

Decision Makers' Guide to Enterprise Intelligent Assistants

(May 2022)



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While it's important to acknowledge we're still in the "early days" in the development and acceptance of Enterprise Intelligent Assistants, the proliferation of chatbots, voicebots and virtual assistants has already reached billions of end users. With a growing audience, the number of use cases will grow as well, and there is no turning back.

Opus Research presents a comprehensive assessment of enterprise-grade Intelligent Assistant solution providers bringing natural language processing, machine learning, AI and analytics to support customer care, self-service, employee assistance, messaging and device control. This report evaluates 21 firms to better understand enabling platforms & technology, integration points & scalability, track record and future vision for enterprise-scale Conversational AI.

In this document, Opus Research evaluates the offering according to criteria that go beyond the immediate impacts on customer satisfaction and loyalty to address long-term value of insights garnered from analysis of conversations and shared among product development teams, marketing departments and human resources.

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Addressing First-Order Concerns for Intelligent Assistants

Customers have spoken! ...or texted or messaged. Millions of people routinely now converse with their favorite brands through “voicebots,” “chatbots,” or dialog boxes in their mobile apps, websites, and messaging channels. To stay competitive, thousands of companies feel compelled to integrate elements of “Conversational AI” into their customer care infrastructures.

Yet, the path is not clearly defined. There are literally thousands of firms or individuals that claim to have the technology and resources to build bots and help companies automate the handling of routine, frequently invoked actions. In this document, Opus Research evaluates the offerings of 21 firms according to criteria that go beyond the immediate impacts on customer satisfaction and loyalty to address long-term value of insights garnered from analysis of conversations and shared among product development teams, marketing departments, and human resources.

Successful Enterprise Intelligent Assistants address the first-order concerns of customers by employing so-called “Conversational AI” to recognize intent expressed in natural language input and respond with consistently correct answers or actions, including the transfer of the conversation to a live customer care agent, when appropriate. From the customer’s perspective, the pay-off is faster resolution of issues like “Where’s my package?”, “Did you receive my payment?” or “How do I cancel my service?.” These conversations are a rich source of insights and correct responses that, with the help of machine learning and human supervision, will continue to improve the quality of responses and, customer satisfaction.

Our evaluation gives higher marks to solution providers that take an approach that employs artificial intelligence to augment human intelligence (and vice versa) when deploying intelligent assistants (IAs).

An “agent assist” or “co-pilot” approach to supporting customer care agents in the course of real-time conversations are also well-regarded. So are solution providers that provide the tools and workflows for agents to serve as subject matter experts (SMEs) that can train “bots” to provide the best possible answers over time.

Other attributes that define successful EIA solution providers include:

- **Focus on CX and UX:** IAs are the natural user interface through which both customers and employees benefit from Conversational AI.
- **Offers for two distinct segments:** Small and medium-sized businesses (SMBs) and newcomers have contrasting needs with experienced enterprises. This is satisfied by tooling that spans so-called “no-code/low code” as well as “pro-code” approaches.
- **Place emphasis on outcomes:** Positive outcomes, like task completion, greatly improve customer sentiment and satisfaction with a corresponding positive impact on employee morale and retention.

- **Take a cloud-based, multi-vendor approach:** IA solutions leverage all four pillars of the Conversational Cloud: Self-Service, Application integration and Automation; Interaction Processing/Intelligent Routing and Data/Conversational Intelligence.
- **Offering significant “zero-day capabilities” remain a factor:** Premium placed on what works “out of the box,” including pre-configured conversation models, domain expertise, and connectors to backend systems.
- **Pay attention to Orchestration:** To support the training and maintenance of IVAs that carry out asynchronous conversations between companies and their customers and involving access to backend IT systems calls for unprecedented amounts of monitoring and tooling.
- **Build communities:** Successful solutions depend on citizen developers (internal) as well as partnerships with system integrators and business process outsourcers as go-to-market partners.

Selection Criteria Anticipate Mature Intelligent Assistants

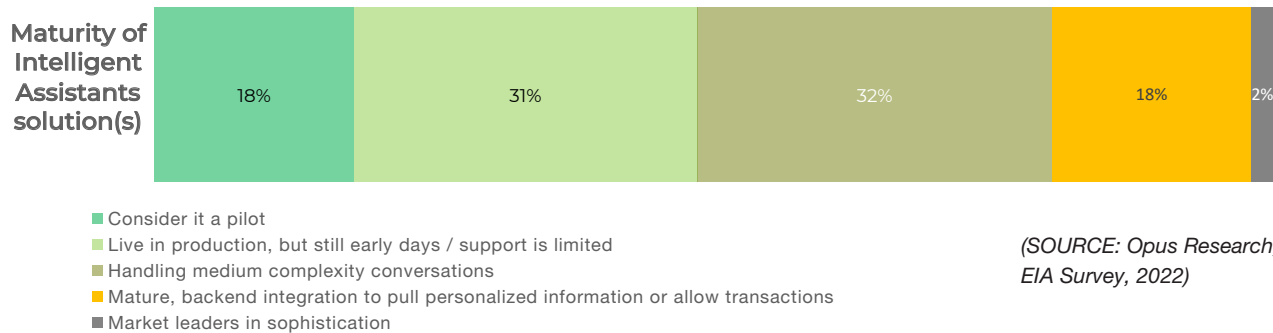
Opus Research started to monitor implementations of Enterprise Intelligent Assistants more than seven years ago. At that time, only very large companies with budgets surrounding “digital transformation” were making investments in development, deployment, and maintenance of IAs. They were the proverbial “Early Adopters” seeking a competitive edge from gaining experience with new technologies.

In the first quarter of 2022, Opus Research conducted a survey of 250 firms that offer customers access to customer care and other services through bots. It reflects a new reality where less than one-out-of-five (18%) consider themselves in a “pilot” phase of deployment. The rest have already gone live with their intelligent virtual assistants. Roughly one-third of the total see themselves in early days of live deployment, while the same number (32%) are already handling conversations of “medium complexity.” [Figure 1 below]

The remaining 20% are, most likely, the Early Adopters mentioned above. Eighteen percent think of their chatbots or voicebots as “mature”, thanks to robust connections to the IT systems that house customer records, inventory or transaction processing resources. The other 2% clearly see themselves as “leaders” with highly sophisticated voice or chatbots. They were, most likely, the aforementioned Early Adopters who sought competitive advantage years ago. Today they define and drive demand for new tools and “integrated development environments” (IDEs) as well as the specifications for connectors and APIs to popular Customer Relationship Management (CRM), Enterprise Resource Planning (ERP), Process Automation and IT Service Management systems.



