

TECHNOLOGY & MARKET SOLUTIONS
Enabling Platforms: Features & Technologies

- **Speech Processing (ASR/TTS) :** AIVA leverages DNN-based speech recognition technology as part of the algorithm. Also adds multiple layers of data input, NLP, NLU and predictive intent, helpful in complex dialogues with mixed initiatives.

- **Text Processing:** AIVA uses natural language processing, language models and sentence embeddings to analyze the data and improve the VA experience.

- **Natural Language Processing or Understanding:** Understands user inputs expressed in slang, local nuances, and colloquial speech.

- **Data & Design:** [24]7.ai offers pre-packed intents for vertical industries including financial services, healthcare, insurance, retail, telecom, travel and hospitality. [24]7.ai engages with enterprise clients to sift through interaction data to determine top intents/journeys and resolution paths using unsupervised learning algorithms for automation and routing. The out-of-the-box reporting tools are Voices and Intents. All reports can be set to display a graphical representation on the dashboard, be downloaded, switch between graphical and table view, include descriptive text for individual metrics, and limit data access by user group.

- **Dialog Management:** Out-of-the-box includes enterprise-grade tools in Dialogue Management that enable the client to manage the customer journey themselves by editing or creating dialogues. Tools like Content Manager, Modeling Workbench and Voices empower the client with partial or near-complete control over the user experience if they choose those solution options.

- **"AI" / Machine Learning:** AIVA provides unattended services for most customer inquiries. Primary avenues include machine learning or rules-based; either can be initiated internally or by the client. [24]7.ai AIVA utilizes both automated machine learning and human-assisted machine learning. In addition, predictive models designed for a vertical market and/or a specific client's needs are other manifestations of AI and machine learning in AIVA.

- **Process Automation:** Through a partnership with Robotic Process Automation leader Blue Prism, [24]7.ai AIVA now has the capability to access hard-to-access back-office systems in order to processes faster, reduce response time and deliver a more satisfying customer experience by accessing more intents.

Integration Points & Scalability

- **"Zero Day Functionality" :** Supports hundreds of industry specific intents, with more than 70 consumer journeys across multiple verticals. Day-zero models can integrate with third-party AI (e.g. IBM Watson); Best practices for key vertical journeys are captured in pre-built bots, simplifying deployment and ensuring success.

- **Search and Discovery:** AIVA seeks to improve search accuracy by understanding the searcher's intent through intent-tagging activities, including tagging web pages on which chat or self-service is not offered. AIVA then arranges the contextual meaning of terms as they appear in the searchable dataspace, whether on the web or within a closed system, to predict the customer's intent and generate relevant results. Context-free grammar and a top-down parser are both deployed as acceptable semantic search methods by [24]7.ai AIVA.

- **Modalities & Channels:** AIVA works across all channels including Web-based, mobile/smartphone, phone/IVR and chat. Other iterations or integrations include SMS, VPAs, Facebook Messenger, Apple Business Chat, and Google Business Messaging.

- **Intelligent Routing:** [24]7.ai engages with enterprise clients to sift through interaction data to determine top intents/journeys and resolution paths for automation and routing. [24]7.ai applies intents to specific enterprise flow, determine points of CRM/back-end integration, and determine/agree on the appropriate treatment (automate, transfer, follow-up, survey, etc.).

- **IVR Integration**: Offers administration consoles to support for IVR functionality. Cloud-based, AI-powered speech solution.

- **Human Supervision**: Yes, support both human-assisted virtual agents, and supervised machine learning.

- **Support of Live Agents**: Supports both our own live agents, as well as a company's own agents. An agent can take over a bot conversation at any time, and hand the conversation back to the bot to complete the interactions. Bots assist humans and humans assist bots.

- **Integration with Customer Service Stack**: Integrates with CRM and transactional systems. In addition, a partnership with Cloud Elements allows for integration with multiple CRM and help-desk solutions.

- **Analytics & Reporting**: Reporting for AIVA is carried out by [24]7.ai Insights: 1) Supports key engagement, revenue and operational data 2) Provides In-channel and cross-channel data and analytics 3) Provides data monitoring and alerting capabilities.

- **Authentication & Security**: Sensitive data is encrypted at rest and in transit. The [24]7.ai solution is audited by third parties on an annual basis. Browsing information is collected, anonymized, and handled in compliance with security policies agreed upon jointly with the client.

- **Ability to Support Multiple Use Cases**: Excels at handling complex conversations and deployments, particularly when a consumer has multiple intents.

Track Record & Enterprise IA Maturity

- [24]7.ai has virtual agents deployed at more than 100 companies, in every major industry. Based on hundreds of industry-specific intents and more than 70 consumer journeys across multiple verticals. Handles more than 36M chat interactions and 1.3B self-service interactions per year.

- **Highlighted Customer Deployments**: DISH (Media and Entertainment), SiriusXM (Media and Entertainment), Hilton (Hospitality), Marriott (Hospitality), Optus (Telecom)

- **Customer Engagement Strategy**: Offers several components via a Customer Engagement Cloud that can be quickly deployed and turned on as needed. Companies can start very quickly with Conversational AI, and can extend other AI technology such as IBM Watson. These models can be tuned and optimized over time.

- **Recommended Success Metrics**: [24]7.ai has pioneered the "cost-per-resolved-conversation" (CPRC) model. CPRC is the first model to look at costs holistically, and is calculated by looking at three things: 1) Costs driven by technology 2) Costs of the agent services 3) Costs of channel hopping (and repeat contact)

Future Plans & Vision

- Leverage the power of AI to drive smarter, more secure automation on voice, digital and mobile-based self-service channels, while maintaining a consistent brand experience with personalized, "near-human" conversations.

Key Differentiators:

- Unique Blend of AI and HI - Work together to reduce average handle time and boost efficiency, while consumers can self-serve and effortlessly escalate to a human agent when needed.
- Two decades of unparalleled expertise in customer journeys across all channels
- Proprietary Insights - [24]7.ai holds more than 150 patents and patent applications, including several specifically related to artificial intelligence and customer experience.

ARTIFICIAL SOLUTIONS

Enabling Platforms & Technologies	Enterprise IA Maturity	Track Record	Future Plans & Vision
			

Artificial Solutions
Headquarters: Stockholm, Sweden
Website: www.artificial-solutions.com

FIRMAGRAPHICS
Year business started: *2001*
Investment/Funding: Several rounds of funding since 2001; company listed on Nasdaq First Northon (March 2019) after completing a reverse IPO. See: https://www.artificial-solutions.com/investor-relations
Number of employees: 120
Revenue (either estimated or publicly available): ~$25m (estimated 2019)

BRIEF COMPANY DESCRIPTION:
Artificial Solutions® enables enterprises to rapidly build conversational AI systems, allowing users to converse with applications and electronic devices in free-format, natural language, using speech, text, touch or gesture. Delivered through Teneo®, an ultra-rapid AI development and analytics platform, Artificial Solutions' technology allows business users and developers to collaborate on creating sophisticated, conversational applications in 36 languages, running over any OS, on any device, without the need for specialist linguistic skills.

TECHNOLOGY & MARKET SOLUTIONS
Enabling Platforms: Features & Technologies

- **Speech Processing (ASR/TTS):** The Teneo Platform supports voice as an interface through integration with third-party ASR/TTS providers, including previously integrated with Google, Apple, Microsoft and Nuance.

- **Text processing:** Fully multi-modal and supports text, voice, touch and gesture within the same conversational solution.

- **Natural Language Processing or Understanding**: NLU engine uses multiple technologies including logistic regression algorithms and patented syntax language leveraging own linguistic ontologies for intent recognition. Also ships with pre-trained ML technologies for NLU which can be leveraged within Teneo's syntax language including Named Entities, POS and Morphological information, e.g. shallow parsing. The Teneo Platform has an open architecture allowing additional NLU/NLP tools to be plugged in to both pre- and post-processing chains. Currently supports 36 languages.

- **Data & Design:** Ships out-of-the-box with Teneo Language Resources. These map out the structure of 36 languages (built using ML algorithms to recognise and process multiple intents). Pre-built industry domain packs are also available, Data labelling is delivered through Teneo Discovery, a comprehensive data mining and labelling tool for use with unstructured conversational data. The suite is comprised of two modules: Teneo Discovery and Teneo Inquire. These tools enable enterprises to utilise massive amounts of raw, unstructured conversational data from sources such as virtual assistants, bots, live chat, call transcripts and emails.

- **Dialogue Management**: Dialogue state includes stack-like structure, which holds information about the currently active flows (tasks). Each active flow has access to its own set of instance data, flow variables, as well as session variables shared by all flows. The Teneo architecture allows for advanced and flexible dialogue behaviour. All this is managed in Teneo Studio, which is the graphical IDE where all aspects of natural language solution creation, maintenance, testing and deployment are managed. Teneo supports the automated import of language flows and language objects (for intent recognition) and a unique Master-Local structure to support deployments of the same solution to multiple regions and languages.

- **AI / Machine Learning**: Has patented hybrid approach that combines the best of linguistic and machine learning models so enterprises can quickly build business-relevant AI applications. Rules or statistical algorithms can be used or combined as required (e.g., depending on the availability of quality, annotated data) to deliver maximum value. Teneo can incorporate statistical algorithms in a transparent manner if data are available. If no data are available, Teneo comes with the tools to collect data and expand the rule-based resources as well as train statistical algorithms.

- **Process Automation**: Can be integrated with RPA systems/platforms; architected from the ground up to support integration with external systems that supports access via webservices, or a Java API.

Integration Points & Scalability

- **"Zero Day Functionality"**: Fully functional out-of-the-box; no limit to the number of

categories or intents which may be created.

- **Search and Discovery**: Teneo Discovery is a comprehensive data mining tool for use with unstructured conversational data. May be easily integrated with systems of record such as databases, knowledge banks, etc, to retrieve the current, best answer for a particular user inquiry.

- **Modalities & Channels**: Supports any messaging platform that provides an Open API. Currently have connectors for web chat, Facebook Messenger, Skype, Skype for Business, Slack, Microsoft Teams, the Microsoft Bot Platform, Telegram, Cortana and the Google Assistant.

- **"Intelligent Routing"**: Supports intelligent routing and handover to human agents based on business rules defined by our customers themselves. Examples of when a conversation might be routed include:
    - The bot does not understand the user twice or more in succession;
    - The bot detects the users is angry or upset;
    - The user directly requests transfer to a human agent;
    - The user asks for assistance not currently in scope for the bot;

  Such routing can be to virtually any type of customer support channel including live chat, call-back, call centre, email, messenger platform, etc. In general, a transcript of the conversation up to the point of handover is also provided to the human agent along with a brief summary of the user's issue to avoid the need for repetition once a conversation has been routed.

- **IVR Integration:** Fully supports integration into IVR systems such as Genesys, Avaya, Finesse, Twilio and more.

- **Human Supervision**: Supports a self-learning loop involving human supervisions where humans can review and implement/reject suggestions from the engine for improvements to both the structure of the solution itself as well as to training data used for the machine-learned classifiers.

- **Support of live agents**: Can be used to support live agents when automatically routed to/through a Teneo engine to provide an agent with a suggested answer to a user query. In addition, live agents can use an internal bot for quick access to information they may not yet be aware of or trained on.

- **Integration with customer service stack**: Teneo VCAs have been integrated with many of the most common CRM (and ERP/CMS) systems. These include Salesforce, SAP, eGain, RightNow and other forms of semi-automation for customer service such as live chat, e.g. Live Person. Has comprehensive support for new integrations.

- **Analytics & Reporting:** Teneo Data allows building comprehensive BI dashboards using the patented 'Teneo Query Language' with Teneo Inquire, allowing clients to view both aggregated data (trending graphs) and non-aggregated datasets (conversation input and responses) within a single application. Teneo Inquire is a live data feed of the solution in near real time accessed via a RESTful API, allowing conversational data to be plugged in to existing BI tools, integrated into data warehouses and augmented to provide additional insight. Data access is via the proprietary Teneo Query Language (TQL), whose syntax is similar to SQL, allowing business analysts to quickly start creating complex queries to extract value from voice of the customer data.

- **Authentication & Security**: Authentication for the end user would be implemented within either the solution itself (an integration connecting to an authentication server), the deployed application (webpage, mobile app, etc requiring a login before it can be used) or a combination of the two (deployed application generates a token passed to the solution at runtime to be authenticated).

Track Record & Enterprise IA Maturity

- **Market Presence:** Over 200 customers globally; top 5 verticals are Telecom, Banking, Insurance, Automotive and Retail. Many different use cases, customer facing or for internal processes, through many different channels such as web chats, mobile apps, smart home apps, in-car communication, messaging tools, etc.

- **Highlighted customer deployments:** New customers recently closed include Jack in Box, Medtronic, Folksam, Sony, Cigna, TIAA, Circle K, Volkswagen Group, Shiseido, and Continental. Other major customers who have been with Artificial Solutions for some time include Vodafone, Shell, AT&T, Volvo, Skoda, Telenor, NTT, MPS, Webank, Widiba and more.

- **Customer Engagement Strategy**: Have both a direct sales channel and work through partners who tend to be either the larger, multinational system integrators, enterprise focused technology giants looking to extend their AI/NL capabilities and digital agencies. Pricing model is typically based on a license fee for the Teneo Platform, a variable 'success-based' usage element typically based on overall sessions or successful interactions (the usage element is typically purchased in blocks) plus a support & maintenance element and hosting (if required as clients may self-host) Additionally, there may be a professional services implementation element to the project depending on whether the client implements themselves, works with one of our integration partners or uses Artificial Solutions' own PS resources. The length of deployment is highly dependent on the scope and complexity of the project.

- **Recommended Success Metrics:** Artificial Solutions works with the client at the

outset of a project to agree relevant success metrics and they are often directly related to the client and their industry focus. Typical examples of KPIs recently used include:

- Percentage improvement in customer conversions (after implementation of EIA)
- Number of service calls successfully completed
- Percentage of overall customer service calls handled automatically
- Reduction in call volume to call centre
- Customer satisfaction with EIA
- Number (or percentage) of intents successfully recognised
- Number of queries hitting the safety net

Future Plans & Vision

At a capability level, Conversational AI technology will rapidly start to deliver even more humanlike, conversational systems that are truly able to hold long, complex conversations around a broad range of topics and provide in-depth knowledge on specific subjects. This will ensure that Conversational AI based systems are able to solve complex issues and at the same time engage, entertain, socialise and exhibit emotional intelligence.

Key Differentiators:

- Enterprise - Offer automated coding to aid speed of development, web-hooks to allow flexible integration with external systems, and ease of portability to new services, devices and languages.
- Data – Allow enterprises to maintain ownership of their data & offer data analytics package for drilling down through the information and understanding the context of conversations, as well as the level of detail provided.
- Hybrid - Most AI development tools today are either linguistic or machine learning models. Both have their drawbacks, so a hybrid approach makes most sense.

avaamo

Enabling Platforms & Technologies	Enterprise IA Maturity	Track Record	Future Plans & Vision
			

Avaamo
Headquarters: Los Altos, CA
Website: https://avaamo.ai/

FIRMAGRAPHICS
Date founded: 2014
Investment/Funding: $23.5M
Number of employees: 105
Revenue (either estimated or publicly available): >$20M (estimated for 2019)

BRIEF COMPANY DESCRIPTION:
Avaamo is a conversational AI platform for large enterprises. Avaamo's proven technology is deployed by 100+ enterprise customers, automating millions of interactions each day in 29 languages across 40 countries. Avaamo has developed fundamental AI technology across a broad area of neural networks, speech synthesis and deep learning to make conversational computing for the enterprise a reality. Avaamo tightly integrates tooling, data, and enterprise connectors to ensure designers, data scientists, and developers can design and deploy complex conversational applications in weeks.

TECHNOLOGY & MARKET SOLUTIONS
Enabling Platforms: Features & Technologies

- **Speech Processing: ASR/TTS:** Uses neural network-based recognition to provide better understanding of speech, accurate mapping of the user intent via domain-specific intent recognition. Avaamo's patent-pending technology matches speech to the specific domain and provides for a significant better match on the intent and a significant increase in accuracy of intent matching and better quality of responses.

- **Text processing:** Apply several methods to process text:
  Unsupervised Deep Learning: Avaamo Data Categorization service eliminates a lot of

the traditional machine learning pipeline activities using a combination of intelligent preprocessing, query identification, and unsupervised classification. This ensures a high degree of accuracy within a few days of getting started. Each chat utterance, voice intonation, emoji, and exclamation mark continually reinforces a positive learning loop.

Supervised Learning and Expert Review: Using a series of easy-to-use review tools within the Data Categorization service, subject matter experts can quickly sample and review the accuracy of the unsupervised classification process.

- **Natural Language Processing or Understanding:** Extensions to recurrent Artificial Neural Network algorithms are aimed at maximizing accuracy and recall for varying levels of complexity on the dataset. These extensions include multiple dimension reductions for untagged, unstructured data covering both text and speech. This improves the detection of false positives as well as domain-based accuracy resolution. Avaamo's NLU Engine applies syntactic, semantic, and stochastic processing to distill and discover the purpose behind the user's message. To speed entity extraction and matching, Avaamo's NLU engine comes pre-built with 1000's of entities, but also enables developers to create their custom multi-hierarchical entity definitions with associated dependencies. Engine can not only detect the appropriate tone and sentiment of the user query but also use additional dimensions including user conversation history, goals achieved, user feedback and accuracy of prediction to make a more contextual prediction on the user tone.

- **Data & Design:** Pre-built ML models with more than 275 pre-built domains for key verticals such as telecom, manufacturing, retail, financial services, insurance, and healthcare. Data services layer can classify and create meaningful intents from various unstructured enterprise data sources. Irrespective of the data - whether it's unstructured chat transcripts, voice transcripts or search logs - classification algorithms can work in "unsupervised" mode and can extract the top intents and associated entities with good accuracy and fit. These classified intents can be further refined using our tools and expert supervision.

- **Dialog Management:** Offer multiple design and conversational patterns for dialogue management, ranging from multi-turn conversations to simple inference response from documents. We support multiple ways to design and implement dialog creation and management including Knowledge Inference and Knowledge Graph; multi-turn goal-oriented conversations; tabular inference engine and auto-generated conversations. Offers 200+ business app integrations out of the box.

- **"AI" / Machine Learning:** Implements various ML techniques, some of which can be seen here: 1. Pre-built vertical ML Models that drastically reduce the time and effort it takes to create a conversational bot that is already pre-trained for the domain, 2.

Advanced NLU to predict the right intent, 3. Data Science automation to make sense of various structured and unstructured sources of information, 4. Knowledge graph to take various data sources and documents and convert them into NLU ready knowledge repositories.

- **Process Automation:** In large enterprises sometimes the data is in documents, Sharepoint repositories or other knowledge repositories. Data from these structured information sources can also be utilized for generating the response. Using rich domains and combined with the parsing technique, Avaamo can construct knowledge graphs that can significantly enhance the accuracy of results coming from these data sources.

Integration Points & Scalability

- **"Zero Day Functionality":** Avaamo platform comes with the following capabilities out of the box:
  - Pre-built domains: 275+ Pre-built domain models across various verticals as detailed https://avaamo.ai/vertical-ai-models/
  - Pre-built knowledge packs: Knowledge packs ranging from greeting, frustration detection, Praise, Assertions, Agent transfer, smalltalk are pre-packaged and made available.
  - Pre-built integrations: 200+ pre-built integrations to various business applications
  - Pre-built channels: from Consumer Messaging channels(FB Messenger, Whatsapp, Skype) , Social Media channels (FB), Enterprise messaging channels (Skype for business, Slack, MS Teams), Corporate channels (Web, Portal), Smart Speakers (Alexa, Google Home, Google Assistant), Voice (Phone)

- **Search and Discovery:** Avaamo's Knowledge graph provides relevant and accurate information to employees by analyzing and organizing content, including documents, procedures, or product manuals. Avaamo's Knowledge graph has out-of-the-box seamless integration into content management platforms like Sharepoint, IBM ECM, Adobe Experience Manager, Box and provides a single pane of glass to turn a previously static, unintelligent system into a dynamic, intelligent knowledge engine

- **Modalities & Channels:** Provides omni-channel and multi-channel support, including: voice, phone, SMS/MMS, webchat, smart speakers, FB Messenger, WhatsApp, Skype, Slack.

- **"Intelligent Routing":** Integrates with various Customer Interactive Management as well as Workforce Management platforms from NICE, Avaya, Genesys, LivePerson, 8x8 and continuing to explore partnerships with similar vendors in the space.

- **IVR Integration:** Details about conversational IVR support can be located here https://avaamo.ai/conversational-ivr/ - Integrate with most of the common enterprise IVR platforms like Cisco, Genesys and Avaya.

- **Human Supervision:** Avaamo enables supervised learning through a data services layer that can classify and create meaningful intents from various unstructured enterprise data sources. These classified intents can be further refined using tools and expert supervision. Additionally, unhandled messages are constantly analyzed, and new utterances/training data and new responses are automatically fed back into the bot for it to learn. The learning is a combination of both user feedback (supervised) as well as based on learning from the trained domain to disable bias well as incorrect user feedback. However, in practice most enterprises disable the automated learning feedback loop and instead choose a "supervised" approach to review the suggested training data and suggested new intent generation

- **Support of live agents :** Support integrations with multiple Live Agent products as well as various rules can be applied for the Live Agent trigger. Integrate with Live Person, 24x7, Zendesk, IMIChat, Kana, RightNow, Salesforce, Genesys and several live agent and WFO software products. Avaamo live agent integration allows the virtual assistant users to connect to a human agent across web, mobile, social media or phone channels. The user and agent can communicate directly with each other without the need for the end user to transition between different channels or different chat windows.

- **Integration with Customer Service Stack:** Has 200+ integrations out of the box that can be used to connect to various backend systems to help automate transactional use cases. Avaamo offers connectors/business app integrations out of the box, for a conversational-ready integration using inference engine that is able to connect to the data sources and automate conversations.

- **Analytics & Reporting (backend integration, key metrics, IA success factors)** Bot developers can get real-time insights on how their users are interacting with the bots and how quickly and effectively the bot is able to respond and resolve customer queries across all channels. They can also drill down to popular intents, channel specific usage, goal specific metrics and other business metrics that can help drive better customer experiences.

  Some of the key analytics capabilities in the platform include:
    - User journey: visual view of how users are utilizing the assistant and how they interact within the context of a specific intent - where they drop off; where the bot needs more training; results of A/B testing; feedback specific to intent; can all viewed in one place

  - Insights across channels: Drill down specific to channel, intent, timeline, user, usage - all the way down to the specific conversation
  - Unhandled Messages: View, train and test through various supervised and unsupervised training mechanisms all from a single interface
  - User feedback/surveys: View results of surveys (bot developer can use our pre-created templates of surveys) and user feedback and drill down straight to the conversations.
  - Integrate: Integrate all analytics into existing analytics tools like Adobe, Google Analytics or any analytics platform of choice

- **Authentication & Security:** Provide for a variety of authentication methods, including unique user ID and voice biometrics. Also compliant with a number of standards, including GDPR, HIPAA, ISO 27001, NIST 800-171, SOC 2 Type II, and more.

Track Record & Enterprise IA Maturity

- **Market presence:** More than 100 large enterprise customers in 40 countries. Use cases: Customer Service, Supply Chain Automation, IT Service Desk, Sales, Marketing, Human Resources

- **Highlighted customer deployments:** UCHealth – healthcare**;** Pep Boys – retail; ABInBev, VW - supply chain management**;** Ericsson, Celcom, Guam Telecom – telecom**;** Birla Sun Life – insurance**;** Reliance Capital - financial services

- **Customer Engagement Strategy**: Typical engagement with a customer as well as the various phases of engagement and activities involved are shown below. This implementation journey is part of Avaamo's broader client engagement strategy in making sure customers have a successful implementation

- **Recommended Success Metrics:** Enterprise customers depending on the use-cases and the audience have various business success metrics. A sample of success metrics include:
  - Platform metrics: % Accuracy (steady state)**.** % Recall (Steady state)**,** F1 score**,** Interactions (by Channels, Geo, Intent types), Business processes automated, Goals achieved (User journey), Languages used, Documents processed, Custom domains, Knowledge objects, Vertical ML models, Regression test suites, Response time, SLA, Production clusters
  - Business Metrics: Call deflection, Cost per call, Conversation rates, AHT, Ticket reduction, Customer satisfaction, Employee satisfaction, Support cost per agent, Boost in revenue based on worker productivity, retention

Future Plans & Vision

Avaamo targets VLE (very large enterprises) that have $5B+ in revenue and are typically multinational or in regulated industries that need an enterprise-grade conversational AI

platform. Have a hybrid go-to-market strategy with both a direct sales team as well as a partner channel. Primary focus remains in 6 key verticals: Healthcare, Retail, Manufacturing, Insurance, Telecom, and Financial Services. Our focus remains in US and European customers and certain Asian countries. Also building out partner channels across additional implementation partners as well as technology partners especially in adjacent space like RPA (already have partnerships with UIpath and Automation Anywhere).

Key Differentiators:

- Pre-built Vertical ML Models: Comes with over 275 prebuilt vertical AI ML models to give enterprises a head start in implementing conversational assistants in Banking, Insurance, Telco, Retail, Manufacturing and Healthcare.

- Enterprise Ready: Platform ready for (VLE) very large multinational enterprises where scale, security and compliance are critical. Scaled to support millions of interactions per day on the platform and compliant with HIPAA, SOC2, FINRA standards and also provide large enterprises multiple deployment options: Cloud (across multiple regions), On-premise or Hybrid environments

- Pre-built integrations: Avaamo Conversational platform comes inbuilt with 150+ integrations to various backend applications ranging from CRM, SCM, Document Lifecycle, Purchasing, Finance enterprise applications.

creativevirtual
The science of conversation™

Enabling Platforms & Technologies	Enterprise IA Maturity	Track Record	Future Plans & Vision
			

Creative Virtual
Headquarters: London, England
Website: http://www.creativevirtual.com

FIRMAGRAPHICS
Year business started: Founded in 2003
Investment/Funding: No outside funding or investors
Number of employees: 120
Revenue (either estimated or publicly available): Private

BRIEF COMPANY DESCRIPTION:
Creative Virtual, winner of the Queen's Awards for Enterprise: Innovation 2017, is a global leader in conversational self-service solutions that bring together humans and artificial intelligence to enable anywhere, anytime customer and employee engagement. Our innovative virtual agent, chatbot and live chat solutions, backed by our award-winning knowledge management and business intelligence platform, empower organizations to provide consistent, accurate, personalized and seamless omnichannel engagement across all contact channels.

CORE INTELLIGENT ASSISTANT PRODUCTS AND SERVICES:

- V-Person™ (virtual agent) – V-Person Web, V-Person Mobile, V-Person Social Media, V-Person Contact Centre, V-Person Service Desk
- V-Person Live Chat™
- V-Portal™ (knowledge management, workflow management and business intelligence platform)

- **Natural Language Understanding**
  CV's virtual agents are conversational self-service solutions designed to understand user intent and engage in natural language conversations. Currently support 20 languages (English, Dutch, Finnish, German, Spanish, Turkish, Swedish, French, Italian,

Norwegian, Latvian, Indonesian, Traditional Chinese, Simplified Chinese, Arabic, Polish, Danish, Russian, Hindi, Filipino) – along with variations of those languages, such as British English and American English, with additional languages delivered soon. Solutions are text-based but can be integrated with any voice technology.

- **Dialog Management**
  V-Portal is for knowledge management, workflow management and business intelligence reporting platform that backs all virtual agent/chatbot and live chat implementations. Content is created in the tool, aided by semantic search functionality that facilitates quick and easy identification of similar content. Content categorized by product, line of business, channel or use case and business rules can be created around buyer attributes to configure unique responses. V-Portal allows for the design, testing and deployment of conversation flows (decision trees) with easy-to-use drag and drop tools. Principal scripting language is Python, and integration is possible with any database, Web Service, CRM or business intelligence platform.

- **Machine Learning / NLP**
  NLP is the backbone for virtual agents/chatbots. Have developed a hybrid approach to self-learning that combines human input with machine learning in a way that creates efficiency and predictability for both organizations and their customers. Approach brings together human curation of content, feedback loops, semantic matching, statistical self-learning, neural networks and user surveys in a way that allows systems to continually improve while also enabling enterprises to maintain control over the reliability of the virtual agent responses.

- **Process Automation**
  Knowledge management, workflow management and business intelligence reporting platform backs all virtual agent/chatbot and live chat implementations. It allows for management of permissions and workflows from content creation, approval, revision through to publishing. The audit trail provides strong levels of accountability for content authors and other users of the system. Users can ensure accountability, accuracy and guard against data loss with automated regression testing, version history and roll back functionality.

- **Authentication**
  V-Person is recognized as the first virtual agent product to deliver personalized answers through integration with user account information. Can be integrated with Single Sign-On (SSO), CRM systems and other personalized account information to provide responses specific to that user. V-Person can integrate with any authentication and biometric system, and can also control the authentication process directly.

- **Human Involvement**
  V-Person can be integrated with any live chat system to provide seamless escalation

from virtual to live agent. Allows for deeper integration through the use of the same knowledgebase being used to power the self-service virtual agent. As customers ask questions, the platform automatically presents live chat agents with the response found in that knowledgebase. Agents have options to reply with the answer as it appears, send an edited version of the text or type in their own response. They can also submit real-time feedback on content through the unique feedback loop, thus enabling agents to help keep content accurate and consistent for both virtual and live agents.

- **Analytics & Reporting**
  Via V-Portal - The platform collects the data from every conversation and translates that data into dashboards and charts that provide multiple, tacit views of what customers are saying, thinking and feeling. Organizations can identify gaps in their content and obtain key metrics on call deflection, containment/first contact resolution, conversions and satisfaction rates for each interaction in real time.

- **Multi-channel**
  Ability to deploy virtual agents/chatbots and live chat across devices and channels with a single knowledgebase. Answers can be customized by channel, for example, providing a shorter response on a mobile. Our solutions can be deployed on web, mobile, social, messaging platforms (such as Facebook Messenger), SMS, contact center, service desk, live chat, IVR and voice assistants (such as Amazon's Alexa and Google Home). Because all channels are backed by a single knowledgebase, users receive consistent information across contact channels.

- **Track Record**
  Creative Virtual has been providing virtual agents/chatbots for over 14 years, and the company's very first customer is still a customer today. We have a strong presence across a wide variety of industries, and are particularly strong in Financial Services with customers including Lloyds Banking Group, HSBC and Chase. In 2017 we were awarded The Queen's Awards for Enterprise: Innovation 2017 for our innovative V-Person and V-Portal technology and the outstanding commercial success the company is achieving because of these innovations. We are also strong in developing and supporting partner networks, which is allowing us to develop more markets and offer more innovation.

- **Affordability / Speed to Deploy**
  Depending on the size of the deployment and integration required, the solution can be deployed within a couple of weeks.

Customer Engagement Strategy

- PoC with no commitment
- PoC to scaled solutions

- Full deployment from day 1

Revenue Models

- Perpetual license
- Unlimited annual user license
- Annual concurrent user licenses
- SaaS
- Cost per response
- Cost per session
- Cost per successful interaction

Highlighted Customer Use Cases:

- HSBC Hong Kong – Virtual assistant Amy is available on desktop and mobile in English, Traditional and Simplified Chinese
- Octopus – Virtual customer assistant Helen communicates with thousands of Octopus users in Hong Kong Cantonese
- BT – The embedded virtual agent for BT in the UK is integrated with their Oracle/RightNow system to pull excerpts from their existing help articles

Key Differentiators:

- Knowledge management, workflow management and business intelligence reporting platform backs all virtual agent/chatbot and live chat implementations.
- Creative Virtual has been providing virtual agents/chatbots for over 14 years, and the company's very first customer is still a customer today

Enabling Platforms & Technologies	Enterprise IA Maturity	Track Record	Future Plans & Vision
◑	●	◕	◑

Genesys
Headquarters: Daly City, CA
Website: www.genesys.com

FIRMAGRAPHICS
Year business started: 1990
Investment/Funding: Acquired by a private equity firm Permira in 2012; Hellman & Friedman LLC $900 million investment (2016)
Number of employees: 5,000 employees
Revenue (either estimated or publicly available): $1.5 billion (2018)

BRIEF COMPANY DESCRIPTION:
Genesys AI powers exceptional customer and employee experiences with real-time predictions, speech and text analytics, routing decisions, self-service automation and more. Kate, powered by Genesys AI, acts as your customer's personal guide – anticipating needs and solving problems so effectively that customers may not need your employee's help. Kate also acts as your agents' personal assistant – empowering them with context, real-time recommendations and training.

Genesys provides a central orchestration, reporting and management platform that is integrated to every channel to support omnichannel interactions and context sharing including the ability to monitor, control and report on third-party bots connected to the Genesys platform. This open AI approach enables customers to mix and match AI capabilities from native Genesys sources as well as third parties whilst remaining in control of the entire experience (including the administrative experience).

Products powered by Genesys AI & Kate include:
- **Altocloud** – proactive engagement and tracking of sales and marketing activity across

channels in the cloud

- **Genesys Designer** – Dialog management for omnichannel intelligent assistants – natively created in Genesys or from native and third party (e.g. Genesys Dialog Engine, Google Dialog Flow, Amazon Lex and select 3rd parties). Design the dialog once and deploy on any channel. Designer includes pre-built MicroApps for common business process and business user interface.
- **Genesys Dialog Engine** - Natural Language Understanding and AI engine that integrates with Genesys Designer to drive conversational dialogs across voice and digital channels
- **Speech Services Gateway** - Speech services gateway that orchestrates the use of transcription, and can leverage third-party transcription and text-to-speech services like Google and Nuance.
- **Genesys Knowledge Centre** - Knowledge management tool that is exposed to agents and consumed by bots to combine static knowledge as well as transaction handling across voice and digital channels
- **Genesys Voice Platform** - platform to playback AI driven dialogs from Designer and Dialog Engine over the phone and recognize input via ASR engines, supporting voice bots / intelligent assistants
- **Genesys Digital Channels** - Cloud-based service enabling integration of digital channels to Genesys customers. Supports web and mobile chat, social, messaging, and SMS channels that enable chatbot (intelligent assistant) conversations.
- **Genesys Predictive Routing** - routing based on statistical models and machine learning to more accurately route interactions to individual agents based on business outcomes
- **Genesys Workspace Web** - omnichannel agent desktop that integrates with Genesys Intelligent Assistants including Google Contact Center AI

TECHNOLOGY & MARKET SOLUTIONS

Enabling Platforms: Features & Technologies

- **Speech Processing: ASR/TTS:** Google, Nuance
- **Text processing:** Google Speech to Text
- **Natural Language Processing or Understanding**
    - Genesys Dialog Engine
    - Tight integration with Google Dialogflow, Amazon Lex, IBM, Genesys Dialog Engine, and soon Microsoft Luis
    - Open platform for any 3rd party NLP with multiple vendors on our AppFoundry to service domain and language specific customer requirements

- **Data & Design:** Micro-apps - pre-built applications for rapid deployment of commonly required functions within a self-service system that can be used across all channels; Drag & Drop interface; Dialog Engine – model training & evaluation; Full reporting on bots and post-intent identification journey

- **Dialog Management:** Genesys Dialog Engine, Google Dialogflow, Amazon Lex (for intent building)
    - Genesys Designer (creation tool and scripting tool)
    - Support for conversational, directed dialog and hybrid (adaptive based on context)
    - Business User Interface with zero scripting (scripting can be enabled if required)
    - Pre-built business processes for speed to market of Intelligent Assistants based on vertical
    - Design once, deploy across channels (voice, messaging, etc.)
    - Personalization – built in interceptors and shock absorbers to personalize based on customer, context or capacity of the contact center
    - Personas – ability to easily support different personas based on language or demographic

- **"AI" / Machine Learning**
    - Genesys Altocloud uses machine learning to predict the likelihood that a customer will achieve a specific milestone within the customer journey (purchase of product, support request, account cancellation). This information can prompt predictive engagement through a web chat.
    - Genesys Dialog Engine (NLU uses self-improving, problem solving)
    - Predictive Routing (automated learning, self-improving, problem solving)
    - Currently, sentiment analysis is only done post-interaction. The analysis can then be utilized in the feedback loop to improve interaction performance, e.g., Was that customer happy with self-service? If not, were they transferred to the correct agent? This type of information can optimize the IA and clarify a different routing strategy (Genesys Predictive Routing) in the future for that specific customer.

- **Process Automation**
    - Genesys Intelligent Workload Distribution optimizes back-office processes with continuous reprioritization to meet SLAs and match the right work to the right employee
    - Genesys Knowledge Center (knowledge management)
    - RPA solutions are partner led

Integration Points & Scalability

- **"Zero Day Functionality"**
    - NLU integrations 1st & 3rd party
    - Micro-apps and Pre-built NLU models (Banking)
    - Easy to use interface
    - Omnichannel capability & Blended AI
    - Reporting solution

- **Search and Discovery**
  - Micro-Apps – provides task completion application for self-service functions like address change, bill payment, identity and verification, and more.
  - Knowledge Center provides information for commonly asked questions

- **Modalities & Channels**
  - Voice; Web and Mobile Chat; Email; SMS/MMS; Facebook Messenger; WhatsApp (roadmap: Apple Business Chat)

- **"Intelligent Routing"**
  - At a basic level, interaction steering to the correct workgroup can be identified by the bot through a triaged conversation. The evolution of this is Genesys Predictive Performance, which uses machine learning, leveraging available data to find the right patterns that create the right match between customers and the best resources.
  - The IVA could escalate to an agent if the customer: (a) asks a difficult question and prompts "yes" to speak with an agent; (b) asks a difficult question and the IVA automatically transitions to an agent; or (c) reaches a portion of the interaction where agent escalation is by design (post-identify verification, or regulatory needs for self-service).
  - Context of chat will alter routing and use of Predictive Routing enables business outcome driven routing

- **IVR Integration**
  - Genesys Designer is an IVR tool, also supports wide variety of third-party IVR platforms.

- **Human Supervision**
  - Dialog Engine (NLU supervised machine learning)
  - Assisted feedback loop in Knowledge Center to identify if knowledge articles are correct and which articles are positively rated.
  - Certain portions of the conversation might be repeatable, such as appointment scheduling, payment processing, or new-address capture. The agent can put these portions of the conversation on "auto pilot," letting the system collect the information and prompt for the questions during this specific portion of the conversation. The agent can step in at any time and can fully take over once the automatable piece is complete.

- **Support of live agents**
  - The agent interface has a pane on the right side that enables agent assist to provide context during the current interaction. Agent Assist displays suggestions in the form of notifications within the agent desktop by proactively surfacing knowledge articles/FAQ suggestions during a live voice or chat

interaction (between a customer and live agent).

- **Integration with customer service stack**
  - The solution is able to integrate with CRMs using data actions (API). This is commonly done for leveraging data, updating CRM records, and would operate like any other data source for handled interactions.
  - Genesys Interaction Analytics (GIA) leverages recorded customer interactions and analyzes each interaction for business topics and events; the system "listens" to conversations between customers and contact-center agents, identifies the topics discussed, and categorizes what took place within each interaction

- **Analytics & Reporting**
  - The Bot Dashboard provides a dashboard-style summary that can be used to evaluate the impact of chatbots, including visualizations of session and message volumes, and breaks down sessions based on whether bots, agents or both were involved. The dashboard report organizes data on the following tabs: Session durations; How many sessions were initiated, started, interrupted, or failed; Information about the number of messages sent and received by bots
  - Omni-channel reports around raw data and customer journey reporting; standard self-service reports are:
    - interaction summary
    - interactions per day
    - interactions per time of day
    - interaction results
  - Interactions with bots are treated like other interactions within Genesys. All interactions generate data within the Genesys reporting infrastructure, and can inject data into other customer systems, such as CRM, etc., through REST interfaces. Data retrieved from other systems can be added to the customer journey information maintained by Genesys.

- **Authentication & Security:** Genesys software can be deployed and configured such that the solution can be certified as PCI-DSS and HIPAA compliant. Genesys also has payment microapps that are certified as PA-DSS compliant. Genesys Cloud is certified as a PCI DSS 3.1 Level 1 Service Provider and HIPAA compliant. Genesys software has capabilities that support GDPR compliance, including "forget me" and "user data export." All data managed by Genesys products is assessed in the context of GDPR, under the overview of Genesys's Chief Privacy Officer. Genesys's IVA can leverage 2-factor, authentication tokens, back-end services (multi-factor), and partner services like Pindrop for voice biometrics.