Figure 1: Snapshot of EIA Implementation Maturity



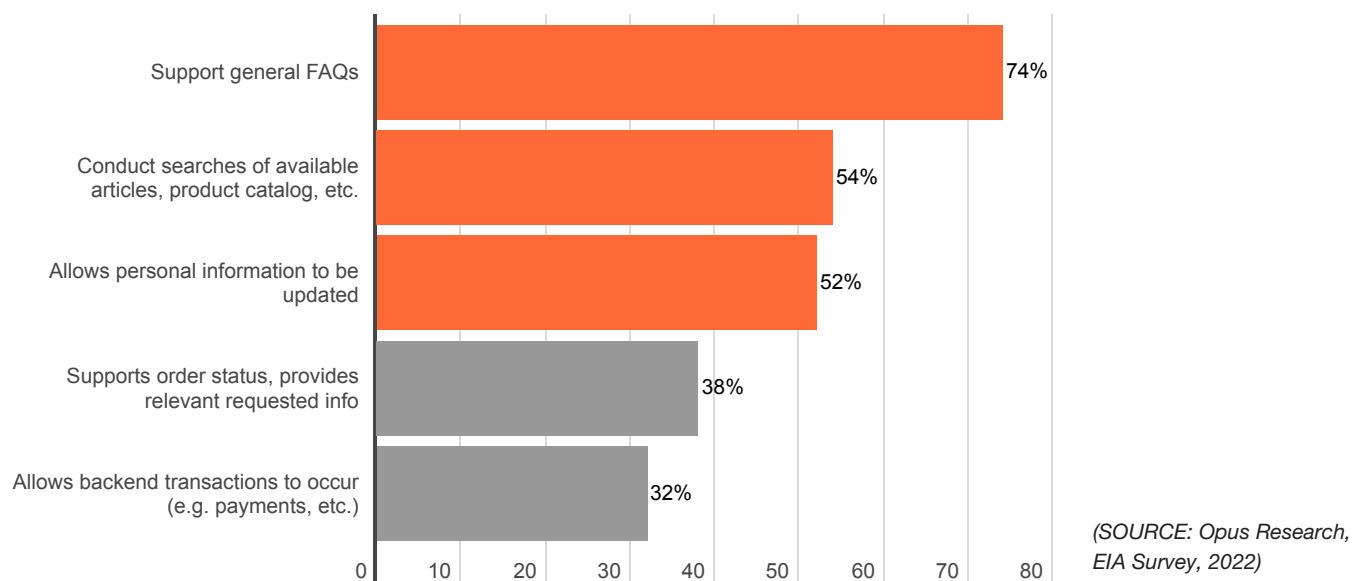
Opus Research uses the requirements and demands of this diverse base of enterprise customers to define the evaluation criteria employed in this document. The Early Adopters hired teams of developers with skills ranging from knowledge management, dialog design, computational linguistics and the like. Such teams also had skilled developers accustomed to writing code for managing conversations and helping users achieve their objectives.

Today, solution providers offer development tools designed for non-technical personnel who are experts in customer care or Help Desk applications. They help train the models that support conversations that culminate in task completion. The tools they use are “no code” or “low code” alternatives that employ drop-down menus of common tasks or actions and “connectors” that direct the dialogs. If you can play a videogame, you can build a bot.

Fulfilling Expectations for Enterprise Intelligent Assistants

Results of the survey also provide a snapshot of the basic capabilities baked into today’s bots. Figure 2 below shows which functions and support is currently offered by the respondents’ intelligent assistants.

Figure 2: Functions Supported by Today’s Intelligent Assistants

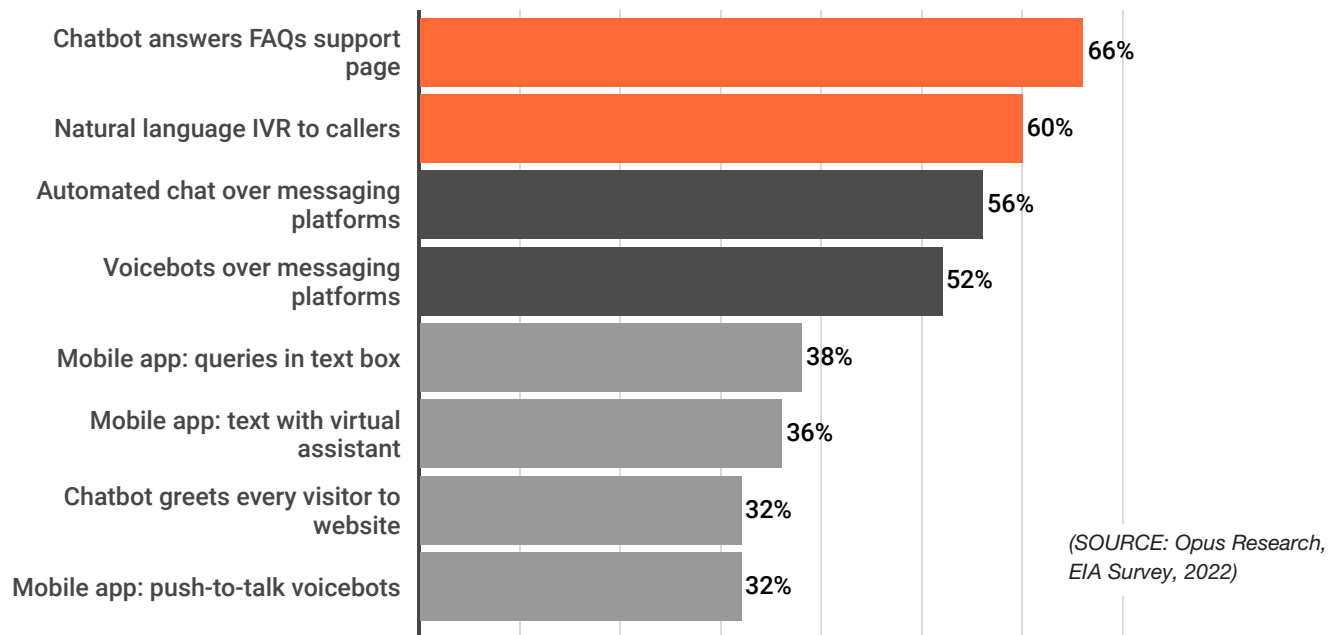


These capabilities were developed to respond to organic demands from customers. To avoid long wait times associated with reaching live agents or representatives, millions have grown accustomed to interacting with chatbots or voicebots when looking for answers or resolving issues with their selected brands.

Almost three-quarters of respondents (74%) offering assistants empowered to support frequently asked questions (FAQs) while more than half have deployed IAs that conduct searches (54%) and allows personal information to be updated (52%). Still, the market for automated customer care is maturing with many implementations designed to provide order status (38%) and even allow backend transactions and payments (32%).

In vertical industries like financial services, travel and hospitality, telecommunications, entertainment, healthcare and insurance, customer needs are not satisfied by looking up pat answers in static FAQs or by directing customers to a related website To reach customers at their time of choice over their device choice, IAs are made available in the manner described in Figure 3:

Figure 3: Type of Access Provided by Intelligent Assistants



Ideally, the answers, actions and results provided are identical, regardless of channel or modality. The longest-standing and most sophisticated companies have already launched a multiplicity of intelligent virtual assistants and their first-order challenge is to implement solutions that leverage the results of past investments. This is the reality that shapes the solution providers included in this year's report.

INITIALLY, WE WERE NOT LOOKING AT A VIRTUAL ASSISTANT ... NEVER CONSIDERED BECAUSE NO ONE WAS USING IT IN OUR SPACE. IT HAS MADE A HUGE IMPACT ON OUR BUSINESS AND WE ARE EXCITED FOR NEXT STEPS."