Track Record & Enterprise IA Maturity

- **Market presence:** Mid-market to Enterprise
- **Vertical Experience:** Banking, energy and utilities, government, healthcare, insurance, retail, telecommunications, travel and hospitality
- **Use-cases:** Developed internal use-cases for both sales and service intelligent assistants. R&D team has worked on vertical-specific bots, with the initial work in Banking. Additionally, the product has micro-applications, which allow for rapid deployment of commonly required functions within a self-service system and can be used across all channels (bill payment, identity and verification, address collection, etc.).

- **Highlighted customer deployments for Enterprise IAs**
  - Entel (Telecommunications)
  - DNB (Financial)
  - Bosch Service Solutions (BPO /Technology)

- **Customer Engagement Strategy**
  - The IA can be purchased as a chatbot, voicebot, or both. Chatbots and voicebots have different price points, but both include all the Genesys and third-party components required to deliver a bot for a single price. These include, depending on the channel:
    - Voice or Digital Messaging channel
    - Designer - manages dialogs integrates with channels and bots
    - Knowledge Center - manages content and surfaces knowledge
    - Dialog Engine (Genesys NLU)
    - Dialog Flow (Google NLU)
    - ASR (speech recognition)
    - TTS (text-to-speech)
    - ASR/TTS Connectors
  - Users can fully implement the solution on their own, leveraging the visual designer. Professional Services is also available for companies that would like work to be done by Genesys.
  - While creating an environment and deploying a pilot bot can just take a few minutes, clients typically deploy within 7-10 weeks; most of that time is reserved for testing and training data with the customer.

- **Recommended Success Metrics:**
  - Reduced IT operational costs
  - Improved first contact resolution rate
  - Improved Net Promoter Score
  - Improved agent efficiency rate
  - Increased agent satisfaction score
  - Improved containment rate (self-service)

- Higher intent recognition percentage (NLU performance in voice and digital channels)
- Reduced agent average handle time
- Improved agent transfer rate

Future Plans & Vision

Genesys strives to help customers use conversational AI to build personal, more synergistic journeys; for both the customer and employee. These tools should be easy to try, buy, deploy, and self-optimize.

A few of the visionary items in the works:

- **Intent mining tools** that natively connect to all transcripts (across every channel) to create better NLU models.
- **Conversational dialog management** interfaces that enable users (of all technical levels) to build experiences more reactive to complex use-cases (3rd party data, website journey, etc.). Customer data outside of the dialog itself could directly affect the experience within the current conversation.
- **Knowledge automation loop** where one agent creates a knowledge article, and it is validated by other agents using conversational AI within agent assist. Supervisors could create a gated process to automatically promote this knowledge more widely after validation levels reach a certain confidence level. This knowledge loop would help agents, but also contribute new information to self-service bot interactions.
- **Globally curated repository of intents** and entities organized by regions, vertical, and other journey specific identifiers to help customers realize faster time to market and better intent recognition with limited training.

Key Differentiators:

AI orchestration

- Orchestrating use of multiple native and third-party AI technologies within a single interaction, including out-of-the-box integration with Google, Amazon and Genesys Dialog Engine

Omni-channel AI

- Configuration of an entire bot dialog (intents, entities, fulfilment, personalization, personas, etc.) in one UI, and automatically rendering it to voice and digital channels; including the agent desktop, for assisted service

Blended AI

- Intelligent transition from bot to agent, including delivery of conversational context, to blend AI into the customer journey

Enabling Platforms & Technologies	Enterprise IA Maturity	Track Record	Future Plans & Vision
●	◕	◑	◕

Haptik
Headquarters: Mumbai, India
Website: www.haptik.ai

FIRMAGRAPHICS
Year business started: 2013
Investment/Funding: $100 million
Number of employees: 145
Revenue (either estimated or publicly available): $2 million

Company Overview
Haptik is one of the world's largest Conversational AI companies, having reached over 100 million devices, and processed over 2 billion conversations till date. Established in 2013, Haptik has been at the forefront of the paradigm shift of interaction from clicks to conversations. We have built a robust set of technology and tools that can enable any kind of conversational application. With a 100-member strong team, including some of the finest minds in Artificial Intelligence, Haptik is truly poised to lead the Conversational AI revolution.

TECHNOLOGY & MARKET SOLUTIONS
Enabling Platforms: Features & Technologies

- **Speech Processing: ASR/TTS** - Support ASR and TTS to enable voice assistants for large enterprises. Haptik converts all voice from the user to text using ASR and then process the text message to come up with a reply, which is then converted back to speech using TTS. ASR and TTS are not built in-house; partner with different companies for these technologies. Include different ASR partners for different languages and geographies to ensure the best customer experience. ASR APIs have

some inaccuracies, which can cause the NLU to degrade; to circumvent working on algorithms that can help ensure our NLU and third-party ASR can work together more seamlessly.

- **Text processing:** Have technology that scrapes data from the interweb, uses APIs to get data from third parties and converts it into structured data. This can then be used in downstream processes like creating a knowledge graph.

- **Natural Language Processing or Understanding:** Core strength: have been building NLU over the last 6 years using real customer interaction data. Have multiple algorithms that come together to power our NLU. First start with building a language across different languages, which understand the nuances behind each language. For customer care, it is important to have an NLU that caters to unique flows of each client. This includes a combination of domain classification to detect which sub-category the query belongs to, intent detection, entity extraction, decision tree walking and context retention to understand the state of the conversation and be able to create a response. For sales, recommendation and closing the transaction is the main objective and to achieve. Create knowledge graphs and ontologies to understand the different elements and their relationships in the domain.

- **Data & Design:** Follow a philosophy that the base model should understand the nuances of the language and then provide an IVA builder (Intelligent Virtual Assistant) to allow the addition of domain specific data along with labels. The IVA builder is a GUI tool that empowers anyone to enter data that trains our NLU in a very non-technical and understandable manner. The IVA builder also allows to create chat flows to control the narrative of the end experience.
  Along with tools and technology, Haptik has a team of conversational UX experts that work closely with clients to make sure designing the dialog flows in the right way. A team of 40 AI Trainers/Analysts is responsible for tagging/labeling/annotating data through the IVA builder.

- **Dialog Management:** The dialogue flow is a multi-step approach with NLU algorithms understanding the sentence and then a combination of slot filling, decision tree traversal, knowledge graph traversals and seq2seq learning from historical conversations to figure out the state of the conversation, and ultimately generate a response. The IVA builder allows ability to enter data, write & debug code to integrate into third-party system within the tool itself (code executor), as well as build response templates to control the narrative. The IVA builder tool has pre-defined dialogue templates to make it easier for people to reuse the same flows.

- **"AI" / Machine Learning:** Apart from the NLU, Haptik paraphrase generation algorithm to make data entry easier. This algorithm combines various different ways a sentence can be said by using synonyms, sentence structures etc. have a semi-

automated learning process which uses an algorithm that looks at messages that were not replied back to and provides actions that can be performed to correct them, this could mean adding more labelled data, creating new intents. To enhance the self-learning process, also have algorithms that detect profanity or gibberish to make it easier to filter out noise. Recently developed an advance spell checker, which will help correct spelling based on context and sound as traditional method is not sufficient enough. To support multiple languages including low resource languages, also created language detection to help figure out which language models to use in NLU and build transliteration models to make sure the language and the script are in sync.

- **Process Automation:** Automated alerts when there are any anomalies in data, for example if the AI starts answering too few questions suddenly. Have an automated IVA testing tool that helps make QA faster and more scalable. The architecture on which this is based is a robust plug and play pipeline which runs multiple different algorithms, some in parallel vs some in serial. This architecture supports addition and removal of more algorithms in the future. Also have a mechanism to A/B test copies which helps analysts to make the content better. Ability to integrate into 3rd party systems without infrastructure requirement, where people can write code in the code editor itself, and the execution of the code is handled through an event-based architecture. Also built chat prompts, which are intelligent notifications that engage the user at the right time.

Integration Points & Scalability

- **"Zero Day Functionality":** Out of the box, there is an understanding of different languages, ability to customize and create dialogue flows up to 1000+ nodes, 500 predefined entities (names, cities, dates, addresses etc.), smalltalk to do chitchat, and about 100+ chat flow templates. Pre-integration into multiple 3rd party systems without any infrastructure requirements.

- **Search and Discovery:** During training of the data, there are multiple checks in place to see if there are conflicting entries (same sentences being labeled to different intents). Also paraphrase generation to show multiple ways the user can say the same things to allow more discovery of data.

- **Modalities & Channels:**
  - Voice and text functionality across Web Chat (JS), iOS, Android built by Haptik with various different customizable UI elements.
  - WhatsApp, Facebook Messenger, Slack, Skype, Google assistant as 3rd party integrations.
  - IVR over telephony integration with various contact center providers.
  - We have a message delivery layer which makes it super easy to add or remove more channels.

- **"Intelligent Routing":** Have own agent chat dashboard, along with intelligent routing from the IVA to this tool. Can integrate any third-party CRM dynamic data into the right-hand pane of this dashboard. Have connectors and webhooks which allow to use own contact center solution and allow live agents to chat. Have seen successful integration of Genesys into system using asynchronous webhook system.

- **IVR Integration**: Yes

- **Human Supervision:** Allow humans to take over chats from the bot based on intelligent routing mechanisms. Humans can get the full context of current and previous chat and be able to reply back. Also use human supervision to make sure continuous data is being ingested by the algorithm to be able to learn and improve over time through our analytics tool. Process for human supervision during the time of development of the flow to make sure knowledge graph creation and ontology creating is happening in the right way.

- **Support of live agents:**
    - Intelligent Routing
    - Shortcuts
    - Suggested Answers
    - Dynamic data integration on the "right hand pane"
    - Auto chat assignment
    - User's profile on "left hand side"
    - Lifetime history of chat data
    - Context summary of chat when routed from IVA
    - Dynamic smart elements in chat
- **Integration with customer service stack:** Support third-party system integration using APIs without any infrastructure requirements. We have integrated into most CRM systems of our customers using webhooks and APIs.

- **Analytics & Reporting:** Conversational Analytics capabilities include:
    - Real time Insights
    - Chat First Data with unique information like Automation %, Chat Completion %
    - Fully indexed search to analyze chat history
    - Deep integration with IVA builder
    - Unsupervised machine learning recommends intents automagically!
    - CSAT Feedback Score for all Chats
    - One of a kind 'User Journey' capability to analyze chat funnels
    - Granular Message and Conversation View
    - Proprietary AI scoring mechanism that looks at 14 different variables and metrics to come up with one rating for the IVA out of 100

  Also offer in-house customer success team consisting of a set of business analysts and managers who sift through the data regularly to generate reports.

- **Authentication & Security:** Have a unique identifier for each user and ability to map the unique ID of clients to the system and follow the security and login protocols of the client; GDPR compliant; ISO27001 certification in process.

- Ability to support multiple complex conversations in the same flow and the users can jump from one topic to another as and when required. Also combine different IVAs in the same platform and data talks to each other seamlessly. From a deployment perspective, fully hosted on the cloud and provide ready to deploy IVA. Also have the ability to deploy in the private cloud account of a customer so that they can own and control the data and other protocols.

Track Record & Enterprise IA Maturity

- With clients across the globe, Haptik has regional offices in USA and India. Haptik's focus verticals include: Financial Services, Retail / Ecommerce, Travel / Hospitality, Telecom / DTH
- Focused on end customer experience use cases for large brands, and have customized NLU supporting capabilities for each specific use case:
  - Customer Care
    - Live chat and Messaging (LCM)
    - Conversational IVR (IVR)
  - Sales
    - Lead Generation (LG)
    - Conversational Commerce (CC)

- **Highlighted customer deployments:**
  - Zurich Insurance - Insurance (LCM)
  - Samsung - Consumer Electronics (CC)
  - Oyo Hotels & Rooms - Travel / Hospitality (LCM)
  - KFC - Retail / QSR (CC)
  - Reliance Jio - Telecom (IVR)

- **Customer Engagement Strategy**: Generally work with consumer brands of a certain size, to provide either a 20-30% increase in sales of 70-80% reduction in costs. End to end engagement model is as follows:
  1. Pre-Sales: Understanding the requirements and suggesting the best possible solutions. Involves the Sales Representative and Solutions Architect.
  2. Solution-ing: Gain deep understanding of the client's business problems and processes. Involves a Solutions Architect, Program Manager, Conversational Designer and Customer Success Manager. Outcome is to come up with an entire journey of how the IVA will work including detailed flows.
  3. Development: We build the solution tailored to the clients' business needs and goals, including integration with 3rd party CRM systems. This phase involves a

Conversational Designer, Writers, AI Trainers, Program Manager and Integration Engineers. The end outcome here is to deliver the end product ready to be taken live.

4. Operate & Succeed: Once IVA is live, continuously train and improve it to ensure it keeps getting intelligent and delivers the desired ROI for the customer. Analytics tool capabilities become important coupled with support of business intelligence team.

- **Recommended Success Metrics**: Track the following metrics to measure success:
  1. Haptik AI Score: A proprietary single metric to view the success of an IVA that combines customer feedback, query completion %, automation %, repeat requests and 8 other variables to come up with one score
  2. Usage: No. of conversations
  3. ROI - How much savings / revenue jump was the assistant able to deliver to the customer, this uses real data from the client such as cost per call, conversion rate, sales, etc.

Future Plans & Vision

Help enterprises transform their customer experience using virtual assistants, while delivering ROI at every stage of the consumer lifecycle. Mission has always been to build artificial intelligence products that enable the paradigm shift of interaction from clicks to conversations. Goal to get to 1 billion monthly conversations processed across all our IVA deployments, while adding an ROI of hundreds of millions of dollars to our customers.

Key Differentiators:

- Only company to have deployed Virtual Assistants at scale for their own business- Haptik's entire tech stack has been battle tested for scale and has been perfected to deliver results for its own business
- Agility of a startup, resources of an institution - With $100m backing from a conglomerate like Reliance Industries Haptik has the capital and appetite to invest for the long term.
- AI Built and Trained for Specific Use Cases - Technology stack needs to be built differently to solve different business problems

Enabling Platforms & Technologies	Enterprise IA Maturity	Track Record	Future Plans & Vision
			

IBM Watson
Headquarters: Armonk, NY
Website: http://www.ibm.com/smarterplanet/us/en/ibmwatson/

FIRMAGRAPHICS
Year business started: IBM (1911), **IBM Watson** (2014)
Investment/Funding: N/A
Number of employees: 400,000+
Revenue: $79.6 billion (2018)

Company Overview
Watson Assistant is an offering for building conversational interfaces into any application, device, or channel.

TECHNOLOGY FEATURES AND CAPABILITIES

Enabling Platforms: Features & Technologies

- **Speech Processing: ASR/TTS:** Provide STT/TTS technology that clients use for use cases such as intelligent assistant over the phone (IVR enhancement), real-time call transcription, etc.
- **Text processing**: Provide leading text processing/NLP technology to help process user utterances, knowledge bases (for long-tail questions/agent assist) and directly answering questions from documents, even scanned pdfs, with preserved document structure (headers/footers/tables, etc).
- **Natural Language Processing or Understanding:** Proven in third-party studies to have the best NLU/intent detection in the market - key to help clients build, maintain, and continuously improve their intelligent assistants.

- **Data & Design:** Provide clients with a content catalog that allows them to get kickstarted on projects; however, find that pre-built agents is not a useful approach since client's will modify the Assistant to their needs. Offers Intent Recommendation feature which allow clients to train and build intents from their own log data.

- **Dialog Management**: Provide clients with an intuitive UI and tooling to build and maintain the Assistants dialog.

- **"AI" / Machine Learning**: In addition to analytics, IBM has features like Intent Recommendation and Intent Conflict Resolution to help clients build and continuously improve their assistant

Integration Points & Scalability

- **"Zero Day Functionality"**: Provide a content-catalog for top use cases and industries. Recommend Intent Recommendations is an important feature to get clients started quickly with their own data (not generic data). Also include out of the box web application, out of the box service desk integrations, and tooling anyone can use to quickly build dialogs, chats.

- **Search and Discovery:** Have a Search Skill that will seamlessly look for answers in a client's knowledge base, like Salesforce, Box, online FAQ, Watson Discovery, etc. if we answer/action can't be found in Dialog skill.

- **Modalities & Channels:** At core is a REST API to support channels. Also have new packaging making it easy and affordable for clients to use in an IVR/Voice use case.

- **IVR Integration:** Can integrate with any IVR system through SIP trunking, including (but not limited to): Twilio, Genesys, Avaya, AT&T, Cisco, Nexmo, Blueworx

- **Support of live agents:** Yes, support in two ways. 1) OTTB integrations in to leading Service Desk platforms 2) with clients that implement us specifically for Agent Assist

- **Integration with customer service stack:** Can integrate with most front-ends and back-ends through API and webhooks. We also have OTTB integration into voice, leading Service Desk providers, and front-end channels.

- **Analytics & Reporting:** Provide clients with analytics in the tooling

- **Authentication & Security**: Several features/standards for security and authentication.

Track Record & Enterprise IA Maturity
Highlighted customer deployments for Enterprise IAs: VMWare, RBS (Banking), Sprint (Telecom), Humana (Insurance), Smart Dubai (Public Sector), Versus Arhritis (Health).

Future Plans & Vision
Anyone can build: Continue to improve our tooling to help LoB users build, deploy, and continuously improve more effective virtual assistants in the market.

Improve with machine learning: Watson Assistant gets better with IBM's market leading machine learning algorithms.

Connect to anything: Out-of-the-box integrations into leading contact-, service desk-, and automation platforms as well as front-end channels.

Key Differentiators:

- **Better understanding**: IBM Watson AI outperforms the competition in understanding accuracy
- **Faster learning**: Watson AI can quickly be trained with a client's own data (such as chat logs, call logs). It also learns with less data and is has tooling allowing your line-of-business users to build and maintain with little, to no-code.
- **Own your insights:** Your training data and insights are your own. As your models gain value, you maintain ownership of your data.
- **Goes where your data lives**: Watson can be deployed anywhere (public, private, and other vendors' clouds). The is no cloud vendor, lock-in. And it can connect to external data and systems

Enabling Platforms & Technologies	Enterprise IA Maturity	Track Record	Future Plans & Vision
			

Inference Solutions
Headquarters: San Francisco, CA
Website: https://www.inferencesolutions.com/

FIRMAGRAPHICS
Date founded: 2007
Number of employees:
Investment: ~20M (Series A)
Revenue: privately held

BRIEF COMPANY DESCRIPTION:
Inference Solutions is a global provider of Intelligent Virtual Agents for sales and service organizations. Inference's AI-powered Intelligent Virtual Agents automate the routine and repetitive conversations handled by live agents today over voice, chat and text. Inference is trusted by organizations around the world – from small business to the Fortune 5000. Businesses and government organizations trust Inference to streamline inbound and outbound customer communications and service. Inference is resold by T1, T2 & T3 carriers, as well as by UC and Contact Center software providers to extend their automated self-service capabilities.

TECHNOLOGY & MARKET SOLUTIONS
Enabling Platforms: Features & Technologies

- **Speech Processing: ASR/TTS:** Understands human speech in over 120 languages and language variants. When building the self-service application using Inference Studio, users can select which speech recognition engine they want to use including engines from Nuance, LumenVox, Google and IBM Watson.

- **Text Processing:** Can operate on both audio and text channels. The text channel covers all interactions where the input from the customer appears as text (e.g. SMS, Web Chat, WhatsApp, etc.). Many of the building blocks ('nodes') are common to all channels. Can build virtual agent experiences that span multiple channels and hand off to other channels.

- **Natural Language Processing or Understanding:** NLP lets users eliminate complex IVR menus and go beyond speech-enabled, directed dialog systems. Inference Virtual Agents help users to embrace NLP by packaging and integrating the most advanced technologies. Inference natively supports NLP from Google Dialogflow, but users can easily switch in other NLP engines such as Amazon Lex or Watson Assistant.

- **Data & Design:** By default, Inference utilizes Google Dialogflow for intent processing and combines that solution with the Inference Studio tools allowing data labeling and out-of-the-box tools to create, build, augment and extend the self-service functionality within the solution. One of the more powerful building blocks is the Open Form node. Think of Open Forms as a bundled speech and NLP building block. The NLP is pre-tuned but can also be extended by the customer as required. Can also use Open Forms to support more traditional closed grammars in virtually any language. The Open Form allows you to store both the original audio utterance along with the raw transcription so you can further tune your forms.

- **Dialog Management:** Utilizes the Inference Studio tools, allowing users to design, script, build, augment and extend the self-service functionality within the intelligent agent solution.

- **"AI" / Machine Learning:** By default, Inference Studio utilizes Google Dialogflow to provide the machine learning. This is integrated within the Inference Studio solution to deliver a single application tool to assist our customers with the Intelligent Agent solution. If the customer used an Open Form they can benefit from a pre-tuned NLP, or they can build upon a pre-tuned NLP or design their own. Sentiment Analysis is provided by IBM Watson. You can analyze the sentiment of any interaction by simply dragging the 'Tone Analyzer Node' into the flow of the dialog that you are designing.

- **Process Automation**: Supports a 'workflow' channel within Studio. Workflows are designed in the same way as other studio tasks except that they are not triggered by a conversation. Rather they are triggered by either a webhook, time interval or specific time of day. Workflows are typically used for RPA, for example to check social media feeds, schedule the sending of email, or generate a report. In addition, Inference also provides an extension to Studio called Inference React which enables virtual agents to trigger workflows based on BroadWorks XSI events.

Integration Points & Scalability

- **"Zero Day Functionality":** The entire interface is designed to allow customers achieve a real-world outcome with the lowest possible investment. A key enabler of this is the bundled Studio Task Library. The Task Library is similar to an app-store in that it provides examples of tasks that other users have developed in Studio. There is no limit to the complexity of a task that you can publish to the Task Library.

- **Search and Discovery:** How answers from the NLP are confirmed to be correct is done via a typical supervised learning process. In Studio users can train data sets that include the raw audio (in the case of a phone or WebRTC call), the transcription and the semantic tagging (i.e. intent match). You can also log the verbatim answer provided back to the caller. In terms of task completion, this is generally handled as part of the initial design of the task. Success and failure points are agreed and explicitly logged. These can then be visualized in real-time using the inbuilt reporting tools. Also supports Google Dialogflow's Knowledge base feature that allows you to upload documents to create FAQs in bulk.

- **Modalities & Channels:** Inference Virtual Agents can provide service across multiple channels including voice, webchat, SMS, WebRTC and WhatsApp. RPA-style interactions can be triggered via simple http webhook.

- **"Intelligent Routing"** – Routinely integrate with the Intelligent Network (IN) functionality of our telecommunications partners. Have more than 40 partners in the USA, Canada, Australia, UK, EU and Africa. Also integrated with leading hosted contact center platforms such as Cisco, BroadSoft, 8x8 and Five9. We are also integrated into leading CPaaS platform such as Twilio, Nexmo and Clickatell.

- **IVR Integration:** Many partners/customers use Inference as their IVR. In fact, Inference is packaged and resold as Cisco's WebEx Contact Center IVR, Nextiva Advanced IVR and 8x8 Intelligent IVR. Some partners already provide a basic IVR solution and dialog UI (for example Five9). In these cases, Inference is integrated within the existing IVR solution to provide support for multilingual speech recognition, TTS and natural language processing.

- **Human Supervision**: All NLP Virtual Agents require some degree of supervised machine learning. Inference Studio allows users to create training data sets that are fed into the various NLP platforms (e.g. Dialogflow). Our agents are designed to operate standalone (i.e. true IVA vs Agent Assist).

- **Support of live agents:** Inference Studio offers a Screen Pop node that allows users to forward relevant customer information to a call center agent or sales representative when a call is transferred from a virtual agent.

- **Integration with customer service stack**: During a virtual agent conversation, the VA will typically access other systems and services in order to effectively respond to questions and solve the customers problem. This is the process of fulfillment. With a no-code, visual development tool, Inference Studio can easily build an application that uses natural language to converse with a customer and then closes the loop by communicating with back-end systems to solve your customer's problem. Can provide webhooks for custom integration as well as a set of pre-packaged integrations with popular applications.
    - Pre-Packaged Integrations
    - CRM: Salesforce, MS Dynamics 365, Copper
    - SMS: Nexmo, Twilio, Clickatell
    - Payment Gateways: Merchant Warrior, eWAY Payments, Fat Zebra, Authorize.net (U.S. only), Worldpay, Pay Trace, First Data (Pay Ezeey), Westpac PayWay
    - Scheduling: Google Calendar, Acuity Scheduling
    - Call Center: BW Call Center, 8x8, Five9, UCCX, UCCE and many more

- **Analytics & Reporting:** Data can be stored remotely (i.e. in an existing database) or in the Inference Private Cloud (in the form of 'data stores'). Allow push data to public cloud data warehousing style platforms (e.g. Google Firebase, Amazon Aurora). In Studio, data takes two different forms: The first is data that relates to call and message volumes and arrival rates (Interaction Volume Data); second is data relating to specific intent of the call flow that has been designed in Studio (Call-flow specific data).

- **Authentication & Security:**
    - Voice Biometrics - speaker authentication technology that captures a voice sample from a live speaker, compares it to a previously stored voiceprint, and produces a score of how closely the speaker's voice matches the voiceprint
    - PCI Compliance
    - HIPAA Compliance

Track Record & Enterprise IA Maturity

- Primary use of Inference products is in handling phone call interactions, as well as message-based interactions. Focus on the contact center but also used in many non-contact center enterprises to perform call routing from 800 numbers to local stores, and/or departments and other locations where virtual agents respond to guest services requests. Inference addresses both horizontals as well as verticals. Some of the horizontals are in surveying, collections, call routing, spoken directory-style systems, identification and verification, booking services, informational services, callback-style services, etc. Some of our verticals include retail, health care, hospitality and government. Highlighted customer deployments for Enterprise IAs (Please provide names & industry where appropriate)

- **Customer Deployments:** Netgear, Hotels.com Sheraton, Marriott, Toshiba, Barnes & Noble, HealthScope, SiteLock, Pizza Hut and many others.

- **Customer Engagement Strategy:** Go-to-market strategy is largely channel focused. The primary channel partners are telecommunications service providers that purchase, package, price and re-sell our services to businesses of all sizes. In many cases the services of those carriers may also be resold by their channel partners, which include master agents and their sub agents. Inference is also resold through UC and Contact Center software providers like Cisco, 8x8 and Five9. Inference has more than 40 resellers partners throughout NA, APAC and EMEA.

- **Recommended Success Metrics**: The best way of assessing the performance of an IVR is to have very clear definitions as to what constitutes "success" and what constitutes "failure." Success can take different forms but is usually broken down into business objectives and customer objectives:

Future Plans & Vision

Inference expects that Intelligent Virtual Agents to be standard within enterprises within the next three years. The increase in quality, coupled with a lower cost of entry, has dramatically expanded the types of interactions that can be handled by IVAs. Expect to see virtual agents become smarter, gaining the ability to automate more complex tasks and see a broadening in the channels where the technology is currently used.

Key Differentiators:

- **Conversational and Intelligent:** Inference Studio is a gateway to build customer service applications that leverage a wide array of the latest, most advanced Conversational AI technologies.

- **Deeply integrated with UC and Contact Center Solutions:** Have deep, out-of-the-box integration with software platforms like BroadWorks, Cisco, 8X8 and Five9.

- **Designed for Resale:** The Inference Studio platform has been designed from the ground up to be resold by partners. There are numerous features that are baked into its technical architecture that allow for segmentation, white-labelling, customization and personalization.

Enabling Platforms & Technologies	Enterprise IA Maturity	Track Record	Future Plans & Vision
◔	●	●	◔

Interactions
Headquarters: Franklin, MA
Website: http://www.interactions.com

FIRMAGRAPHICS
Year business started: 2004
Investment/Funding: latest round of funding was $56 million in 2016
Number of employees: 480+
Revenue (either estimated or publicly available): Approx. ~$100M

BRIEF COMPANY DESCRIPTION:
Interactions provides Intelligent Virtual Assistants (IVA) that seamlessly blend conversational AI and real-time human understanding to enable businesses to engage with their customers in highly productive and satisfying conversations.

TECHNOLOGY & MARKET SOLUTIONS
Enabling Platforms: Features & Technologies

- **Speech Processing: ASR/TTS -** The Interactions Curo Speech and Language Platform provides highly accurate automatic speech recognition (ASR) and natural language processing (NLP) that can recognize and understand complete sentences. A combination of conversational AI (i.e., ASR, NLP, machine learning) and real time human understanding (Human Assisted Understanding (HAU)) enables Interactions IVA to offer a highly successful and conversational solution in areas where traditional technologies alone fail, such as: alphanumeric information capture, utterances with substantial background noise, heavy accents, multiple speakers etc. Interactions use both proprietary and third-party TTS to generate dynamic responses to callers.

- **Text processing -** For text-based digital transactions, Interactions utilizes the appropriate conversational AI technologies such as Natural Language Understanding

(NLU), Natural Language Generation (NLG) and Advanced Dialog Management from the Curo Platform. Process the text strings and create a pipeline of semantic features to assure the highest levels of accuracy in understanding.

- **Natural Language Processing or Understanding -** The Interactions IVA starts with generic models (numbers, dates, etc.) and large vocabulary general purpose recognition models that are then tuned for a domain using domain-specific training corpora. The NLU models are continuously tuned for the first 30-60 days of operation to improve performance. If the input processed by the NLU models does not score a high confidence level, Human Assisted Understanding will direct the input be sent to an Intent Analyst, in real-time, for accurate intent determination and processing (Adaptive Understanding). The tagged data is then leveraged in retraining the models for successful automation in future interactions.

- **Data & Design -** Interactions has developed an internal tool that provides our designers with a starting dialogue flow and a selection of standard modules with prepackaged intents, in order to streamline the process of starting a basic application. The design process is currently strictly done through professional service engagements, leveraging a proven set of methodologies and best practices. Because of Interactions unique Human Assisted Understanding (HAU) capability, IVA applications can be launched with very little data labeled in advance. The IVA quickly learns as the human intent analysts (IAs) label any utterances not understood by the conversational AI.

- **Dialog Management -** Interactions IVA is capable of engaging in rich multi-step dialogs with the customer. At each turn the IVA selects the optimal action to maximize user experience and task completion while maintaining a natural and free-flowing conversational experience. At the core of this is an adaptive capability to recognize user intent which combines speech recognition, natural language processing, machine learning, and real-time human-assisted understanding. The IVA is driven by a dialog engine that operates over declarative representations of dialog logic that are authored in a web-based interactive graphical tool. Dialog logic can be authored either as an interaction flow, by populating a domain knowledge graph, by configuration of pre-defined conversational AI modules, or through a combination of these approaches.

- **"AI" / Machine Learning** - Processing includes proprietary Machine Learning capabilities, including deep neural network (DNN), support vector machine (SVM), MaxEnt, reinforcement learning, sequence learning, etc. The appropriate ML algorithm is used based on the data and task at hand. Improvements in automated automatic speech recognition and NLU combined with new machine learning technologies provide an automatic feedback loop, improving appropriate AI models while reducing the number of utterances going to human assisted understanding.

- **Process Automation:**
  Implementation Methodology: Interactions adopts a multi-phased approach to implement the Intelligent Virtual Assistant. The key phases include the initial discovery/ROI, contract, kickoff, design, development/QA, User Acceptance Testing(UAT), launch and continuous improvement. Client engagements are highly collaborative. Areas of collaboration include: Program Management, Design and Caller Treatment/Experience; Business Rules and streamlining caller effort; Integrations, including Web-services, Telephony/Networking/Security, CTI; Daily File Exchange, Report Data Extract; and QA and UAT testing. Interactions hosted managed services minimize heavy lifting on the part of our clients to the greatest extent possible.
  Architecture and scalability: Interactions IVA is a cloud-based, managed solution. All of the platform hardware required to support client applications is hosted and managed in Interactions Data centers. Minimal on-premises hardware may be required based on the agreed upon architecture between Interactions and client. The IVA platform is distributed and fully redundant on telephony, network, compute and storage stack across multiple data centers across the globe. Each of the data centers are hosted in co-location facilities that comply with process and infrastructure industry best practices to ensure maximum uptime. Even within a single data center, the platform is built on top of a truly distributed component architecture where there are no single points of failures.

Integration Points & Scalability

- **"Zero Day Functionality"** - The Interactions IVA has traditionally started with generic models (numbers, dates, etc.) and large vocabulary general purpose recognition models that are then tuned for a domain using domain-specific training corpora. The NLU models are continuously tuned for the first 30-60 days of operation to improve performance. If the input processed by the NLU models does not score a high confidence level, Human Assisted Understanding will direct the input be sent to an Intent Analyst for accurate processing (Adaptive Understanding). The tagged data is then leveraged in retraining the models for successful automation in future interactions. Have begun to use the seed data for transactions using data collected to build Intent Analyst Desktops to build zero-day models. These models allow automation to begin on day one beyond generic responses.

- **Search and Discovery** - Use a variant of Solr Lucene in the IVA; reporting portal supports searching across client data.

- **Modalities & Channels:** Voice, chat, interactive SMS/text, Facebook Messenger and other messaging platforms, also smart speakers such as Amazon Alexa.

- "**Intelligent Routing":** Interactions IVA can capture intent at a granular level and route the customer to the correctly skilled customer service agent, working within client's business rules. Interactions has successfully integrated with many leading customer interaction management platforms, such as Genesys, Zendesk, Avaya, Amazon Connect, Salesforce and Liveperson, via APIs or web services.

- **IVR Integration:** Interactions can integrate with a client's IVR or replace an IVR entirely

- **Human Supervision:** If the AI engine triggers a below-threshold confidence score, the audio or text is forwarded in real-time to an Intent Analyst, who listens to the utterance or reads the text string to guarantee the correct response is provided to the customer. The Intent Analysts never engages with the customer. Business rules may direct specific customer intents to go to a live agent (e.g., buy a new phone or cancel a subscription). In this case the IVA will transfer the customer with the context of the conversation to the correctly skilled live agent. Interactions works with clients to review the business rules that would direct a customer to a live agent. This behavior is modeled into the call flow. Applications can also identify conditions when a customer is angry/frustrated, etc. 'Handlers' also recognize swearing etc., and can direct callers out of the IVA if business rules require this.

- **Support of live agents:** Prototyping live agent recommendations, based on next-best answers, for IVA integration in 2020. Have product technology from Digital Roots product (2017 acquisition) that provides in Social Engagement platform.

- **Integration with customer service stack:** Use standard API's and integration techniques with our client back-end systems. In most instances, can call data on the client side in real time to create, read, update or delete records/data. In rare instance can host the data for a customer if their system is not capable of extending or consuming. The objective is to provide the IVA with the same data and backend system access as the customer's agents have. Back office integration includes a specification for Data exchange, API availability, and integration services. Interactions obtains a specification from the client for all data services.

- **Analytics & Reporting:** Each client has reporting portal with detailed view into the daily data and high-level trends of their call center, including call review, success tracking, analytics. The portal contains 5 standard reports, a custom report builder, and daily CSV file exports. Reports accessible from the client dashboard include Call Viewer, Billing, Script Performer, FAQ use, and Conversation Handler. IVA reporting provides clients with the detailed analysis needed to improve applications and call center performance on a consistent basis. Interactions builds custom reports when requested. Integrates with both QlikView and NetCharts. Daily CSV exports are provided from an Interactions-hosted SFTP site if client prefers.

- **Authentication & Security:** Interactions IVA provides three factors of Authentication: Knowledge-based, Device-based, and Voice Biometrics. IVA clients can choose what authentication factors are used for each transaction Voice Biometrics Authentication is a service add-on for caller verification. Proprietary Voice Biometrics technology supports active (text-dependent), and passive (text-independent) authentication and provides dynamic prompting for additional security. Robust DR/BCP architecture/processes (no SPOFs, Data geo-redundancy). Information identified as sensitive by our clients is redacted in real time or recorded/stored encrypted. IVA Architecture is based on security best practices (segregation of concerns, Principle of least privileges, etc.). The IVA has PCI DSS Level 1 certification, SOC 2, Type 2 Certification, is GDPR Compliant, and FedRAMP certified for government clients. Regular penetration tests and vulnerability scanning occurs on IVA production data centers. Service providers must meet our security/compliance requirements. Network Security Systems Ex. SIEM, IDS, AV, PM.

- **Ability to support multiple use cases:** Have over 15 years of experience developing complex conversational customer service solutions across various industries. Some noteworthy use cases: Automated room reservations, password resets, utilities start/stop after moving, bill payment and settlement, order status and management, account management, food ordering, claim status, conversational banking and FAQs.

Track Record & Enterprise IA Maturity

- Market presence: Since 2004, Interactions has been providing conversational, engaging customer service interactions across multiple channels, covering a broad range of verticals: Telecommunications, Retail, Travel & Hospitality, Financial Services, Utilities, Healthcare, Insurance, Federal, Restaurants/Food Services, Automotive

  Highlighted customer deployments for Enterprise IAs:
  - MetLife halved misdirected calls, raised self-service rates to 25% in key departments, and boosted customer satisfaction by 7%.
  - TXU Energy's self-service rate rose an impressive 18%, while customer satisfaction scores improved by 11%. TXU Energy also saved $1 million in cost avoidance and IT savings and reached their payback goals in just 40 days.
  - Westar Energy's self-service rate increased to 39%, while customer satisfaction improved to over 80%.
  - Salt River Project nearly doubled the self-service rate achieved by its traditional IVR.
  - Hyatt saved $4.4 million, with a 125% year-over-year return on investment while simultaneously freeing agents to focus on more complex tasks like sales.
  - Great Wolf Lodge (T&H), Kiwi.com (T&H), SRP (Utilities), TXU (Utilities), Lifelock (technology), Diversified Consultants Inc (Financial Services), Hyatt (T&H), Mountain America Credit Union (Financial Services), Pizza Pizza (Food Services), Chipotle (Food Services)

- **Customer Engagement Strategy:** Adopts a multi-phased approach to assuming responsibility of IVA service including the following: Discovery/ROI, Contracting, Kickoff, Design, Development/QA, User Acceptance Testing, Launch and Continuous Improvement. All Interactions Solutions teams consist of an Account Manager, Project Manager, Client Services Manager, Software Developers, Business Analysts, Interface Designers as well as a QA Manager. The Professional Services team ensures the implementation is carried out according to the plan in collaboration with client's team. The Account Management team starts to get involved right before our solutions go-live in the production environment. The Account Management team brings deep industry expertise to streamline the application performance and work collaboratively to come up with a roadmap.

- **Recommended Success Metrics**: *Success-based Pricing* - to ensure a continued dedication to a high performing solution, Interactions only charges for successful transactions. A successful transaction is defined as the completion of a discrete task, such as authenticating a caller or completing a reservation. In this unique model, there is a shared interest for continuous improvement. Whereas most traditional voice self-service systems charge on a per-minute basis regardless of success, Interactions only charges when delivering value to our clients

Future Plans & Vision

Continued thought leadership in Conversational AI space; Learned Dialog for faster and more accurate dialog automation; Machine learning across the AI stack and throughout the customer journey; Faster development and deployment using internal tools and processes. Improve reusability of code and intent libraries; Extend product and feature offerings to include more complex transactions across voice and digital channels and in more languages; Adding Live Agent Assist to Human Assist to improve the customer experience and support live agents; Enhanced end-to-end analytics across the platform

Key Differentiators:

- Adaptive Understanding - Seamlessly blends Artificial Intelligence and real-time Human Understanding to recognize complex utterances, classify compound intents and tag data to aid machine learning.
- Proprietary, Patented Technology - The Curo Speech and Language Platform (ASR, NLP, TTS, Dialog Management, Voice Biometrics and a suite of Machine Learning tools)
- Success-based Pricing - IVA clients pay only for successful transactions that have been mutually defined before the IVA solution launches.

Enabling Platforms & Technologies	Enterprise IA Maturity	Track Record	Future Plans & Vision
●	◔	●	◑

IPsoft

HQ: New York, NY
Website: https://www.ipsoft.com/

FIRMAGRAPHICS
Year business started: 1998
Investment/Funding: N/A
Number of employees: +2,000
Revenue (either estimated or publicly available): Private

CORE INTELLIGENT ASSISTANT PRODUCTS AND SERVICES:

- **Amelia** - Amelia is the most comprehensive conversational AI agent on the market. Customers and employees communicate with Amelia via natural language (voice or chat) to resolve support issues or ask questions. Amelia responds quickly and carries out tasks for users by connecting with back-office applications. She delivers relevant, personalized information efficiently, freeing up humans to focus on high-value tasks.
- **1Desk** - 1Desk is an autonomic IT and shared services platform that can streamline operations from the front to the back office. With an autonomic backbone, a robotic process automation (RPA) engine and a cognitive interface (Amelia), 1Desk provides employees with a digital concierge that can execute and complete their tasks in internal systems like IT, HR and Finance, and resolve service and support issues.