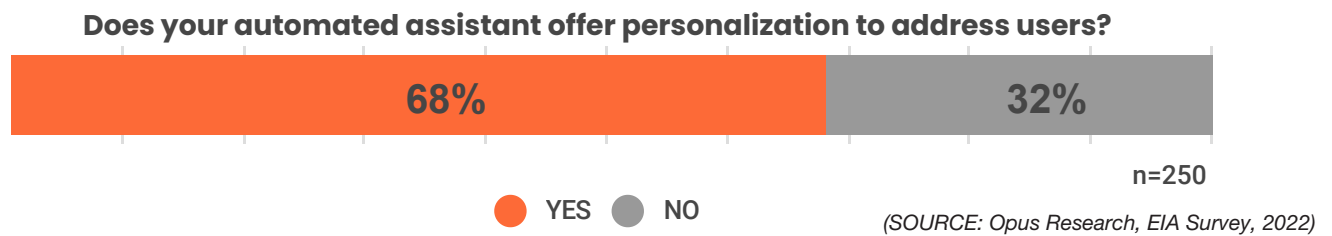
–DIRECTOR, SUPPORT SERVICES | HEALTHCARE BENEFITS PROVIDE

Now is the Time to Evaluate Options

The 250 respondents to our survey offer insights into the features and functions that define mature IAs today and in the future. These are not “nice-to-have” features. They are destined to be key to competitive success in both digital and voice channels.

For example, 68% of respondents have already put into place IAs that are capable of providing personalized responses to authenticated customers or prospects [Figure 4 below]. They recognize that establishing trust early in a conversation paves the way for faster recognition of intent and the ability to complete tasks (including transactions) quickly.

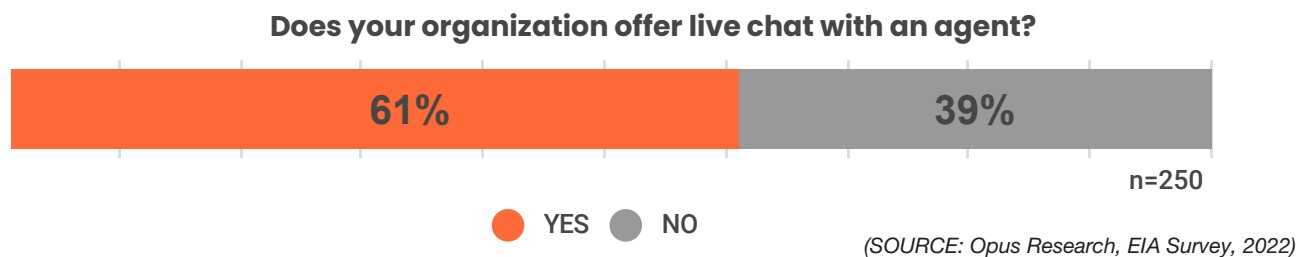
Figure 4: Automated Assistants Utilize Personalization



Sixty-one percent of respondents already offer customers access to live agents in the course of a conversation with an IA. “Intelligent transfer” from bot to live agent was an early addition to the list of IA functions offered by solution providers. But there is now a difference. Originally it was associated with “out of scope” or unrecognized requests that confounded a bot.

Today, experienced companies know that the bulk of asynchronous conversations benefit from one or more transfers between IA and live agent in order to help customers complete their tasks or transactions.

Figure 5: Organizations that Offer Live Chat with Agents

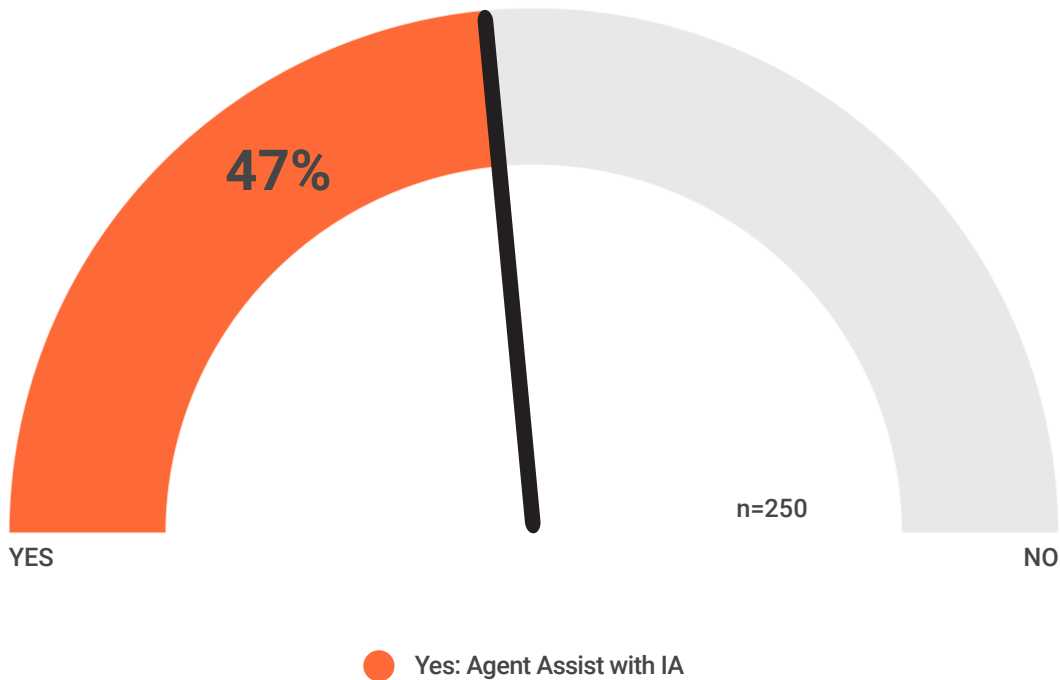


In regards to AI/HL balance, nearly half (47%) of respondents already have their live agents interacting with intelligent assistants to help improve their responses (Figure 6 below). Nearly two-thirds of those instances involve agents interacting with virtual assistants in the course of conversations with customers.

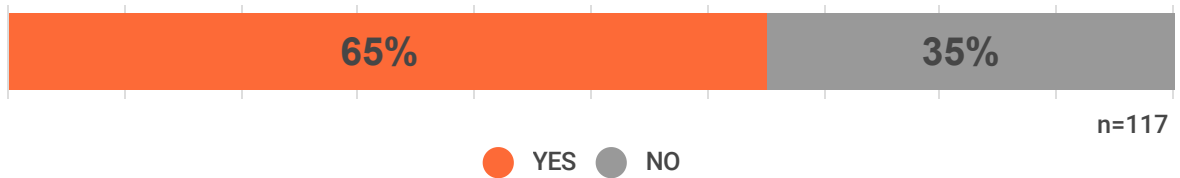
Based on submissions from vendors participating in this report, we know that the other instances involve such activities as the generation of post-calls summations and dispositions, review of content to ensure compliance with regulations, as well as company policies, and other forms of training. In other words, we've reached a point where bots and live agents are interdependent. Humans can train bots who, are then available to make sure that other humans are performing at a high level.

Figure 6: Intelligent Assistance for Live Agent Customer Support

Do your customer support agents have the option to use an Intelligent Assistant for internal use?



Is the assistance in real-time (providing answers during the course of the call/chat)?



(SOURCE: Opus Research, EIA Survey, 2022)

CALL DEFLECTION HELPS US DRIVE COSTS DOWN WITHIN OUR CALL CENTER. ALSO ALLOWS OUR ACCESS SPECIALISTS TO BETTER SERVE CALLERS WITH WHOM THEY ENGAGE.