Enabling Platforms: Features & Technologies

- **Speech Processing: ASR/TTS:** IPsoft Built Native Voice Engine can be deployed on-prem or hosted with 90%+ Accuracy. Allows for language model and semantic NLU models to be built with a single data set for reduced effort and time-to-market, Entity Based Grammar adaptation allows for more flexible recognition (for names, funds, addresses, etc.). Also support 3rd party Voice recognition/TTS for implementations where capabilities already exist, including: Google, Amazon, Verbio & Nuance

- **Text processing**: See below on NLP and NLU.

- **Natural Language Processing or Understanding:** Own internally built NLP
    - NLU powered by ELMo (Embedding from Language Models) which is a Deep Neural Net algorithm that allows for more contextual understanding of utterances, and as a result can provide best in class accuracy (>95%) and reduce the training data required (50% data compared to standard Deep Neural Net models)
    - EQA (Elaborate Question Asking) / CQA (Clarifying Question & Answer). Users Natural Language Generation (NLG) driven follow-up dialogs to allow deeper contextual understanding means that Amelia can follow-up dynamically without needing to build business rules.

- **Data & Design:** Amelia is able to handle basic dialog without any training. You can upload documents and Amelia will use the content to answer questions. Amelia will utilize several built-in classifiers for recognizing common terms (yes/no, currencies, addresses etc.) as well as using social talk and other techniques which can be customized or disabled as needed. 1Store content store allows download of Amelia roles and skills. Several companion tools allow for:
        - Automated conversational testing and QA of new releases or new content promotions.
        - Automated promotion of capabilities between development, staging and production environments.

- **Dialog Management:** Leveraging a multifaceted processing engine managed by an arbitration system that manages the interaction with and between the different subsystems. These include Information Retrieval based Semantic Memory, Inference Engine driven Logic Framework, Natural Language BPMN and Learning based Process Memory, Through Vector and Contextual Long Short Term based observational learning Episodic Memory, Social Talk leveraging AIML, and Emotional Memory using PAD models to provide Humanized responses and business decisions. As part of determining the intent(s) initially, Amelia makes use of various techniques such as Clarifying and Elaborating questions to determine intent as well as machine learning techniques. Amelia will dynamically present visual information (data, selections, etc.) to guide the conversation depending on the channel chosen (web/mobile) The workflows and logic that drive the experience once intent has been recognized is dynamic.

- **"AI" / Machine Learning:** *Automated Learning and Simplified Training* - While it is supervised learning with Amelia v3, have automated the process for the SMEs and Cognitive Engineers with an algorithmic driven automated Annotation Framework. Initially, Amelia will be trained with available curated documents, process diagrams, chats which can all be uploaded and analyzed automatically. Once Amelia is in

production, she will analyze all escalated and abandoned interactions and present the ones deemed to contain additional learnings. Automated learning has always been a priority for Amelia and is available for all modules, including Intent, Entities, Business Processes, Episodic Memory, and Natural Language Generation. Machine learning and DNNs are used throughout Amelia. Amelia advises on which machine learning technique (model) is best to understand user utterances and other inputs and automatically highlights which intents and entities require additional training to meet an acceptable level of recognition. Machine learning classifiers are incorporated into her Business Process models and it allows her to dynamically "jump" around in processes and between processes as oppose to following a set decision tree.
    - The biggest advancement in v3 is the expanded inventory of learning tools throughout Amelia's system. Her new multi-turn dialogue system allows her to recognize utterances and generate responses based on the best human conversations in her training set, this is achieved using LSTM models and Vectors. All sessions and escalations are processed for additional learning. It can be as simple as thumbs up/down for intent and entity detection which can be done in real-time to algorithms doing matching and merging for existing or new dialog process flows.

- **Process Automation:** BPN (Business Process Network) is a visual designer allowing users to design the flow of the dialog and other interactions. This includes executing integrations to obtain data, start processes and write data to backend systems, including executing RPA tasks. The BPN also allows for controlling what the customer see via UI interactions depending on the modality. 1RPA - Amelia can use IPsoft's RPA solution for accessing application through Windows, Mac. Linux and Web UIs.

Integration Points & Scalability

- "**Zero Day Functionality":** Amelia will be able to have conversations without any specific training. However, she has been pre-trained on specific roles and skills for banking, healthcare, insurance and horizontal solutions. Roles include: credit card concierge, personal digital teller, robo advisor, mortgage agent, auto insurance agent, healthcare insurance benefits agent and appointment scheduling assistant. Roles can be viewed and experienced at http://1store.ai - 1Store will feature 17 roles covering 98 skills at launch, with more being added in the future. IPsoft is also expanding its pre-packaged solutions through partnerships.

- **Search and Discovery:** The arbitration system within Amelia orchestrates the different modules and engines to derive the best answer, based Amelia learning. As mentioned above, several additional engines (CQA, EQA) are used to dynamically disambiguate if Amelia does not have high enough confidence in any underlying system.

- **Modalities & Channels currently supported:** Multi-channel handling is part of Amelia's conversational intelligence. Users can interact with Amelia through chat over web, mobile, apps and social (Facebook). Amelia also has the ability to connect by voice with apps, collaboration tools (Skype, Slack), web, phone, Amazon Echo, Google Home, and Kiosks. Amelia can carry conversations between channels, such as starting one on Facebook and then direct a customer to the corporate chat system where she has access to all the internal systems to better assist the customer with the full knowledge of a customer's previous contact history.

  Amelia manages Dialog as consisting of 3 Primary Components to enable more Responsive Conversational Design once intent is detected:
  - *Process* - Allow visual flow builders to drive the conversation flow and processes required in a conversation. ML is embedded in the process to allow Amelia to jump within the process based on understanding.
  - *Dialogue* – The words and content that are conveyed to the user, optimized for the channel and modality. Allow designers to manage the words spoken and optimize these based on the channel and modality the user is interacting.
  - *Style* – How the words and content are presented to the user. This allows the richness of interaction to match to the channel the user is interacting in, the designer doesn't have to deal with the technical complexity of enabling such rich interactions.

- "**Intelligent Routing**": Amelia will escalate into various queues based on conversational context. She will alert individuals that have been assigned the escalation, monitor SLAs and also open tickets if nobody is available. While not a complete list, have integrated with Avaya, Genesys, LivePerson.

- **IVR Integration:** Yes - Amelia's SDKs, APIs and built-in integration framework provides developers with significant ability to customize around her core conversational capabilities. 3rd party modules around input (chat, messaging, email, Voice, IVRs) can be easily integrated and configured through SDKs

- **"Human Supervision"-** Amelia extracts new learnings, some customers are testing Co-pilot, a collaborative contact center platform for human and digital agents. Co-pilot leverages natural language, context switching and transactional abilities and combines it with a sleek, intuitive interface. The platform enables human agents to handle high volumes of interactions with speed and accuracy.

- **Support of live agents:** Amelia has been implemented as a whisper agent is several customers. Allstate use-case attached in presentation.

- **Integration with customer service stack:** Integrates seamlessly with all common APIs through a built-in Integration Framework. Standard customer service integrations include: ServiceNow, BMC Remedy, SAP, MiContact Center Enterprise/Solidus, LivePerson/LiveEngage, Cisco UCCX, VOIP & WiFi management, Skype for Business, and homegrown APIs to fraud, insurance and banking back-ends. Amelia can also document every interaction in a CRM system. Integrates with SAP, Oracle, Salesforce.com, Pegasystems, Microsoft, Zendesk, and many others. Can use IPsoft's RPA solution for accessing application through Windows, Mac. Linux and Web UIs.

- **Analytics & Reporting:** Provide integrated business analytics to highlight the value of Amelia implementations and find areas for optimization. This allows tracking of Amelia value over time and drives places for teams to continue to optimize Amelia functionality. Customer journey analytics provides metrics and success from the start of the interaction to end. Advanced drill-down capabilities to the actual conversations provides SMEs with a wealth of information and has been designed for continuous improvement of Amelia's capabilities. Automating extracting new intents and entities (slots) from unlabeled data and building new dialog flows based on human activities.

- **Authentication & Security:** Amelia is scalable with robust security and compliance functionality, having undergone both internal and external penetration tests by IPsoft, 3rd parties and our clients – including
    - **Data Encryption** – 256-bit AES-GCM, Parameters set following NIST Guidelines – 800-38D, All conversation data encrypted at rest
    - Password encryption - System (database, etc.) passwords encrypted with 256-bit AES on file system. Support LDAP, SAML2, SSO (PING, RSA, Okta, Username/Password) for user access
    - **Biometric Authentication -** Our own built-in Facial Recognition for biometric authentication. 3rd Party Integrations for Voice Biometrics fingerprint authentication (fingerprint currently available on iOS only)
    - **Transport Encryption -** TLS 1.2 for internal app to app communication when possible. Application encrypts before transport in other cases. Minimum TLS 1.0 for end-user requests. "A" from Qualys SSL Labs test
    - **Web Application Security -** OWASP Top 10, CSRF Protection, XSS Protection. HSTS, Audit Events, RBAC throughout, HP Fortify
    - **Administration -** Full user administration logic (or integrate into Enterprise SSO for handling all user permissions). Integrate channels for 2-factor authentication capabilities

- **Ability to support multiple use cases:** Designed to support a wide range of use-cases from internal to external across all industries. Handle different specialties as 'Domains' to support multiple use cases and switch between conversations on different topics. A customer can deploy Amelia as an HR specialist, Help Desk IT Specialist, and even handle different languages. Each specialty (or domain) has its

own NLU, business rules, privacy/security and dialogues. They can work individually, or orchestrate through a Global domain that resides above other specialties and can route users to the correct domain based on their query. Additionally, each domain can be enabled to route to a different domain if a user has a conversation that is best handled by a different domain.

Track Record & Enterprise IA Maturity

- Market presence, vertical/horizontal experience, use cases
  - Targeting large enterprises, system integrators and service providers.
  - Industries: BFSI, Insurance, Healthcare
  - Horizontal: IT, Finance, HR, Procurement
  - Use cases: Contact center, ITSM, IT operations, HR, Whisper agent, sales assistant

- Highlighted customer deployments :
  - BNP Paribas: Amelia as a chat-based customer service agent for BNP Paribas' Security Services customers, in both French and English. Amelia can execute on 27 skills including providing account information, document search, executing orders, opening accounts, among others, for over 1 million customers. Once fully implemented, Amelia's labor will be the equivalent of 10 full time employees.
  - SEB: Chat-based IT Service Desk agent for 15,000 internal employees in English. She is able to recognize the correct intent for 93% of conversations, and 91% of users rate her as "very good" or "good". As a customer-facing bank teller, Amelia serves 300 customers per day, performing tasks such as booking meetings, finding nearby services, and guiding users to open accounts.
  - Allstate: 75% of Contact Center Agents Leverage Amelia, 200,000 Conversations per Month (saving +1000 hours call duration), over 300 Skills developed
  - Telefonica: Voice-based customer service agent for contact centers in Peru, which fields roughly 150,000 daily calls. Developed 28 specific skills it wanted Amelia to master, including 18 end-to-end automated skills, and 10 skills that would require Amelia to route a call to an appropriate human agent. Skills included solving customer queries on outstanding balances, plan changes, and payments.

- **Customer Engagement Strategy:** Historically, IPsoft relied on a direct sales force, but over the last 2 years have built out an extensive partner program for sales, implementation and specialized services. IPsoft maintains direct relationships with clients in strategic verticals (BFSI, Insurance and healthcare) but sees its partner network growing, especially in new geos (LATAM, Asia). Amelia is deployed in the cloud in 15 minutes and can be used directly after that. Known use-cases (i.e. from 1Store) can be validated quickly (once integrated with backend systems). Common

timeframes are 1-2 months POCs for known use-cases with known backend systems. 3-4 months for new use-cases and unknown systems.

- **Recommended Success Metrics:** (e.g. successful outcomes, number of turns supported, etc.)
    - ACE Score
    - The Artificial Capability Equivalent (ACE) Score is the number of trained goals Amelia handled correctly in context of her role during the conversation with the user. The ACE score is measured by performance (P) over the total number of goals (G). The Artificial Capability Equivalent (ACE) score is broken down into three (3) levels to track Amelia's competency in context of her role.
    - Beginner = <50% ACE Score
    - Intermediate = 50-80% ACE Score
    - Mastery = >80% ACE Score
    - Replaces v2 metrics such as % Successful, Successfully Handled, Resolution Rate or Accuracy

Future Plans & Vision

Virtual agent / human agent collaboration with automated learning across cognitive and autonomics; Ready-made virtual agents for specific use cases with roles, abilities and integrations; Intelligent channel optimization as virtual agents expand across modalities and channels; Automating entire processes across the organization, linking cognitive and autonomics via cognitive descriptive language; Multi-threaded, asynchronous and synchronous capabilities for solving more complex and/or lengthy interactions

Key Differentiators:

- Most human-like conversational virtual agent for multi-step dialog, with automated learning and improvement across all NLP functions.
- Enterprise focus: Customers are some of the largest and most secure enterprises, focus on dependability, scalability (+2,000 concurrent conversations using Spanish and voice), privacy and security.
- End-to-end automation of roles and skills, which includes:
    - Amelia to handle the conversation
    - Automation backend (incl RPA) for executing tasks
    - Human/Virtual agent collaboration system to handle and learn from exceptions.

Enabling Platforms & Technologies	Enterprise IA Maturity	Track Record	Future Plans & Vision
			

LivePerson
Headquarters: New York, NY
Website: https://www.liveperson.com/

FIRMAGRAPHICS

Year business started: 1997
Investment/Funding: publicly held, NASDAQ: LPSN
Number of employees: 1300
Revenue: $70.96 million (Q2 2019)

CORE INTELLIGENT ASSISTANT PRODUCTS AND SERVICES:

- LiveEngage: A conversational platform that provides routing, management, and reporting for all a brand's bot- and human-handled conversations. LiveEngage includes workspaces specifically designed for agents and managers, providing customizable interfaces for managing conversations from a wide range of integrated messaging channels.
- Conversation Builder: A set of bot-building tools designed to speed the design and development of conversational bots. Conversation Builder allows both technical and non-technical personnel to use point-and-click and dialogue-based scripts to build and improve bots.
- Maven: A machine-learning based engine that orchestrates conversational flows. Maven's AI-powered routing can dynamically route conversations to the right bot or agent based on customer profile, conversation history, or operational context. Maven's Agent Assist recommends the next best action for agents, suggesting either bots or Knowledge Base content.
- LiveIntent: Provides real-time intent detection, recognizing customer intents expressed in their conversations to improve reporting, automation, and routing of messaging conversations. LiveIntent's dashboard allows brands to track and analyze intents, in real-time, to improve agent performance and provide actionable business insights.

Enabling Platforms: Features & Technologies

- **Natural Language Processing or Understanding:** Proprietary NLU is used for intent recognition for bots built with Conversation Builder. It also powers real-time intent detection for use with LiveIntent and Maven advanced routing as well as sentiment recognition with LivePerson's proprietary sentiment measure, Meaningful Connection Score (MCS). Conversation Builder, LiveIntent and Maven also integrate with third-party NLU Google Dialogflow, IBM Watson, Amazon Lex, and Microsoft LUIS.

- **Data & Design:** For LiveIntent, support intent discovery and modeling through professional services, with starter pack intents for key verticals that are created using historical data that is bespoke to each brand. We also provide custom intent modeling services. Roadmap items include self-service tools for model building that will enable brands to quickly uncover patterns in their existing data, better discover specific high impact intents, and then automatically develop training phrases that can be used to train brand-specific machine learning models.

- **Dialog Management:** Conversation Builder is a dialog-based conversation creator, which allows for the mapping of dialogs to particular intents. Our dialog management system includes features such as slot-filling, error handling, context switching, and even built-in intent disambiguation. The inclusion of integrations via REST APIs or FaaS increases the dynamic nature and capability of these conversations. While Conversation Builder has been designed to enable non-developers to quickly and easily create rich, automated conversations, there is the ability to include additional scripting via JavaScript as needed. Conversation Builder also includes an Assistant tool which "listens" to dialogs as they're built, interaction by interaction. The Assistant suggests intents, entities, and patterns which can be added to each interaction.

- **"AI" / Machine Learning:** Maven learns from each interaction and improves prediction over time. For example, with Maven's Agent Assist feature, usage and feedback of each recommended action is recorded and used for training the relevance model by calibrating the match score for each suggestion. For Maven's AI-powered routing, a Q4 roadmap capability will add additional models for policy-setting, including sentiment via MCS, or a brand-specific data (i.e. sales funnel conversion score).

- **Process Automation:** AI engine, Maven, powers an Agent Assist feature, which recommends a suitable automation based on the conversational intent. Recommended actions are proactively shown to agents in their workspace for a specific conversation and allow the agent to transfer the conversation to a bot or join the bot in the conversation. For example, an agent could bring a bot into a conversation to complete a routine interaction (like an address change), and then re-

assume control of the conversation to continue with more complex tasks. Agents are able to score a recommended action up or down, which informs Maven's machine learning capabilities. Similarly, brands can upload FAQs and Knowledge Base content to suggest responses to agents based on conversational keywords and pattern recognition.

Integration Points & Scalability

- **"Zero Day Functionality":** In addition to pre-built bot templates, Conversation Builder includes built-in integrations for Knowledge Base content, Sending Email and Agent Escalation.

- **Search and Discovery:** Maven's Agent Assist feature recommends automations or Knowledge Base content based on the conversation, aiding agents to deliver successful outcomes; A Knowledge Center (knowledgecenter.liveperson.com) is accessible directly from LiveEngage as an agent resource. Documentation about LivePerson's APIs and SDKs is available at developers.liveperson.com; Agents can search for predefined content and transaction history through an All Connections tab in LiveEngage.

- **Modalities & Channels**: Support the following messaging channels through pre-built connectors: SMS (multiple gateways), Facebook Messenger, Apple Business Chat, RCS (Google and other), Google Business Messaging, WhatsApp, LINE, WeChat, Viber, Amazon Alexa, Google Home, AdLingo (conversational display ads). Instagram, Twitter, and Facebook (social post to message) are road mapped. Also support messaging on a brand's website and in their mobile app through an SDK for Android or iOS.

- **"Intelligent Routing":** With Maven, customers can build advanced routing policies using intent and other contextual attributes, such as customer profile data, operational factors (i.e. agent availability and predicted wait time), and conversational history. For example, Maven can use data from CRM systems to route high-value customers to a dedicated agent group. Maven can also route a customer who messaged about a specific intent (i.e. lost baggage) to the same agent.

- **IVR Integration:** With SmartConnect (our IVR Deflection service), we support the ability for brands to provide an option to message when customers call into an IVR.

- **Human Supervision:** Design services to easily allow human agents to manage and supervise bot performance. Bots can escalate conversations to human agents, human agents can intervene if they see sentiment decreasing, and human agents can transfer conversations back to bots with a feature ("Tango").

- **Support of live agents:** AI engine, Maven, powers an Agent Assist, or recommended actions feature, which recommends a suitable automation based on the conversational intent. Recommended actions are proactively shown to agents in their workspace for a specific conversation and allows the agent to transfer the conversation to a bot or join the bot in the conversation. For example, an agent could join a bot to complete a routine interaction (like an address change) and then continue with the conversation. Agents are able to score a recommended action up or down, which informs Maven's machine learning capabilities.

- **Integration with customer service stack:** Offer an open platform that allows integration via API with any CRM or backend business system. Through LivePerson Functions (FaaS), developers are able to customize conversational flows through code that runs in the LivePerson Functions cloud, based on conversational triggers. Functions can be used to integrate data from CRM and other business systems for Maven routing as well as integrate business systems for bots in Conversation Builder.

- **Analytics & Reporting**: LiveEngage Management Console includes: Real-time data on all Open Connections, All Connections, and Messaging Agents; Ability to sort and filter by conversation status, date/time, agent, skill, sentiment, and CSAT; Ability to search through closed conversations using advanced filter and search, including by sentiment; Ability to monitor conversations in real-time; A Manager Workspace is tailored specifically for agent managers, and consolidates agent data in a single dashboard and enables managers to better manage their shift and keep track of changing KPIs.

    - Report Builder offers brands ready-made dashboards reflecting data drawn from their LiveEngage account activity.
    - LiveIntent dashboard (launching Q4): Real-time reporting based on intents, including: topline metrics, volume, confidence, trendlines, and conversation quality; Ability to drill down into intents, conversations, and messages for decision-making and training.

- **Authentication & Security**: Multi-factor authentication; Single Sign-on; PCI-DSS certification; ISO27001 certification; GDPR compliant; HIPAA compliant; SSAE16 SOC2 audited; At-rest and in-transit data encryption; Data masking and Secure Forms

- **Ability to support multiple use cases:** Bots built with Conversation Builder are able to do context switching, sometimes referred to as Digressions. Within the scope of a conversation, a bot can store data in its active memory and make decisions on that entire data set. This allows the bot to arrive at advanced conclusions, or process one item and then return to others automatically.

Track Record & Enterprise IA Maturity

- **Market presence**: Operate globally, with offices in North America, EMEA, and APAC. Customers include Fortune 500 companies in banking, airlines, telco, retail and automotive. These brands are using AI-powered messaging to interact with their customers for a broad range of use cases across the entire user journey. In marketing, brands are using messaging to improve conversions through conversational ads. For sales, product information and availability can be shared directly in messaging to drive purchase decisions and secure purchase is available through any channel. On the care side, messaging is being used to support a broad range of use cases: bill payment, order status, repair and installation, account inquiries, travel status and rebooking, and more.

- **Highlighted customer deployments**:
    - Spirit Airlines is taking customer inquiries through WhatsApp and leveraging Maven's Agent Assist feature.
    - Tamara Mellon built a shoe-finder bot to help customers select the right kind of footwear. The bot uses different slots and entities to provide options for different styles and colors.
    - A major telco uses real-time intent data from messaging conversations to spot network outage and other service disruptions.

- **Customer Engagement Strategy:** Offer both a usage-based pricing model as well as an unlimited enterprise-license agreement. Conversation Builder and other AI services are available as add-ons. Deployment, integration, and support services are offered. We also offer platform training and certification courses. Many services can be deployed rapidly, and brands have been able to go live on initial messaging channels within several weeks. We also offer a pay-per-performance model where LivePerson manages the implementation and service delivery.

- **Recommended Success Metrics**: CSAT, Containment, Agent Efficiency, Order Value

Future Plans & Vision

AI and automation are foundational to LivePerson's Conversational Commerce solutions. Enterprises will not be able to deliver high-impact conversational interactions with customers -- at scale -- without leveraging automation. Have focused development on services that give front-line employees the ability to manage and supervise bot "agents." With LivePerson's building, management, and reporting tools, humans are able to oversee AI and ensure high-quality outcomes. Since mid-2018, the company has invested heavily in an AI-first portfolio, led by CTO, Alex Spinelli, and an innovative Research & Development team . AI services include Conversation Builder, Maven and LiveIntent services.

Key Differentiators:

- A deep set of conversational data: Having worked with brands for over 20 years providing technology for digital customer interactions (first through synchronous webchat and then with asynchronous messaging), we are able to leverage a brand's existing dataset to understand conversational intents, identify intents that can be automated, and predict outcomes.
- Breadth of channels and integrations: We were first-to-market and one of the only providers to have built integrated connectors with business messaging services through Apple, Google, WhatsApp, and Facebook.
- Investment in NLU, machine learning and AI-management and reporting tools: Allows brands to understand which bots work really well in customer journeys and quickly make adjustments.

LogMeIn

Enabling Platforms & Technologies	Enterprise IA Maturity	Track Record	Future Plans & Vision
			

LogMeIn
FIRMAGRAPHICS
Year business started: 2003
Investment/Funding: N/A
Number of employees: 3,500+
Revenue (either estimated or publicly available): $1.2B (2018)

BRIEF COMPANY DESCRIPTION:

CORE INTELLIGENT ASSISTANT PRODUCTS AND SERVICES:
Bold360 is a suite of solutions that help companies around the world to create next-level customer experiences (CX) wherever customers need it most. Built on the award-winning AI-powered Bold360 customer engagement platform, the Bold360 Suite – which contains Bold360 Service, Bold360 Advise and Bold360 Acquire – is purpose-built to help organizations deliver impactful CX from the very first engagement and throughout the customer lifecycle.

- **Bold360 Service:** Allows companies to support every customer in the channel of their choice – live chat, messaging, email, SMS, social and a conversational chatbot. From AI-powered self-service that drives improved operational efficiency and faster resolutions to personalized engagements with human agents that builds deeper customer relationships, Bold360 Service offers the best of AI and agent technology in one solution.

- **Bold360 Advise:** Empowers all customer-facing employees including care representatives, in store and field teams to make the best decisions for their individual customers by making centralized information accessible to everyone. It removes the friction associated with finding and leveraging job-critical information so employees

can spend more time focusing on the customer and delivering a truly personalized and consistent experience.

- **Bold360 Acquire:** Conversational chatbots will proactively guide website visitors through personalized shopping experiences, accelerating product selection and answering buyer questions in real-time to help accelerate growth by increasing conversion and decreasing cart abandonment.

Enabling Platforms: Features & Technologies

- **Natural Language Processing or Understanding:** Proprietary NLP:
  - Intent Classification – What does the user mean in a given statement or context
  - Conversation AI – The ability to conduct a continuous natural, dynamic conversation such as when the topic or details of a query change. This also includes the ability to update entities and manage Bot memory, and generate prompts to drive the conversation forward.
  - Entity or Knowledge Graph – Functionality which allows an AI Virtual Agent to have real-world knowledge that is utilized during a conversation, automatically. Entities and knowledge are ingested from any data source including databases and APIs, and can represent the world of any organization

- **Dialog Management:** Bold360's Conversation Designer Conversational Designer quickly converts Entities (data sources) into dynamic conversations with multiple questions and answers. Key functionality includes:
  - Fluid variables generate unique conversations for every end user
  - Easily add, change or remove variables and update call-to-action
  - Bot preview in Article Editor allows the content manager to see what the end-user will see
  - Responses can be displayed as image carousels, videos, quick buttons, and rich text.
  - Support for JSON, CSV, and API data sources

- **"AI" / Machine Learning:** Bold360's propriety NLU is regularly updated and improved based on AI models and machine learning algorithms. Bold360 utilizes the breadth of our data repository to improve our AI models and NLP accuracy in an ongoing process. This is achieved by both optimizing and improving the data that we collect and use for AI training, and by improving our algorithms through cutting edge machine learning research.

- **Process Automation:** The Bold360 AI Platform includes knowledge and content management system to power the IA and Smart Advisor – a tool which assists agents during real-time customer engagements by proactively recommending content and solutions to use for greater efficiency - in our Agent Workspace.

Integration Points & Scalability

- **"Zero Day Functionality":** Bold360's proprietary NLU does not require any training in advance of deployment so businesses can deploy a chatbot or AnswerBot immediately once content is added to the knowledge library.

- **Modalities & Channels:**
  - Web-based chat
  - Intelligent FAQs
  - Email web forms
  - In-App Mobile Chat (Mobile SDK)
  - Text/SMS
  - Facebook Messenger
  - MS Teams
  - WhatsApp
  - WeChat
  - Alexa
  - Google Home

- **"Intelligent Routing":** Bold360's smart channeling allows companies to set up the escalation paths and rules on their widgets. This capability is used to forward visitor engagements to another escalation channel such as chat, email or click-to-call. Smart Channeling incorporates a robust rules engine that creates different escalation paths to different scenarios, in order to better guide users who need further support to the channel that is best suited to resolve their issue or get the desired business outcome. Each channel can be shown or hidden as an escalation options after an engagement has been initiated, based on the processed rule. Rules can be related to the following: Topic of users' query, Widget/Interface used, URL, questions' "value" / "complexity", search results, any form of missing context (user geo location, device type, etc.), language, time or day. Bold360 includes an Agent workspace to handle human-assisted engagements such as live chat, email management, video chat, etc. With Bold360's open APIs, we can integration with other open interaction platforms.

- **Human Supervision:** Bold360 includes both AI-powered bot and live agent conversations, allowing customers to engage with the right tool at the right time. When a customer engages with a bot, a supervise can monitor engagements and force human intervention if needed. During human agent engagements, an agent can launch a bot to collect information and take action that would is typically repetitive and time consuming. Bold360 NLU accuracy can be improved by customers for their specific use case. Bold360's. They can do so by utilizing the tools provided which identify AI mistakes and allows customers to correct them. These updates are immediately leveraged to improve the AI behavior and adapt to the specific needs of the business.

- **Support of live agents**: Bold360's Smart Advisor tool assists agents during real-time customer engagements by proactively recommending answers to questions, content and other potential solutions for customer issues -- promoting greater efficiency and happier agents and customers. In addition, the Smart Advisor also helps to easily identify and curate new chatbot/self-service content from frontline agents.

- **Integration with customer service stack**: Bold360 has open APIs, allowing customers to configure integrations that best meet their needs. In addition, Bold360 has out of the box integrations with Salesforce, ServiceNow, Zendesk, and Google Analytics

- **Analytics & Reporting:** For Bold360 AI deployments, out of the box reporting is accessible within the tool including the voices dashboard, custom charts and trend analysis. Quick views of top escalations and questions, customer feedback, and customer profile data are also available. Custom reports can be generated to retrieve data on all engagements and reports can be grouped and filtered by a certain criteria such as time, source, intent and content, article context, channel of engagement, resolution status. Additionally, with Bold360's NLP Voices Dashboard, intents and interaction data are grouped and organized to highlight the most pressing customer needs and help business improved interaction outcomes. Finally, reporting data can be exported via Bold360 API to any third-party system that can take in data. For the Bold360 Agent workspace all major KPIs, SLAs and metrics can be reported on 24/7 by engagement channel including: Operator and chat performance, analytics reporting on visitor information, chat invites (manual and automatic), conversions, acceptance rates, handle times, speed to answer, utilization rates, abandonment rates, and highest pages of chats. Reporting can also be run on agent activity like login and feature use.

- **Authentication & Security:** Bold360 includes a wide range of security features and functionality, and is certified for ISO/IEC 27001 by an independent and accredited certification body, based on successful completion of a formal compliance audit. Functionality includes:
    - GDRP compliant
    - Back-office management interface which is secured and encrypted using TLS and SSL encryption.
    - LDAP/Active Directory SSO integration
    - Encrypted User Credentials which use a strict password complexity policy.
    - User level access privileges
    - Failed login lockout
    - IP range restriction capabilities

- **Ability to support multiple use cases:** Bold360's flexibility, "white box" NLU, and customer insights-driven improvement model allows for Bold360 to be used across use cases. Bold360 has been used for deployments across the customer journey – discovery, conversion, self-service support, live product support - and for different use cases such as proactive engagement, customer acquisition, customer support, agent augmentation, and employee support.

Track Record & Enterprise IA Maturity

- **Market presence:** LogMeIn's Bold360 solution is leveraged by a variety of industries where companies care about total customer lifetime value and want to build brand affinity. The primary industries that leverage Bold360 are Service Providers (telco), Retail / eComm, Financial Services, and Hospitality / Travel. We serve both internal and external use cases (i.e. internal = in service of employees of the company. External = in service of the customer)

- **Highlighted customer deployments:**
  - Fannie Mae, Financial Services
  - Johnsons & Johnson, Pharmaceutical
  - Dyson, Retail
  - VF Corporation, Retail
  - Canon, Technology
  - William Sonoma, Retail

- **Customer Engagement Strategy:** Bold360's go-to-market strategy has centered around working with businesses across verticals which are seeking fast time to value with an AI solution which compliments and works with their human support agents. By marrying market Bold360''s strong pedigree in digital engagement channels, and our conversational AI technology we are able to show significant results for deployments in which bots and live agents work together to provide seamless, delightful customer experiences. Additionally, with our use case focused approach and hands on customer experience team, our customers are typically live with 8 to 12 weeks, and seeing considerable ROI shortly after launch. Finally, with varying tiers of pricing and deployment approaches, customers with a range of budget sizes from the mid-market to the enterprises are seeing success with Bold360.

- **Recommended Success Metrics:** A north star metric for Bold360 is Self-Service Score. Single number which is a calculation of the number interactions and the number negative signals. Many customers focused on increasing deflects, use Channeling Score to identify the rate of channeling out and the associated channel details. Measure success based on bot utilizations, so the percent of engagements to site visits. Outside of Bold360's key metrics, Customer with monitor metrics based on the use case they are solving for and initially established KPIs, these include deflection rate, FCR, NPS/CSat, Conversion rates, customer effort scores, onboarding costs, etc.

Future Plans & Vision

Bold360 is evolving from a single offering for customer support to a suite of solutions designed to help companies create great CX throughout the customer lifecycle. Phase 1 launched in June of 2019 with Bold360 Advise - an AI-powered knowledge management solution for customer-facing employees. Phase 2 will roll out in Q4 and will include solutions to help with customer acquisition and internal employee support. Additionally, we're investing in our core conversational AI technology for to allow for broader voice use cases and will focus is on providing broader data orchestration to the IA, by enriching its interactions with other 3rd party data and other existing systems of record. Finally, we are looking at expansion opportunities into the CCaaS market.

Key Differentiators:

1. **Faster Time-to-Value:** Where most AI powered customer engagement solutions today require complex data analysis, months of set-up and significant amounts of data, Bold360 is accessible and ready-to-use, delivering value in weeks, not months. No data scientists required.

2. **Seamless Interactions Between Customers, Bots and Agents:** Bold360 offers the most tightly integrated agent and bot solution that ensures seamless transition from bot to agent in the same chat window.

3. **AI-Powered Agent Assist:** AI helps the agent's workflow and recommends content to use for greater efficiency and better outcomes. Additionally, Bold360 can automatically handle routine customer interactions freeing agents up to focus on more complex or high-value work

Enabling Platforms & Technologies	Enterprise IA Maturity	Track Record	Future Plans & Vision
●	●	●	●

Nuance
Headquarters: Burlington, MA
Website: http://www.nuance.com

FIRMAGRAPHICS
Year business started: 1992
Investment/Funding: N/A
Number of employees: 7,000 (effective 10/2019)
Revenue (either estimated or publicly available): FY18 Non-GAAP revenue: $2.1B; $483.2M in Enterprise segment (https://investors.nuance.com/investors/overview/default.aspx)

BRIEF COMPANY DESCRIPTION:
Nuance Enterprise is reinventing the relationship between enterprises and consumers through customer engagement solutions powered by artificial intelligence. The company aims to be the market leading provider of intelligent self- and assisted-service solutions delivered to large enterprises around the world. These solutions are differentiated by speech, voice biometrics, virtual assistant, web chat and cognitive technologies; enabling cross-channel customer service for IVR, mobile, messaging and web, for inbound and outbound engagements; and magnified by the design and development skill of a global professional services team. Serves Fortune 500 companies across the globe with a mix of direct and channel partner selling models.

Enabling Platforms: Features & Technologies

Speech Processing: ASR/TTS: Goes deep into vertical markets and is able to understand complex, industry-specific words, which is key to successful Conversational AI implementations in the enterprise market. Nuance offers 40 text to speech languages and voices and more than 80 languages across voice, NLU and text. ASR and TTS can be utilized for a variety of channels, from the phone (to design IVR experiences) to apps, the TV and soon the website.

Text processing: NLU is foundational to the Nuance Intelligent Engagement Platform and powers both text and voice engagements (see more details under NLU/ NLP). The text-based virtual assistant supports 23 languages and a variety of dialects.

Natural Language Processing or Understanding: Nuance is a pioneer in AI and NLP with a team of 2,300 linguists, speech & language scientists, conversational & content designers, developers and customization engineers. The Nuance team has filed more than 5,400 patents and applications and our accuracy rates stand with the best in the world. NLP and NLU is foundational to the Nuance Intelligent Engagement Platform and powers both text and voice engagements. The "one brain" approach allows for one underlying knowledge that updates and tunes across any channel quickly and easily, while making sure that engagements are handled in a channel appropriate way.

Nuance creates and maintains its own unique NLP engine that utilizes the latest advancements in deep neural networks and machine learning, taking in text input and using an ontology based on the NLU models to perform Semantic Processing. The NLU engine performs tokenization, text normalization, spelling correction, etc. to standardize inputs from voice and text channels. Nuance Natural Language Engine (NLE) than uses 3 AI-powered components: intent classifier, entity recognition, and rationalization, making it capable of understanding not only the words enterprise customers speak or type, but also the intent behind their requests. Nuance engines allow layering customer-specific models on top of more general models to allow Enterprises to achieve optimal performance. Nuance NLU combines linguistic and machine learning together to understand intents and meaning from words a customer says, texts or types. Does not rely just on language structure for understanding – produce a complex model that understands context, and pull in language-specific tokenization, word stems, unigrams, bigrams, and trigrams, synonyms, presence/absence of concepts, and frequency of occurrence. Beyond NLU, Nuance offers Natural Language Generation (or NLG) for intelligent result refinement that reduces the size of the entropy of disruption over the inputs

Data & Design: The Intelligent Engagement Platform offers vertical-specific packaged design, from leveraging existing data stores (FAQs, search engine data, chat logs/transcripts, customer IVR data) to language models for each supported language and domain specific NLU starter packs for Banking and Telco, and a variety of social interactions, such as weather information, social chatter, etc.

Dialog Management: Shared dialog management enables organizations to utilize one platform to manage customer engagements in any channel (IVR, web, messaging, IoT, TV, etc.) including the ability to adjust the experience appropriately for the specifics of every channel (i.e. text vs voice, length of answer, etc.). This allows enterprises to reuse their investment throughout their omni-channel strategy. In addition, the tools used to design, deploy and maintain the virtual assistant automate intent and entity handling. For example:

Clustering for intents: The NLU curation tool uses automatic clustering to suggest the right intent for each user response from Production. The curator can skim the results and accept or correct the system's suggestions (in bulk). Clustering for intents: The tool identifies where the data is inconsistent and offers the curator the opportunity for correction. Parsing and entity recognition for concepts/mentions (slot values). The NLU curation tool uses parsing and entity recognition to suggest the right concepts for each user response from Production. The curator can skim the results and accept or correct the system's suggestions (in bulk).

Pathfinder, a tool available through the Intelligent Engagement Platform, reduces the labor-intensive steps of creating a virtual assistant. Pathfinder's proprietary intent discovery algorithm analyzes a company's conversational customer service data and automatically identifies users' intents. It then groups conversations together according to these intents, saving much of the manual labeling effort. Using a company's data, it then builds a visual representation of all the different paths its customer service conversations take—from first question to each follow-up—to reveal the best paths to resolution, as well as unknown problem areas.

"AI" / Machine Learning: Prediction engine allows an organization to predict what a customer may want before they reach out using proactive notifications and when they do reach out, understand what it is they are likely contacting the organization for so responses can be customized, and engagements reach resolution faster. The system is self-improving through different types of learning including from existing data and during the conversation (see examples under Dialog Management). The analytics layer in the Nuance Intelligent Engagement Platform automatically captures and analyzes all omni-channel customer interactions – to give organizations actionable insights into emerging patterns to determine consumer preferences, behavior, sentiment and intents and use that information to inform the engagement.

Process Automation: Nuance integrates with Knowledge Management systems supporting direct integrations, replication, search, and retrieval. Nuance also solves for process automation with middleware solutions as well as the ability to use voice-driven macros (which can switch applications, simulate clicks, enter text, etc.) to enable live agents to streamline cumbersome and repetitive tasks.

Integration Points & Scalability

"Zero Day Functionality": In addition to generic NLU capabilities (such as dates, currency, weather, social interactions) Nuance has created domains optimized for financial services (such as account management and transfers) and telecom (such as password/ PIN reset and carrier specific questions). These "Vertical Starter Packs" contain intents specific to each industry, which reduces the workload of training the language model and improves the accuracy of intent classification at launch. The critical element is to be able to extend and customize these capabilities based on an Enterprise's specific goal, and Nuance has

designed tools and services to facilitate that optimization. Nuance Pathfinder is also used to scan through existing data and immediately show the most common types of conversations, so a developer can design a virtual assistant based on real-data vs SME knowledge (see info under Dialog Management).

Search and Discovery: Nuance Pathfinder is also used to scan through existing data and immediately show the most common types of conversations as well as determining the best paths through a conversation type to arrive at the optimal outcome.