—LARGE, PRIVATE RESEARCH UNIVERSITY

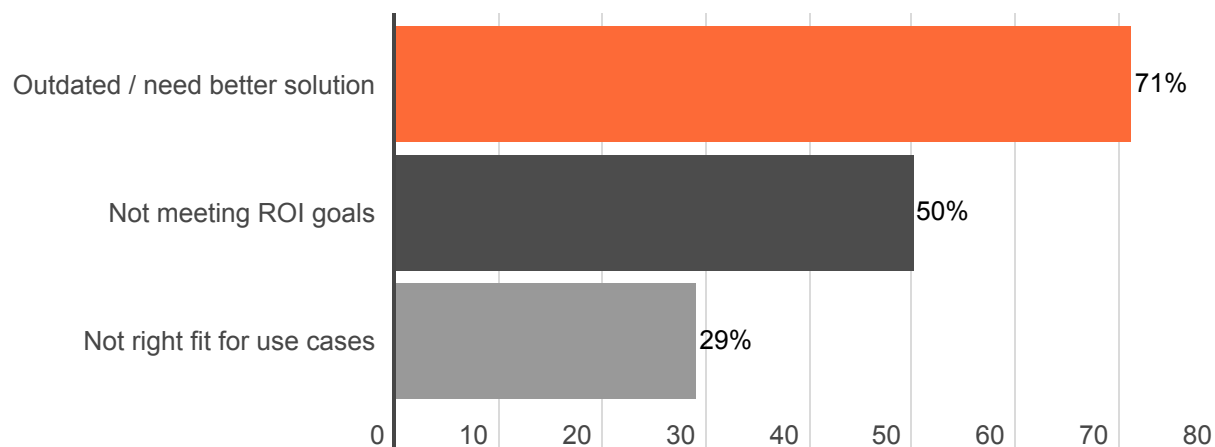
Balancing human with artificial intelligence is a recurring theme as enterprise decision makers evaluate their procurement options. Leading firms in our “Platform” category place emphasis on tools and capabilities that keep “humans in the loop” in crafting dialogs, supervising machine learning and joining conversations as needed.

In addition, their solution sets support orchestration, or automated management of all the complex workflows that take place in the background to support a successful conversation. That would include references to databases with customer histories or inventory status or access to the checkout in order to complete a transaction.

Intelligent Assistants in the Age of the “Conversational Cloud”

Only 11% of the respondents to this year’s survey of Intelligent Assistant implementers said that they had plans to replace their solutions in the coming year. Yet their reasons for doing so provide valuable insights into potential deficiencies in past solutions.

Figure 7: Reasons to Replace Intelligent Assistant Solutions



(SOURCE: Opus Research, EIA Survey, 2022)

The 71% who consider their assistant “outdated” are looking to move beyond their original AnswerBots with limited functionality, informed by databases of static information. The half that cites value to meet ROI goals speak to the need for companies to link evaluation criteria to business outcomes from the beginning. The fact that 29% say that their assistant is not a fit for their use cases provide another cautionary tale for enterprise

WE VETTED ROUGHLY 20 VENDORS AND NARROWED DOWN TO A FINAL 3 BASED ON A SET OF CRITERIA... AMONG OTHER REASONS, THE PRIMARY REASON WAS THE MATURITY OF THEIR NLU ENGINE AND UNDERLYING ML AND SYNTAX MODELS

–PRODUCT MANAGER, CONVERSATIONAL AI | GLOBAL BUSINESS SUPPORT SYSTEMS PROVIDER

executives who are evaluating their options. Vendor selection should be “use-case driven” and great attention should be paid to what works out-of-the-box in terms of pretrained language models and tools for creating bots that help customers *and* agents fulfill well-understood tasks.

To update or implement entirely new Intelligent Assistants and address the needs of an expanding set of use cases requires solutions that transcend traditional boundaries between conversational apps, contact centers, knowledge bases and data repositories. Instead they lean on an AI-infused amalgam of resources that reside in what Opus Research calls “The Conversational Cloud.” The vendors with the highest evaluations in this Intelliview are the ones whose solutions architecture, tools for service creation and management, data repositories and integration resources reside, at least in part, in public clouds or private clouds.

They are shared data centers where the computing resources that can run natural language processing and machine learning models can be closely linked to those governing task routing, person-to-person interactions and references to highly capacious databases or knowledge repositories. The Conversational Cloud enables unprecedented speed and agility when launching new IA applications or refining use cases. As such, they house the engines that speed progress in the Enterprise Intelligent Assistant domain.

Participant Categories: Leaders in Conversational AI

To provide the best tools for readers to evaluate solution providers, Opus Research has organized this year’s respondents into three categories:

Voice First Assistance

Five firms provide “Voice First Assistance” resources. They offer a range of solutions and services that enable enterprise customers to deliver a natural user interface that listens and understands spoken input and responds with a mixture of life-like spoken output or relevant visual material from apps, websites or videos, rendered on smartphones, tablets or other screens as appropriate for each use case.

Included in this category: Almawave, Five9, Interactions, PolyAI, Zaion

Digital Assistance

Eight solution providers offer tools and services to create and maintain Conversational Intelligent Assistants offered over multiple, digital channels. Their core offerings support natural conversations between companies and their customers largely through digital channels, such as smartphone apps, SMS and other messaging platforms. Like their Voice First counterparts, they enable enterprises to respond to digital input with a mixture

of life-like spoken output or relevant visual material from apps, websites or videos, rendered on smartphones, tablets or other screens as appropriate for each use case.

Included in this category: Aivo, Artificial Solutions, Cognigy, Creative Virtual, Inbenta, Kasisto, Rasa, Salesforce

Intelligent Assistant Platforms

Eight firms responded as Platform providers. They offer comprehensive, or “end-to-end” solutions that embrace training and management of a variety of bots supporting multiple channels and modalities, plus connectors or APIs to IT systems and reporting/evaluation resources.

Included in this category: [24]7.ai, Amelia, Avaamo, Kore, LivePerson, Nuance, Verint, Uniphore