Modalities & Channels:

- Phone/ IVR
- Web browser for desktop and mobile web
- Apps via JS, API and SDK
- Messaging: SMS, Apple Business Chat, Facebook Messenger, Twitter Direct Messaging and soon RCS Business Messaging, WhatsApp, and more
- Smart devices, such as Google Home, Amazon Alexa, and TVs (through set-top box integration)

"Intelligent Routing": Depending on the channel in which the conversation starts, the Nuance Intelligent Engagement Platform can route consumers from one channel to another, such as from IVR to digital (see more details under "IVR Integration") or from a VA to a live agent while providing any other useful material without losing the context. Within a web-based engagement, it utilizes real-time data from the customer journey, for example the understood intent, user behavior, information about the pages looked at on a website, time spent, $ amount in the cart, etc. to route consumers to the agent (VA or live agent) with the best skill set to help with that inquiry. For messaging engagements, it utilizes NLU to interpret the meaning of the incoming messages and then routes the inquiry to the agent (VA or human) with the best skill set. In case the user pauses the conversation for an indefinite amount of time (asynchronous conversation in web and messaging channels), the routing engine ensures that new incoming messages related to the same conversation are routed to the same agent, if available. The Intelligent Engagement Platform offers a variety of APIs to "plug into" various enterprise systems, including 3rd party VAs, chat or call center systems like IBM Watson, Oracle, Salesforce, and others.

IVR Integration: The Nuance Intelligent Engagement Platform supports phone and digital channels. For example, when a consumer calls in, the IVR can ask for specific information and check things like agent availability to decide if the inquiry is better suited for a digital channel and can then move the caller to a digital experience without losing the context. This is usually done by sending an initial SMS that enables the consumer to continue via text messages.

Human Supervision: The Nuance Intelligent Engagement Platform intertwines AI and live agents seamlessly and offers active learning for VAs and live engagements. If the VA gets stuck or doesn't know the answer, the live agent can support and supervise the VA by

selecting the correct intent so the VA can continue. This is useful not only for VA training and enhancement, but also for lead generation (filter high qualified sales leads and transfer to live agents for conversion support), CSAT Management (monitor for unanswered intents and take over to maintain and increase customer satisfaction) and insights collection (identify content expansion opportunities based on real-time feedback). Today in production: 79% of those assigned intervened successfully with more than 100k real time self-service corrections to date.

Support of live agents: If the answer is not available or the customer requires a human touch for upsell or CSAT then the VA can seamlessly escalate to a contact center agent, using the understood context to prioritize and route to the human agent with the best skill set. Once the agent takes over, AI continues to assist the live agent by delivering recommendations, fraud indicators, next best action suggestions, etc. This includes the highlighting of live agent scripts, ensuring that compliance is met (i.e. that the agent mentioned certain phrases), highlighting the latest offers, indicating if the agent is still talking to the same customer, etc. Recommendations are all based on data from agent scripts and historical information. This is available for both digital and call agents and can be integrated in any agent desktop. The insights from these interactions are then evaluated to make the VA more confident, improve the recommendations, or identify new areas for automation.

Integration with customer service stack: The IEP is a flexible and highly customizable platform that enables Enterprises to integrate with their existing deployments through a variety of APIs – from legacy infrastructure to internal systems, such as CRMs, reporting structures, etc. and other investments that have already been put in place, such as chatbots, IVR, etc. - and to utilize these integrations to inform and personalize the customer engagement.

Analytics & Reporting: Nuance analytics automate the capture and analysis of omni-channel customer interaction data such as contact center calls, chat transcripts and messaging conversations. Once captured, the raw data is transformed into structured information that can be sorted, filtered, searched and analyzed to better understand customer interactions, and identify patterns and root causes for successes and failures to make those insights actionable. These insights are provided through an easy-to-understand, at-a-glance dashboard so key KPIs can be tracked and acted upon depending on the insights delivered. Omni-channel reporting and analytics solutions also provide near real-time visibility into application performance – validating that call and chat flows are working as designed, identifying usage patterns and facilitating troubleshooting within the contact center, for example a supervisor monitoring the conversations and jumping in to assist if necessary. Finally, with Nuance's experts for automation, data science and professional services, custom analytics solutions can be designed to meet customer-specific needs or complement packaged solutions with customization and optimization services for additional value and to make insights actionable.

Authentication & Security: Security is foundational to the Intelligent Engagement Platform. Secure every channel through a layered approach that includes advanced voice and behavioral biometrics engines, intelligent detectors, ConversationPrint language analysis and anti-spoofing technology. This allows not only for secure interactions but also for real-time personalization. The Nuance Intelligent Engagement also offers 3rd-party integrations with other authentication methods including custom client applications (tokenized authentication systems, single sign-on systems). Large enterprises need robust solutions and Nuance's technology is built to scale without sacrificing security. Customer data is isolated by application and scripts are isolated by server in global hosting environments. Data is encrypted (transport links between agent, the end user and R&C are encrypted over https) and sensitive data (i.e. PII) is masked automatically based on phrases a customer is using or the format used. Compliant with PCI, GDPR, ISO 27001, and soon FedRamp.

Ability to support multiple use cases: A strength and differentiator needed for successful enterprise deployments, which are more complex by nature: Conversational design expertise; Enterprise grade, mission-critical, secure technology; Complex multi-turn dialogs and advanced semantic reasoning. Have mastered basic understanding and recognition, the work is in processing intents, making the exchange valuable to the consumer. Technology is capable of handling enterprise-grade deployments, from hundreds and thousands of intents, distinguishing between them and making sure the conversation flows in a natural, human-like way with tools built to support those deployments at scale. Also provide:

- Version control for NLU grammars, dialog content and business logic
- Push-button NLU generation and content publication
- Multiple work streams
- Content variations (i.e. based on channel or personalized input)
- Grammar accuracy checking
- Global languages, hosting and PS support
- Sensitive data encryption and data masking
- On-demand security

Datacenters and deployments confirm with industry-leading SLAs to ensure a 99.99% uptime of the system and include 24x7x365 NOC support.

Track Record & Enterprise IA Maturity

Market presence: More than 6500 enterprises use Nuance's Intelligent Engagement Platform and 85% of the Fortune 100 trust Nuance for their customer engagement technology. Notable Nuance customers include USAA, FedEx, JetStar, Esurance, Swedbank and The Australian Tax Office. Customers have reported Nuance's technology has improved customer experiences and driven ROI. A top three global retailer that operates in 47 markets around the world was able to deploy Nuance's virtual assistant in record time by leveraging existing chat transcripts and combined industry knowledge for faster training and go-live. From the first day of deployment, it was seeing over 85% of customer cases resolved by the virtual assistant.

Customer Engagement Strategy: Nuance supports the full spectrum, from licensing individual components (i.e. ASR, TTS, NLU, etc.) to full solution design across multiple channels and modalities. It depends on the Enterprises' individual needs what makes the most sense for their individual business needs. Depending on the scope of the deployment, prices vary, offer include: Bundled offerings to include i.e. live chat, proactive notifications, biometrics, etc.; Per seat; Session pricing; Gain sharing (risk/reward); Subscription

Recommended Success Metrics: Depending on the use case and the enterprise's business goal, there are several success metrics that would be relevant: For a sales-focused VA - improved conversion rates, uplift in avg. order value, and increase in revenue in general; For customer care - customer satisfaction, reduced transfers, speed to resolution, and deflection; For internal use cases - reduced time to resolution and efficiency increases.

Future Plans & Vision

Nuance focuses on driving innovations for AI-powered omni-channel engagement augmented by human assistance to predict, engage, and analyze interactions between customers and organizations. The company is dedicated to enhancing personalization possibilities and improving toolsets, expanding the capabilities for self-learning, dialog management, customization, testing, and optimization for enterprise-size deployments. The reporting toolset will provide a full view of consumers as they move across channels in order to optimize the experience based on specific behavior. Nuance is preparing for a future where humans and AI will work even closer together and assist each other, provide personalized UX and right-channeling across the customer journey, and enable all digital channels including messaging, IoT devices, and leveraging voice as a preferred modality.

Key Differentiators:

1. **Flexible and highly customizable platform** enables enterprises to integrate with their existing deployments through a variety of APIs – from legacy infrastructure to internal systems, such as CRMs, reporting structures, etc.

2. **Enterprise-grade scalability** guarantees 99.99% uptime and security for large deployments. Best-in-class security and privacy, industry-leading operational SLAs with 24x7x365 NOC support, shared dialog management, push-button NLU generation and content publication.

3. **Seamless connection between AI and humans.** Conversations start with intelligent automation. If the VA gets stuck or doesn't know the answer, it can ask for help from a live contact center agent who then selects the correct intent so the VA can continue. If the answer is not available or the customer requires a human touch for upsell or CSAT then the VA can seamlessly escalate to a contact center agent.

Omilia
Conversational Intelligence

Enabling Platforms & Technologies	Enterprise IA Maturity	Track Record	Future Plans & Vision
			

Omilia

HQ: Larnaca, Cyprus; Delivery Center: Athens, Greece,
Website: https://omilia.com/

FIRMAGRAPHICS
Year business started: 2002
Investment/Funding: Self-funded with actual client revenues
Number of employees: 218
Revenue: privately held

BRIEF COMPANY DESCRIPTION:
Omilia's Omni-channel Virtual Assistant platform provides a seamless human-like end-to-end conversational experience for self-service across all channels. Omilia has been delivering conversational self-service with their DiaManT dialog management platform since 2012 and currently has more than 24 live end-to-end conversational voice portals and chat bots in production.

CORE INTELLIGENT ASSISTANT PRODUCTS AND SERVICES:
The Omilia Conversational Self-Service Solution is the only AI solution that can boast least 27 production-grade contact centers globally, bringing unique advantages to enterprises that look to employ Voice/speech or Text virtual agent. Omilia Virtual Assistant applications are truly omnichannel as they are developed once and leveraged horizontally, providing a seamless, end-to-end conversational experience across channels, including IVR, social messengers, web chat, smart speakers, mobile app, email and SMS. One platform, one integration - all channels, all formats; same impeccable conversational experience on all of them.

Omilia's native technology stack includes artificial intelligence (AI), speech recognition (based on deep neural networks and recurrent neural networks), natural language processing (NLP)/NLU/NLG, machine learning (supervised and unsupervised), automatic language detection, dialog system, semantics, speech analytics, speech-to-text, text analytics, predictive analytics, text-to-speech (using live-voice talent voice synthesis), passive voice biometrics, and a machine-readable knowledgebase. DiaManT® utilizes unsupervised machine learning to train the AI-enabled NLU models. It performs intent classification and entity extraction on large data sets of actual user utterances and language combinations for each vertical to achieve semantic accuracy. Speech recognition, NLU and dialog management are leveraged in the solution's cognitive capabilities.

Enabling Platforms: Features & Technologies

- **Speech Processing: ASR/TTS**: deepASR® is the Omilia ASR engine - DNN powered Automatic Speech Recognition Engine leveraging the most advanced forms of Deep Learning, achieving accuracy which exceeds human-level performance. Recognizing 17 languages including English (US, Canada, South Africa), Spanish, Russian, Polish, Kazakh, Ukrainian, Greek. deepASR® can achieve Word Error rates of less than half of legacy incumbent providers. All primary language packages include adapted acoustic and language models to cover accent and dialectic variations within the country. deepASR® is compatible with all open standards-based systems, including all major IVR platforms and supports both VoiceXML and the MRCP protocol.

- **Text processing:** The deepNLU® engine works to extract meaning from any transcribed (textual) utterance of free unstructured speech.

- **Natural Language Processing or Understanding**: Omilia NLU engine-deepNLU® works to extract meaning from free, unstructured language. The deepNLU® Engine makes it possible to understand customer requests and intents with human-like accuracy. Because the engine is context aware and retains memory, it is capable of running entire end-to-end conversations with customers. deepNLU® can be trained for any domain (e.g. Telecoms/ Banking) using Omilia's Partner tools and can perform in-depth analysis and extract all low-level information needed to completely understand and categorize customer requests to more than 300 (and sometimes as high as 2500) categories with accuracy higher than 95%.

- **Data & Design:** NLU and ASR pre-trained packages: xPert Packs® Pre-built Domain and Language Specific components, with a fully pre-loaded intelligent Virtual Agent providing out-of-the-box recognition and understanding of all key domain concepts. xPert® packages come with pre-built Concept Annotation Dictionaries, Rules, and Intents for your business. Omilia's Conversation Studio (cloud-based development environment) allows any business analyst to create and manage conversational scenarios within minutes and build advanced dialogs to manage the conversation flow with customers. Conversation Studio allows a business analyst to manage the NLU

Ontologies (Concepts, Entities, and Intents) and the Dialog Flow business rules, all from a single interface designed for business analysts.

- **Dialog Management:** DiaManT® is a mature, sophisticated, enterprise-proven platform that supports true Conversational User Interfaces over voice and text. It provides infrastructure and core capabilities to power omni-channel conversational AI experience, acting as a single-point of integration with enterprise systems for driving conversational dialogs on all channels. The platform interacts with users over Speech, Text, or GUI input; inbound and outbound from IVR, webchat, and mobile applications with true continuity for seamless cross-channel service. Omilia's NLU Engine can perform in-depth analysis and extract all low-level information needed to completely understand and categorize customer requests with 100's of intents categories with accuracy higher than 95%. Omilia's NLU Engine uses the state-of-the-art deepNLU® technology and unlike all traditional approaches (i.e. rule based, static, robust grammars, and statistical semantic models that mostly use *key-word spotting*) deepNLU® applies multiple layers of language analysis on each individual customer utterance: Speech Analysis, Syntactic Analysis, Semantic Analysis, Pragmatic Analysis, Ontologies, Statistical Analysis

- **"AI" / Machine Learning:** Unsupervised machine learning used to add new NLP logic to analyze utterances and cluster similar meaning utterances and identify new intents. Unsupervised Clustering: Application leverages various techniques within the fields of natural language processing, artificial intelligence and machine learning. More precisely, the application relies on the combined use of grammatical, semantical and lexical knowledge to cluster user utterances in coherent intent groups and induce explicit descriptions of the semantic components of each of the intents. Sentiment Detection: DiaManT® uses machine learning to find insights and relationships in text in order to provide sentiment analysis. For example, if the dialog manager notices that the customer is using negative sentiment-oriented language different dialog flow logic can be invoked in order to take business actions for a better experience, i.e. handover to VIP experience specialist.

- **Process Automation:** NLU-based RPA Agent-side benefits: NLU adds to minimizing human error with RPA and assist agent-side cost effectiveness; The added functionality of NLU in RPA allows for agent-side effective time management.; The entire user session can be tagged. This allows agents to go back to the information provided during the dialog or session; review, reuse or repurpose data.

  Overall benefits: The combined NLU/RPA functionality allows for additional available systems to be flawlessly integrated in the process. E.g.: backend process to receive score, systems adding to faster interactions. The solution allows for background systems to be orchestrated effectively and serve business rules and objectives as pe client's needs and priorities. The NLU-powered RPA is building on the benefits of the

bot while able to handle more complex user requests and automate processes based on the NLU of the requests. The solution helps automate the agent & user interaction to extended degrees even end-to-end.

Testing Studio: an automation testing framework created by Omilia, for conversational applications testing. It supports test-driven development as well as different levels of functional testing along with multiple assertions and features and it can be customized based on testing needs and requirements making testing easy, efficient and fast.

Integration Points & Scalability

- **"Zero Day Functionality":** xPert® packages per vertical:
  Banking/Finance: 400 Unique Intents, 180 Entity Types, 54,000 Entity instances.
  Insurance : 226 Unique Intents, 180 Entity Types, 53,500 Entity Instances
  Telecommunications: 487 Unique intents, 157 Entity Types, 53,800 Entity Instances.
  Healthcare: 253 Unique Intents, 152 Entity Types, 52,800 Entity Instances.

  miniApps®: Bitesize Conversational AI Self-Service - independent and configurable natural language dialog components that handle a single task like e.g. soliciting a US address or negotiating an appointment. miniApps® are also instantly configurable to business rules; with zero coding and instant deployment. Pre-trained and pre-tuned by Omilia, leveraging vast amounts of data, miniApps® are powered by the Omilia unique Natural Language AI, and can accurately handle exceptions and real-world conditions, complete with data validation, disambiguation and error recovery strategies.

- **Modalities & Channels**: The Omilia Conversational AI Self-Service solution is true omnichannel: supporting IVR, webchat, MobileApp, SMS, Smart Speakers, Social, etc. There is one brain doing the NLU, dialog flow logic and back-end integrations so that the enterprise is able to leverage the same flows in multiple different channels, able to make modifications where required (Channel Adaptation). It also supports the user to seamlessly transition from one channel to another with all context information carried over either engaging with the virtual assistant or if escalating to human agent.

- **"Intelligent Routing":** Modifiable Call Steering Routing Options – Directly customize the routing logic, create new routing points based on existing concepts, modify Routing Destinations of Categories, modify queue targets, and realize changes in category disambiguation questions, modifications, additions, associated prompts.

- **IVR Integration:** With omIVR® you have full integration with automatic speech recognition by deepASR®. We can connect to most of the 3rd party IVR vendors in the market (i.e. Genesys, Cisco, Avaya).

- **Human Supervision:** Developed a unique architecture for combining the expressive power of deep learning models with the benefits of rule-based systems. Our approach permits fast adjustment to the updates in requirements and the business logic of the clients (e.g. frequent changes in the set of intents, incorporation of new products) with few or even zero training examples.

- **Support of live agents:** Omilia provides Agent Augmentation solutions: Agent Script Adherence to provide analysis, Agent Knowledgebase Coaching (pushing content to agent desktop), Customer Sentiment Analysis and Agent Discourse Assist to provide guidance and sentiment analysis.

- **Integration with customer service stack:** The DiaManT® platform can seamlessly integrate into all back-end systems (CRM, BPM, SOA etc.) and leverage data.

- **Analytics & Reporting:** Visualizing the big data generated by DiaManT® to analyze customer conversations. Real-time business discovery on what customers are actually saying with detailed Topic and Sentiment Analysis on natural language feedback from consumers. Conceptual mapping of concepts and words customers are using. Allows drilling down within topic to listen to the phrase actually used. Twofold as it provides both Virtual Assistant Speech Analytics as well as Agent Speech Analytics. omAnalytics® facilitates analysis of user interactions, identifies areas for increased automation, provides view of interaction summaries for each channel, allows application of extra search criteria for datamining. Reporting possibilities in daily, weekly and monthly basis.

- **Authentication & Security:** Omilia platform, application design, cloud training and development instances are fully PCI and GDPR compliant. DNN-Powered, Passive IVR-side Voice Biometric Authentication. deepVB® uses biometric voice-print features to authenticate customers as they speak, while DiaManT® NLU applications mix traditional security questions into the Conversational Voice User Interface design of the Virtual Agent. deepVB® allows skipping answering traditional security questions when there is sufficient confidence score of the Voice print match. No need for special passphrase or active authentications, decreases Live-Agent talk time.

- **Ability to support multiple use cases:** Omilia is fully capable and has been supporting the complexity encountered in actual natural human conversation; that is one of our greatest differentiators and strongpoints. Handling Multiple Intents - DiaManT® manages double or multiple intents in one user utterance by parsing the sentence, and splitting it into phrases, then classifying the intent on each of the phrases. Once all phrases are classified with an intent (if there is one), the system will proceed to resolve the right order in which the intents must be processed, based on business logic and interdependencies. Omilia's deepNLU® engine is probably the only production-quality NLU engine that can truly handle multiple intents in a single utterance.

Track Record & Enterprise IA Maturity

- **Market presence**: 27 production-grade contact centers globally – fully functional today; Deploying the same solution once and developing horizontally across channels.

- **Highlighted customer deployments**:

- Royal Bank of Canada (banking/finance, North America)
- Discover Financial Services (banking/finance, North America)
- Vodafone (telco, Europe)

- **Customer Engagement Strategy:** Deployment ease: paired with easy changes – Omilia delivers the entire service from an artificial intelligence platform; versus needing a large team of speech scientists and software engineers to write voiceXML applications for conversational self-services. Projects can be delivered in as little as ~3 months.

- **Recommended Success Metrics:**

- Semantic accuracy – Concept Identification Success Rate (CISR): the extent to which the system successfully extracted the correct meaning out of the individual caller utterances in %; Successful Calls – Task Completion Rate (TCR): the percentage of calls where DiaManT® successfully services the customer's request(s) by providing self-service or correctly routing to the correct advisor; Word Error Rate.

Key Differentiators:

- NLU and Dialog Flow Development Tools for Autonomous Development and Management – Omilia provides both the tools and training necessary for the enterprise to enable its own personnel to create and manage their own Natural Language Understanding and Dialog Flow logic. With the Omilia "Conversation Studio" both business and technical personnel can modify Call Steering routing options, create and modify Self-services, enhance Semantic Ontologies, and enhance Language Models.
- Better Speech Recognition Accuracy – Omilia's Automatic Speech Recognition (ASR) engine technology is based on deep neural networks, which allows deepASR® to rapidly improve and reduce error rates in recognition and response. Omilia's deepASR® has achieved a 4.26% Word Error Rate (WER) in enterprise call center environments.
- True Omni-Channel – DiaManT® means that we use the same platform regardless of channel, allowing for developing the application once and leverage horizontally on all channels, invest in cross-channel capabilities, and deliver transformation through evolution.