Figure 8: Roster of Participants | 2022 EIA Intelliview

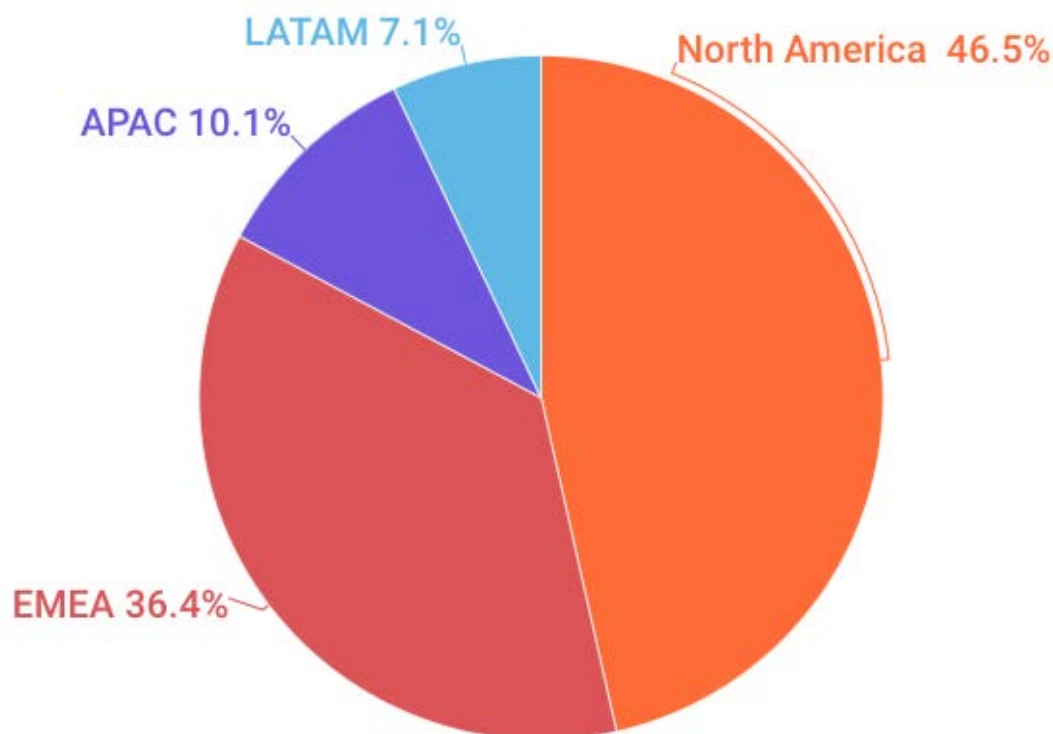
24-7	Engagement Cloud balances Artificial Intelligence and Human Insights (AI+HI)
Aivo	Easy-to-manage tools for digital, live and voice customer care
Almawave	Iride® Wave Bot: built on Composite AI (ML, deep learning & knowledge representation).
Artificial Solutions	Provides tools for development, deployment, analysis and optimization of conversational AI
Avaamo	Automates every conversation end users (Employee, Customers, Partner) and enterprises
Cognigy	Low-code Conversational Service Automation
Creative Virtual	V-Person & V-Portal support conversations among both live and automated agents
Five9	Evolved to manage virtual agents, CTI, live recording & 3rd party ASR and TTS
Inbenta	Interaction Management Platform for chatbot, search, knowledge and human-to-human
Interactions	“Optichannel” Intelligent Virtual Agent (IVA) for voice and chat
IPsoft / Amelia	Amelia transforms both employee and customer experience in collaboration with human colleagues
Kasisto	KAI is a leading Conversational AI solution for the financial services industry
Kore.ai	Experience optimization (XO) platform for 150 Fortune 2000 companies; over 100 million users
LivePerson	Mature offering with extensive list of partners and tech suppliers and customer success
Nuance	An open and flexible framework to enable blending of human and AI engagements
Poly AI	Proprietary approach to building highly efficient voicebots
Rasa	Open-Source enterprise conversational AI platform used by millions of practitioners across the globe
Salesforce	Product suite in Service Cloud to address a vast spectrum of use cases for Salesforce customers
Uniphore	U-Service for self-service and U-Assist for agent assistance
Verint	Native, mature resources for sophisticated automated voice and chat agents and sharing insights
Zaion	Complete solution for processing voice-based customer interactions

Participant Data: Snapshot of EIA Deployments

In addition to soliciting from a detailed questionnaire each company's technology features, business strategies, and future plans, Opus Research also gathered quantitative data on current Enterprise Intelligent Assistant deployments.

Below are a series of datapoints that outline a snapshot of geographic regions, vertical industry distribution, deployed use cases, and channel modalities based on the aggregate data collected solution providers included in this report.

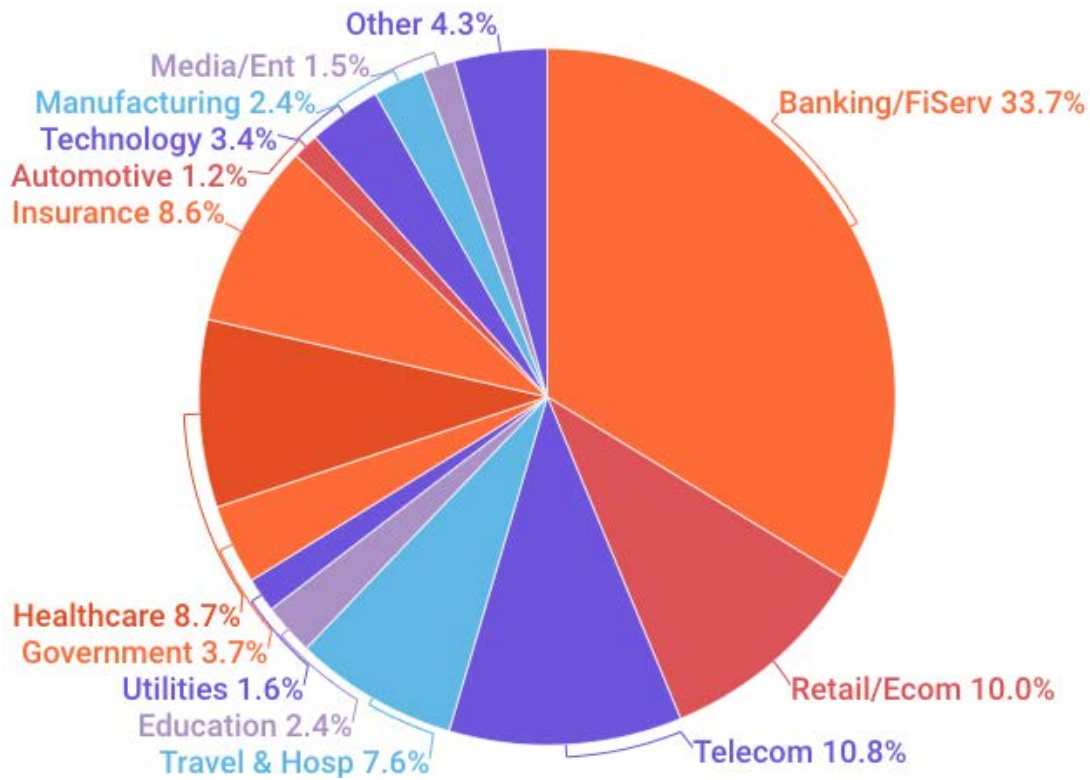
Figure 9: Deployments of Enterprise Intelligent Assistants By Region



(SOURCE:
Opus Research,
EIA Report 2022)

The vast majority of current deployments are in North America (46.5%) and EMEA (36.5%). This reflects the organic demand for EIA solutions from large enterprises, subject to change as those companies take advantage of the growing number of languages supported by the leading firms in all categories.

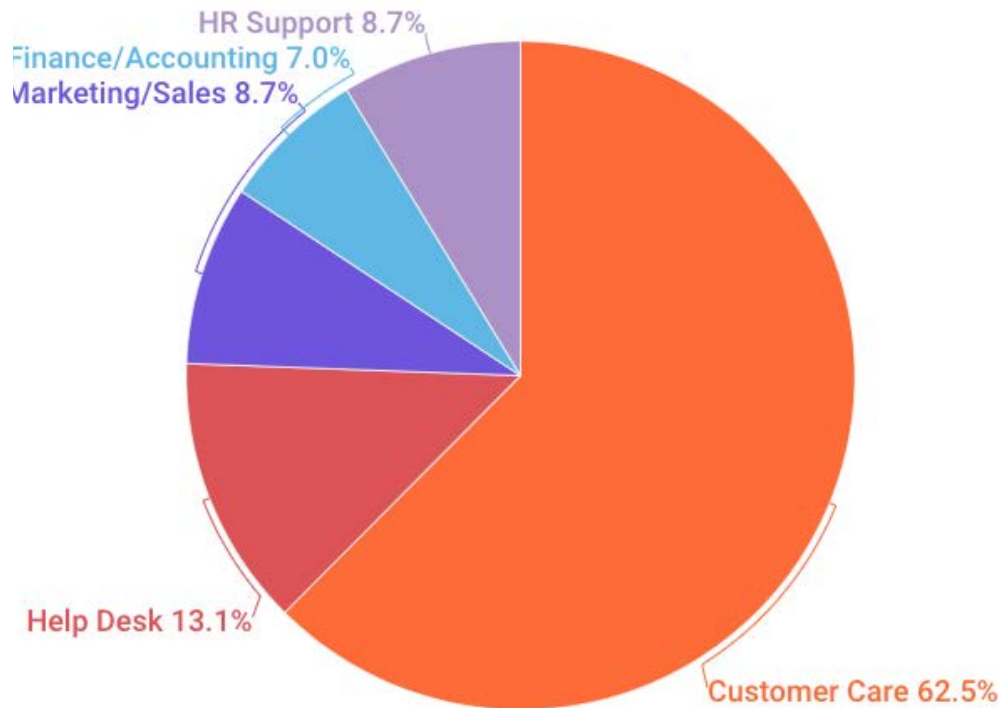
Figure 10: Deployments of Enterprise Intelligent Assistants By Vertical