Enabling Platforms & Technologies	Enterprise IA Maturity	Track Record	Future Plans & Vision
			

Salesforce
HQ: San Francisco, CA
Website: www.salesforce.com

FIRMAGRAPHICS
Year business started: 1999
Investment/Funding: MYSE CRM
Number of employees: ~40,000
Revenue (either estimated or publicly available): Q1FY20 earnings: $3.74 Billion
https://s23.q4cdn.com/574569502/files/doc_financials/2020/CRM-Q1-FY20-Earnings-Press-Release-w-financials.pdf

BRIEF COMPANY DESCRIPTION:
Einstein Bots are part of Service Cloud. They are designed to augment human call center agents. The goal of Einstein Bots is to enable customers to quickly and accurately interact with an organization without waiting for a human agent to become available. Bots provide a chat-based interface to customers. That means they can send messages, ask questions and take actions based on defined rules and/or customer input. Bots use the Einstein Platform's Intent service to interpret customer input. Additionally, bots can present customers with pre-defined options in menus.

Enabling Platforms: Features & Technologies

- **Speech Processing: ASR/TTS**: Google ASR integration for Call transcription (February 2020 pilot)

- **Text processing:** Simple logic (rules and conditions) configurable from declarative process builder; Search and exact match recognition; Complex logic managed with programmatic apex code; Standard Entity validation (Text, Number, Boolean, Currency, Percent, Date and Time, Location, Persons, Organizations); Custom type validation (Regex, Value lists, Programmatic validation)

- **Natural Language Processing or Understanding**:
  - Intent Classification with proprietary NLP service (Metamind acquisition), generally available for English-US.
  - NER model generally available for English-US
  - Intent Classification in pilot for English-Uk, French, Spanish, Portuguese, Italian and German. NER model for the same languages in pilot next January.
  - Ability to integrate any 3rd NLP solution in replacement of our native NLP service.

- **Data & Design**:
  - Declarative model management to configure intents, utterances and entities.
  - Declarative interface to manually train the bot.
  - Pre-packaged Bots available on our Marketplace (built by partners or by Salesforce, free or paid):
  - Pre-packaged Industry specific intent sets published on the AppExchange by December this year - Retail, Professional Services, Banking, High Tech, Travel, Media. Available by the end of the year on AppExchange.
  - Out of the box NLU dashboards, automatically refreshed after each training. Reduce the amount of testing after each model update, ensuring quality.
  - Out of the box Analytics to measure the bot performance. Can be modified to reflect specific KPIs.

- **Dialog Management:**
  - Wizard to Quickstart the bot with desired Voice and Tone and main topics.
  - Bot builder to browse, search, view and edit dialogs.
  - Declarative dialog editor to manage Messages, Questions, Rules and Actions.
  - Map View to visualize the conversation flow.

- **"AI" / Machine Learning:**
  - Supervised learning through a training game to quickly accept / decline / reclassify new utterances. Accessed by admin or business.
  - Self-Improving from end-users based on feedback captured during the conversation - problem solved, topic disambiguation. This requires a

customization.
    - Ability to self-improve from internal users feedback, accepting / declining / reclassifying intent after a conversation has been transferred to them.
    - Problem solving based on FAQ and canned responses used by Customer service representatives - automated learning.

- Process Automation:
    - Declarative action manager for complex logic and access data within Salesforce or from external systems.
    - Bot versioning to quickly clone and improve the bot process or the NLP model. Rollback functionality to quickly re-deploy a former version of the bot and its model (no need to retrain).
    - Out of the box and declarative way to generate testing environments, cloning the entire configuration.
    - Declarative Bot deployments across environments.

Integration Points & Scalability

- **"Zero Day Functionality"**
    - Free packages on the AppExchange for the following domains: utility, financial services, chitchat, appointment scheduling.
    - Soon to come (before the end of the year): Packaged Intents for 6 Industries, including retail, professional services, travel, media, banking, high tech.

- **Search and Discovery:** Knowledge search and serve with article rating.

- **Modalities & Channels:**
    - Webchat
    - mobile
    - SMS
    - Facebook Messenger
    - WhatsApp - GA Feb'20
    - WecHat - GA Feb'20

- **"Intelligent Routing":** Salesforce Omni-Channel routing support

- **IVR Integration:** Not planned.

- **Human Supervision:** Supervised machine learning with agent feedback for intent classifications.

- **Support of live agents:** Next best action / offer recommended during the chat; recommended replies based on articles and canned responses.

- **Integration with customer service stack:**
  - Declarative access to all data from Salesforce CRM.
  - integration with external systems through API callouts (real time before, during or after the conversation).

- **Analytics & Reporting:**
  - Out of the box Analytics for key success metrics.
  - Configurable analytics with data aggregated from multiple systems.
  - Dialog levels analytics which key metrics (Escalation, Deflection, Escalations, Drops).

- **Authentication & Security:**
  - GDPR compliant
  - End-user authentication with unique user ID (authenticated community).
  - Contact Identification from CRM data.
  - 2-factor authentication service through any channel (code through SMS, email.)

- **Ability to support multiple use cases:**
  - Ability to build inter-connected domain-specific bots where bots can transfer the conversation to each other if the domain changes.
  - Bot versioning to make incremental updates and rollback in case of bad performances.
  - No limit on the number of bots which can be built concurrently.

Track Record & Enterprise IA Maturity

- **Market presence:**
  - Available globally with 40% of deployments in US.
  - Great industry coverage
  - Top use cases
    - Reset password
    - Order status and exchange
    - Account information and modification
    - Appointment scheduling
    - FAQ
    - Product Information
    - Contact us
    - Return and Refund policy
    - Product Availability (online / store)
    - Payment issue

- **Highlighted customer deployments:**
  - C6 - Financial Services
  - Hulu - Communications & Media
  - Urban Outfitters - Retail & CG
  - D V L A - Public Sector
  - GVC Services - Communications & Media
  - adidas - Retail & CG
  - MTD Products - Retail & CG
  - Streamotion - Communications & Media
  - Robert Half - Professional Services
  - Arrow Digital - Manufacturing
  - Inwi telecom - Professional Services
  - WILLER - Communications & Media
  - Pearson Education- Communications & Media
  - Heartland School Solutions - High Tech
  - Travelodge Hotels - Professional Services
  - Neopost US - Engineering, Construction, & Real Estate
  - John Lewis - Retail & CG
  - The Prudential Insurance Company of America - Financial Services
  - A. O. Smith - Manufacturing

- **Customer Engagement Strategy:**
  - Bots available to all our Service Cloud Unlimited customers and Digital Engagement customers. 25 bot sessions per user included. $50 cents per additional session.
  - Educational series and webinars for safe and quick rollouts.
  - Agile solutions allowing quick deployments and iterations for continuous improvements.
  - Trailhead modules (Public Learning system with exercises) to educate customers on how to roll out a bot.
  - Democratization of conversational AI - Autonomous customers self-served for simple use cases.

- **Recommended Success Metrics:**
  - Deflection
  - CSAT
  - Number of contacts
  - Decrease in average handling time
  - Leads generated and qualified
  - Order impact, volume of transactions
  - Bookings

Future Plans & Vision

- Expand to all channels, with rich experiences thanks to structured content.
- Auto-train the bots based on past transcripts (topic discovery, utterance generation).
- Converse bot over voice with natural language generation based on past transcripts (2020).
- FAQ and Answer generation based on public knowledge base.

Key Differentiators:

- Easy: fully declarative administration to quickly build, train, test, deploy and monitor large scale Bots, across channels.
- Enterprise ready: secure and scalable platform, integrated with existing processes, routing rules and contact center agents.
- Cross functional: covering multiple experience, sometimes blended: customer service, marketing or commerce experiences.

VERINT

Enabling Platforms & Technologies	Enterprise IA Maturity	Track Record	Future Plans & Vision
●	●	●	◔

Verint
Verint Intelligent Communications Response (combines Next IT, Contact Solutions, SmartCare)

HQ: Melville, NY
Website: http://www.nextit.com/ | https://www.verint.com/

FIRMAGRAPHICS:

Year business started: Verint founded 1994
Investment/Funding: NASDAQ: VRNT
Number of employees: 6,000
Revenue (either estimated or publicly available): $1.25bn, fiscal year end January 31, 2019

CORE INTELLIGENT ASSISTANT PRODUCTS AND SERVICES:

- **Alme Enterprise Solutions:** The flagship product, built upon Verint Next IT's 16+ years of experience in the conversational AI space, the Alme IVA has multi-function and multi-domain implementations for over 50 customers, and is used by 400+ businesses in 11 distinct verticals. These complex virtual assistants leverage 9 unique integrations, on average, capturing the necessary context to create personalized experiences for every user, and are powered by the prolific Alme Data Library featuring over 128,000 unique business intents to constantly train, test, and grow the IVA's understanding.

- **AI Blueprint:** AI Blueprint is a conversation analysis system that identifies and validates intelligent virtual assistant (IVA) use cases and accelerates automation opportunities. AI Blueprint is designed to help every enterprise de-risk their AI investments with a simple, but powerful, approach to planning. Organizations can improve their AI strategy and

journey—whether just beginning or already started.

- **Alme Starter IVAs:** Pre-configured intelligent virtual assistants built for five top enterprise use cases, Verint's preconfigured intelligent virtual assistants specialize in a particular domain allowing the technology to generate fast results while reducing risk and time-to-deployment. Each Starter Package comes with a library of KPI-specific intents, configurable to any vertical. Empowered by Alme's Data Libraries, with a specific integration to a critical system of record, Alme Starter Package IVAs assist users from day one of deployment, and include: Customer Service Assistant, eCommerce Assistant, Brand Engagement and Loyalty Assistant, Human Resource Assistant, and IT Helpdesk Assistant.

TECHNOLOGY & MARKET SOLUTIONS

Enabling Platforms: Features & Technologies

- **Speech Processing: ASR/TTS:**
  - Verint ASR: Real-time natural-language speech understanding
  - Text-to-Speech: The Alme Platform utilizes third-party TTS services for voice channels as well as native mobile TTS capabilities in app or mobile web deployments
  - Alme Voice Extension: Integrates with Verint IVR and third-party IVR to streamline the management and delivery of natural language experiences

- **Text processing / Natural Language Understanding:** Verint has two proprietary NLU engines, supporting a wide range of business needs:
  - **Context IQ (CIQ) Engine**: Customizable, hands-on NLU engine, deployed for all enterprise customers, leverages numerous techniques guaranteeing precision, accuracy, and outcomes. The CIQ engine supports full complex, conversational attributes including multiple languages, two-way and mixed-initiative dialogue, goals, full regression testing, and the ability to eliminate risk and apply human influence for scoring.
  - **Prompt Predict Engine**: Self-learning, quick-start NLU and does not require full personalization and contextual integration.
  - **Third-Party NLU Engines**: Alme's modular design and enabling technologies have been decoupled to support multiple, third-party NLU engines, to ensure Verint customers are always ready and able to deliver best-in-class experiences today and in the future.

- **Data & Design**
  - **Alme Libraries:** Prolific labeled data based on real-world industry implementations giving Verint customers faster time to market and time to ROI. Consist of over 128,000 business intents, validated by over 30 Million real-user questions in 10 different industries.

  - **Prompt AI:** Discovers and creates business intents by categorizing and labeling large amounts of natural language ideas together to prioritize, test and deploy language understanding with human oversight.

- **Management (Dialog, Authoring)**
  - **Alme Administration:** Supports needs and complexities of enterprises with secure permissioining for robust reports, management and access to the IVA.
  - **Alme Conversational Intelligence (CI) Suite:** AI-powered machine learning for conversation analysis with human-in-the-loop crowdsourcing to produce remarkable results with less effort.
  - **Alme ActiveLab:** Visual development environment for designing language models with clarity and precision. Able to support the largest and most robust enterprise language models in the industry.
  - **Author AI:** Manages responses across multiple endpoints, conditions and persona.

- **"AI" / Machine Learning**
  - Alme leverages machine learning for defining the intent model and during runtime, the system also leverages semantic information for specific applications. The Conversation Intelligence Suite focuses on analyzing unstructured text to empower business users to make actionable decisions without requiring data science expertise. This enables human trainers to be as efficient as possible in identifying areas of opportunity and effectively labeling data, through a combination of supervised and unsupervised machine learning methods along with traditional NLP approaches.

- **Process Automation (knowledge management, architecture, testing, RPA)**
  - The Verint IVA's knowledge management and architecture is a modular set of services that allow an application to accept an input by voice or text and present content or perform action on behalf of a user.
  - Administering the Alme system is accomplished with minimal time, cost, or expertise through:
    - Streamlined installation process with a single core installer and centralized configuration values with package upload support for customizations.
    - Standard core product and plugin paradigm as well as data access layer make testing simple.
    - Simple and straightforward upgrade path with support for storing customer data and modular plugins.
    - Ability to audit actions within the system, including changes to the database, security, and tools configuration.
    - Configurable at runtime without downtime.

Integration Points & Scalability

- **"Zero Day Functionality":** Verint's Alme Starter Packages (as listed above) are specialized for specific use cases and are available out of the box with a pre-set amount of intents per package (250-500+) to give the customer immediate success upon deployment. Following the initial deployment, these packages are built to capture continuous feedback in order to grow and expand into new knowledge domains. These packages will continually evolve and expand by adding new use cases, supported by new intents and integrations, to become a full-scale deployment of an IVA. Each package has a pre-built integration to assist in the zero-day functionality. Examples of integrations are: ServiceNow, WorkDay, ZenDesk, Eloqua, Salesforce

- **Search and Discovery:** The Alme Platform leverages a goal-based dialogue NLP that assists the end users in completion of their task. Even if the user exits the 'goal' (which is a task that they are working towards), the IVA can assist in the sub-task, move back into goal state, and progress the user toward completion. Adding in context and user awareness, the IVA has the ability to personalize and expedite the experience. Leveraging integrations, RPAs, and other back end systems, the IVA can correct, progress, and complete task completion.

- **Modalities & Channels:** Verint IVA solutions are omni-channel, supporting both voice and digital channels and with Alme's pluggable, modular architecture, there is no channel integration limit: IVR, Web, Live Chat, Mobile, SMS, Amazon Alexa, Facebook Messenger, Slack, Skype, Kik, Twilio, and more.

- **"Intelligent Routing":** The Alme platform is fully integrated into Verint's Workforce Engagement platform, providing a virtual assistant on the customer journey, as well as an agent-facing IA to assist in customer transactions and CSR specific use cases (such as IT Helpdesk or HR support). Additionally, the Alme Conversation Platform has been integrated with third-party Customer Interaction Management platforms such as Salesforce, Oracle, Zendesk, and custom build solutions. Intelligent Self Service currently integrates into TTech, Five9, and ConvergeOne platforms.

- **IVR Integration:** Alme Voice leverages the Alme IVA on the voice channel. Specifically built for the telephony channel and using Verint platforms, Alme Voice powers natural language dialogue conversations via the voice channel where users can call in and receive personalized support. Additionally, the Alme Voice offering allows for multiple integrations using the singular platform to offer this personalization as well as asynchronous state and contextual customization.

- **Human Supervision:** Human involvement is a critical component of Verint IVA solutions. Verint follows these best practices for applying human involvement:

  - Business policies that require escalation to a live agent for specific scenarios, such as cancelling an account or making financial recommendations.
  - Some customers prefer a live agent, so to honor the customer's wishes and avoid negatively impacting customer experience.
  - In the event that the IVA cannot understand the customer's intent, use the live agent as both a safety net and a source of training to improve the language model. Next-best answers are either automatically or manually generated given their association with specific intents.

- **Support of live agents:** Through Verint real-time speech analytics and RPA, Verint IVAs for Agent Assist provide whisper, cues, and next-best answers to augment and support live agents.

- **Integration with customer service stack:** Most enterprises have unique deployments of the CRM systems or require the IVA to integrate through enterprise middleware. Our approach is to have the Alme platform provide an integration layer which uses multiple integration frameworks and reusable components to quickly achieve a requirements-driven integration. We have done this integration with over 300 different systems, including: Workday, ServiceNow, ActiveDirectory, Twilio, Wolfram Alpha, Duck Duck Go, Sabre, Amadeus, Jire, Zendesk, Microsoft Outlook, Thomson Reuters, UBS, CSG, Xbox Kinect, IBM Tealeaf, and many more.

- **Analytics & Reporting:**
  Alme reports provide:
  - Analytics and reporting on business KPIs, data and system performance.
  - Transactional reporting on volume and cost, auditing and calculating threshold, contribution and negation.
  - Escalation to live support.
  - Custom events such as how many times the events occurred and what other events occurred when that specific event occurred, to help report on marketing events and other trends.

- **Authentication & Security:** The Alme Conversation Platform is HiTrust, HIPAA, GDRP, FedRamp, SOC2, PCI compliant. Verint deploys enterprise security at every level: within the product, solution management, and processes. Alme Voice leverages active voice biometric authentication (via VoiceVault, Verint Intelligent Self Service). Deployments can be hosted in the Verint cloud, Customer cloud, or on premise.

- **Ability to support multiple use cases :** Verint IVAs built on the Alme Conversational AI Platform thrive on complexity. The more systems, functions, uses cases Alme has information to pull from, the richer the interaction experience and success of the

deployment. Our largest, most complex deployment has 12,000+ unique intents and 480+ integrations.

Track Record & Enterprise IA Maturity

- Over 400 IVAs in deployment.
- Global reach with deployments in North America, South America, APAC and EMEA.
- Customers across 11 verticals: Financial, Pharamceuticals, Healthcare, Public Sector, Communications, Insurance, Services, Travel, Retail, Automotive, and Technology.
- Primary use cases are multi-functional, multi-lingual supporting Customer Service, Brand Engagement, Agent Assist, IT Helpdesk, Human Resources, and eCommerce.

- **Highlighted customer deployments:** Alight Solutions, Amtrak, Dell, Intel, U.S. Army, Novo Nordisk, Merrill Lynch, UCB Pharmaceuticals, and Synchrony Financial.

- **Customer Engagement Strategy:**
  - **Time to Market:**
    - Core solutions only need to be configured for individual enterprise deployments
    - Time to market with net-new use cases or implementations is typically 3-5 months
    - Time to market with existing libraries and core products 4-6 weeks
  - **Value prop focuses on global enterprise**
    - Large global enterprises
    - Use case and vertical agnostic (Use Case Starter Packs)
    - Healthcare/Pharma and Public Sector separate market focus
  - **Sales channel aligned to customer buying preference**
    - Direct, Verint sales team, Partners
    - Public Sector has separate sales team
    - Sales and Marketing execution owned by the ISS BU
  - **Deployment model aligned to customer needs**
    - Support models: From fully managed to customer manages the solution
    - Deployment models: Cloud or premise
    - Leverages strength of global Verint delivery and support

- **Recommended Success Metrics:**
  - Average Handle Time
  - Conversion Rate
  - Call Deflection
  - Up-sell and Cross-sell

- Content Compliance
- Engagement Rate
- Customer Satisfaction
- Increased Revenue
- Cost Savings

Future Plans & Vision

- Extend, Enhance, Offer and Lead
  - Extend intelligence and products into broader Verint portfolio to support integrated, One-Verint vision and solutions
  - Enhance tools and technologies to advance solutions
  - Bring more offerings to market that support business goals
  - Continue to invest in IP and Thought Leadership to drive market success

Key Differentiators:

1. AI Blueprint unlocks the power of conversational data and uncovers user intent, mapping automation strategies that align to business goals and user needs
2. Prolific real-world labeled data library with tens of thousands of regression tests in every language model set
3. Full Verint suite of technologies that enhance and support the entire customer journey through AI-enabled, predictive innovations to increase customer experience while lowering costs

About Opus Research

Opus Research is a research-based advisory firm providing critical insight and analysis of enterprise implementations of software and services that support multimodal customer care and employee mobility strategies. Opus Research calls this market "Conversational Commerce" with tailored coverage and sector analysis that includes: Self-Service & Assisted Self-Service, Voice & Call Processing, Web Services, Personal Virtual Assistance, Mobile Search and Commerce and Voice Biometrics.

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