(SOURCE: Opus Research, EIA Report, 2022)

Banks and Financial Services companies were among the first enterprises able to build businesses cases for and ROI models for EIA deployments, representing more than one-third of all implementations. Mature implementations among Telecom (service initiation, outage reporting), Insurance (enrollment, form-filling) and Travel & Hospitality (booking, loyalty programs) We expect to see high growth in Healthcare (scheduling, Q&A), Retail/Ecommerce (shopping, recommendations), and Government (Citizens Services) as regulatory and technical barriers are overcome.

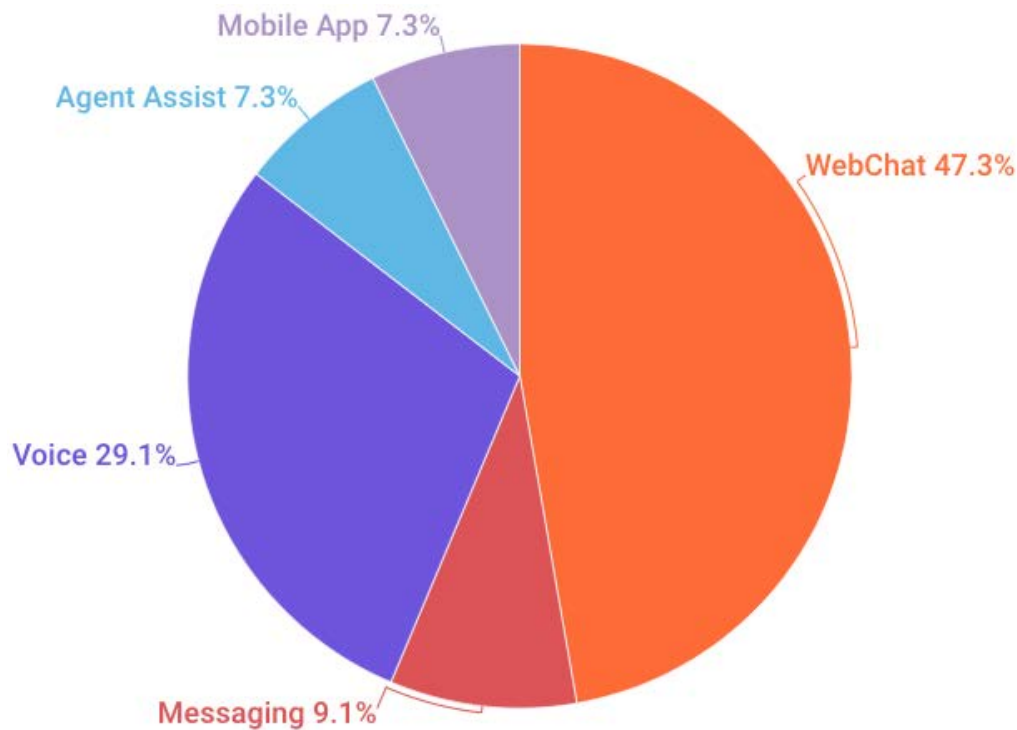
Figure 11: Deployments of Enterprise Intelligent Assistants By Use Case



(SOURCE:
Opus Research,
EIA Report, 2022)

This snapshot reflects rapid growth in implementations of customer facing resources. Many of the early implementations and use cases for EIAs were internal “Help Desk” functions where companies cut their teeth on relatively easy, repetitive functions like Password Reset or tracking trouble tickets. Addressing the needs (and opportunities) of Marketing/Sales (8.7%) is a strong growth area and reflects the value of using AI-infused resources to gain insights that can be shared among business units.

Figure 12: Deployments of Enterprise Intelligent Assistants By Modality



Webchat EIA deployments account for nearly one-half of reported deployments (47.3%), with another 29.1% accounted for by voicebots. This reflects the staying power of precursor technologies like the FAQ page or interactive voice response (IVR) systems. Opus Research expects to see accelerated growth of “Messaging” (9.1%) as the use of popular platforms like WhatsApp, WeChat take off, as well as expanded use of Agent Assist Intelligent Assistants to be deployed much more broadly in the near future.

Competitive Differentiators of EIA Solution Providers

Opus Research asked each solution provider included in this report for a detailed analysis of each company's product solutions and business strategies. This document (Appendix A) provides brief profiles of all these offerings and also positions each vendor on Intelliview maps (figures below) based on the strength of their product offerings and market positions. Included in our analysis was a deep consideration of the following attributes:

Features and Technology

- ✓+ Resources enable orchestrated, AI-infused IA development and management, tools and run time integrates disparate data, processes and workflows; use of "native" technologies that support both "agent assist and customer assistance".
- ✓ Differentiated approach to creation, deployment and ongoing tuning of IVAs or agent assistants across multiple channels. Fulfills basic requirements for ASR, NLP, application development, tuning and maintenance, both native and 3rd party. Presents "best-of-breed" examples of point solutions and use cases for Conversational AI.
- ✓- Tools and resources focused on static answers and hard-coded actions.

Integration Points and Scalability

- ✓+ Orchestrates synchronous or asynchronous interactions and/or transactions across multiple APIs and connectors to internal or external data, processes or workflows during conversations. Takes an "open" approach to connections and APIs with both internal and external resources, processes and workflows
- ✓ Responds at scale based on connections to CRM, KM, RPA sources over voice and text channels
- ✓- Offers selective, use-case driven connectors or integration points or relies on 3rd party, one-off integrations

Track Record

- ✓+ Significant enterprise deployments; multiple use cases and positive customer references; global scope
- ✓ Many deployments; multiple use cases or vertical expertise; mixed customer references; limited global scope
- ✓- Smaller, pilot-established deployments; emerging market recognition; limited global or vertical presence

Future Plans and Vision

- ✓+ Clearly articulated strategy for fulfilling CX and business objectives in the Conversational Cloud; and CX consistent architecture, acquisition, partnership, development and go to market strategies
- ✓ Clearly articulated technology strategy (Machine Learning, NLP, and conversational user interfaces across multiple channels; consistent investment in Intellectual Property and partnerships
- ✓- Articulated short-term roadmap for product development; insufficient information regarding long-term strategy and positioning



Intelliview Map for Enterprise Intelligent Assistants

To assist decision makers in evaluating competing solutions providers, Opus Research represents their positioning in a series of “Intelliview” Maps. Vendors are grouped into one of two following categories:

- **Leaders:** Success is necessitated with a holistic approach, recognizing tangible differences in high-value use cases, omnichannel support, orchestration & management, and growing ecosystem of partners and industry collaborators.
- **Standouts:** Building the next generation of tools and platforms, with a keen understating of conversational AI and data sources to help companies create compelling customer experiences and deliver value in AI and automation.

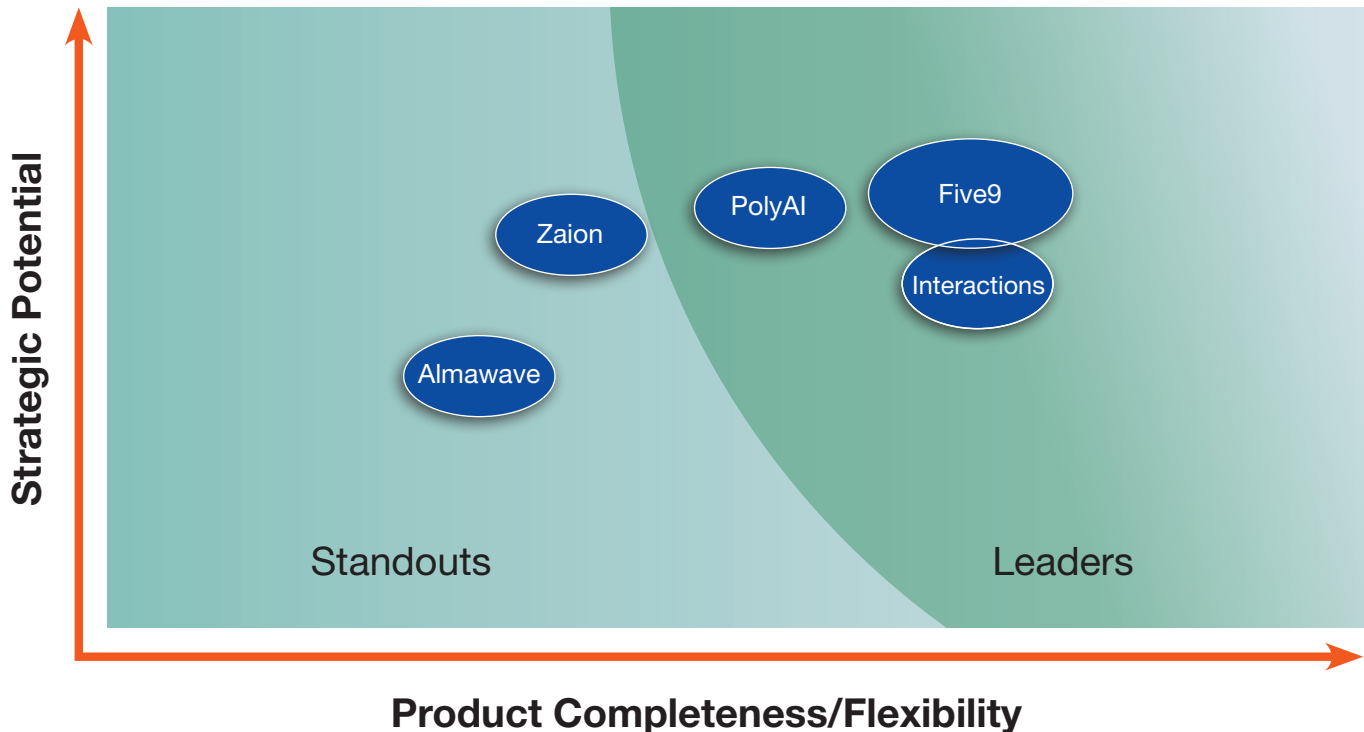
In reference to the figures below we have arrayed the solution providers to relative market positioning and success. The size of the ovals on the Intelliview reflect two, all-important factors:

- **Product Completeness/Flexibility** – Providers receive the highest assessments of “completeness” of services, features, and scaling capabilities.
- **Strategic Potential** – Capturing how vision and roadmap appeals to current and evolving technology requirements in contact center and beyond.

Opus Research has developed a solution provider comparison chart to help decision-makers evaluate how current enterprise solutions fulfill the requirements of Intelligent Assistance.

The size of the ovals represent each vendor presence based on company-provided or publicly available information of current financial strength (revenue, profitability, financial banking, longevity and size of customer base).

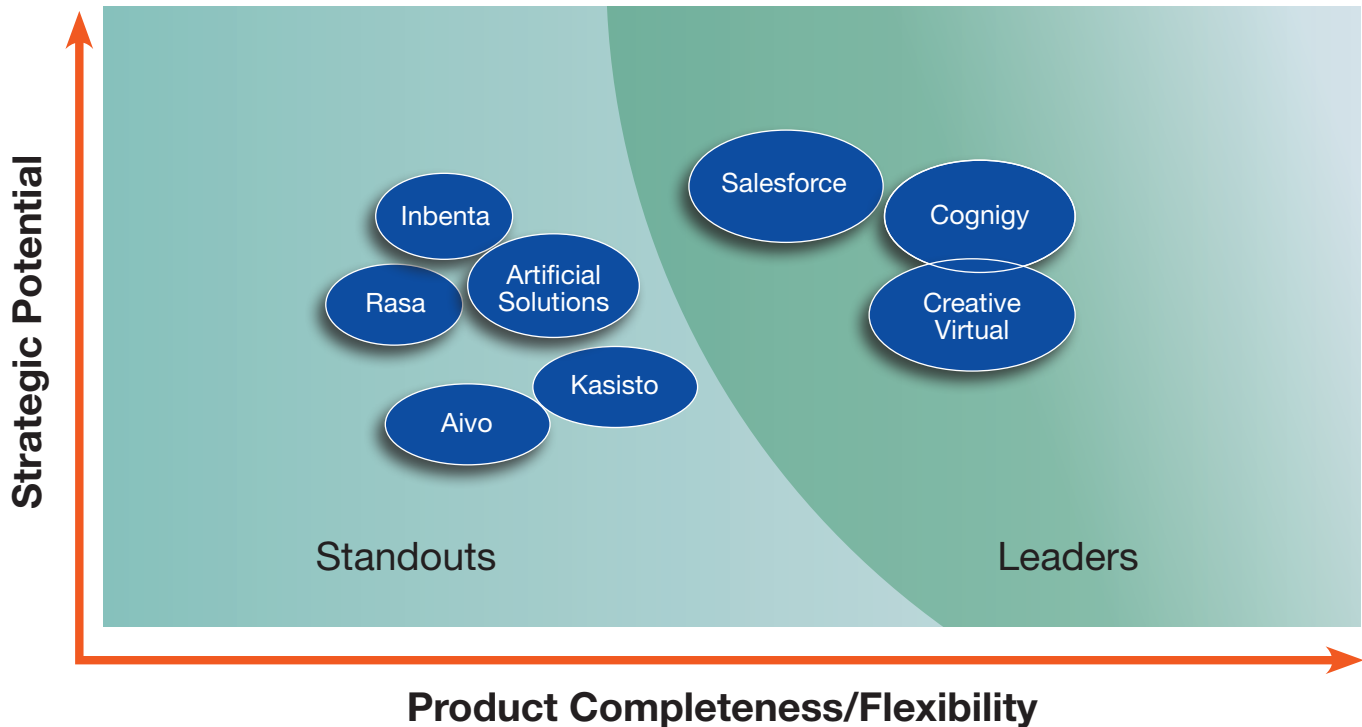
Figure 13: Best In Class | Voice First Assistance



In the “Voice-First Assistance” Intelliview, Five9, Interactions and PolyAI stood out as Leaders. Although it relies on third-party speech processing and text-to-speech resources, Five9 led by offering a broad array of proven solutions designed to integrate with its cloud-based contact center offerings. Interactions has a long track record in voice support and continues to offer its clients with a unique approach to “Adaptive Understanding,” relying on in-call intent analysis. PolyAI is a newer, smaller participant in the market with tools to support human-like voice-based interactions with self-service resources, designed to bolster task completion.

Zaion and Almawave distinguish themselves by integrating accurate speech recognition and natural language understanding into voice-based customer support applications. Zaion has invested significant resources into ASR technologies including sentiment analysis and deep understanding of the requirements of specific verticals, especially insurance and financial services. Almawave offers ready-made global potential based on the international footprint of its parent company, AlmaViva.

Figure 14: Best in Class | Digital Assistance



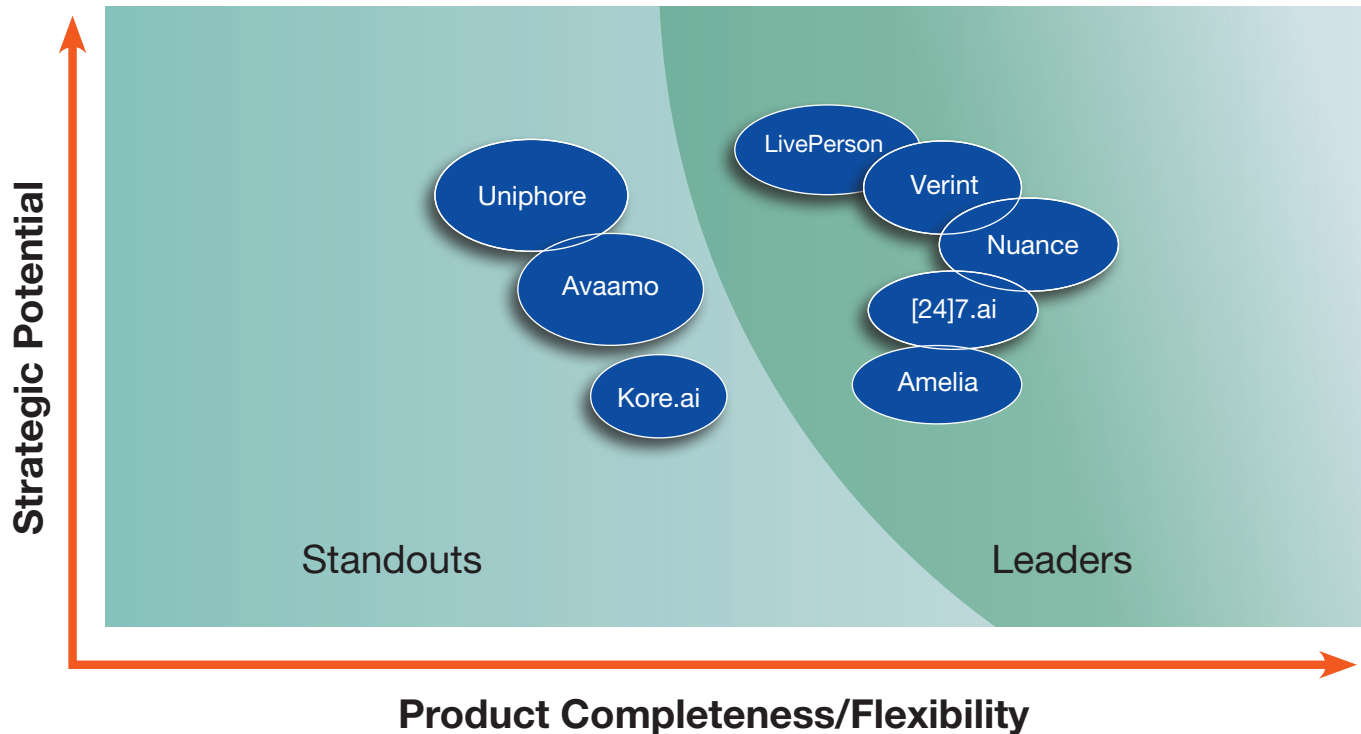
In the “Digital Assistance” Intelliview, Salesforce, Creative Virtual, and Cognigy are the Leaders

- Cognigy: Emphasis on orchestration and integration, broadening to full-fledged contact center solution
- Creative Virtual: Points for longevity, knowledge management, out-of-box solutions
- Salesforce: Formidable suite of AI tools to offer to its legions of customers

Among the Standouts;

- Kasisto: Strong vertical offering, blue-chip customer base in banking and financial services
- Artificial Solutions: Longstanding EIA provider, collaborative development platforms
- Inbenta: Impressive pre-trained linguistic models and extensive language support
- Aivo: Strong presence in Latin America and integration to leading platforms
- Rasa: Developer-friendly in offering open-source tools to build better bots.

Figure 15: Best in Class | Intelligent Assistant Platforms



Opus Research defines “best-in-class” Platforms as comprehensive, scalable solutions that embrace the gamut of services and technologies necessary for successful Enterprise Intelligent Assistant deployments. The Leaders in alphabetical order include:

- [24]7.ai: Open, unified AI+HI platform features low code and third-party integration
- Amelia: Solutions for digital employee and hybrid workforce; white-labeled offering via NICE
- LivePerson: Sights on the Conversational Cloud, pending integration of VoiceBase, Tenfold
- Nuance: Perennial leader, omnichannel customer engagement, ability to leverage Microsoft
- Verint: Open platform, business-focused Conversational Intelligence data across entire enterprise

Among the Standouts:

- Avaamo: Impressive voice and multi-channel offerings
- Kore.ai: Formidable offering with exceptional modeling, testing, import/export options
- Uniphore: Growing customer and partner base, new acquisitions of Jacada and Colabo

Nuance

Year business started: 1992

Investment/funding: Nuance is now a Microsoft company

Number of employees: ~6,900

Revenue: Company 2021 revenue ~\$1.4B



Enterprise Intelligent Assistant (EIA) product

Nuance Intelligent Engagement Platform, based on an open and flexible framework, enables the efficient blending of the best human and Artificial Intelligence (AI) engagements across a variety of channels to maximize cost savings and generate revenue while delivering the best customer experience. It seamlessly combines AI-driven conversational IVRs, Virtual Assistant, chatbot, and Live Chat capabilities. Agents and AI work in tandem as needed, learning from each other to deliver either fully automated, fully assisted engagements or a blend of the two on channels including phone, desktop web, mobile web, mobile app, 3rd-party messaging platforms, smart devices such as Amazon Alexa or the TV, and can be expanded to include emerging channels as they arise.

Enabling Technologies

Automated Speech Recognition (ASR): Nuance provides two complementary ASR technologies:

- **ASR (Krypton) + NLU** – This stack is based on a speech-to-text transcription engine, combined with a semantic interpretation engine (NLU). This technology supports intent matching and entity recognition and allows for intent switching and contextual understanding. The ASR + NLU combination is ideal for creating free-form conversational AI experiences that let customers say whatever they want in their own words.
- **Nuance Recognizer** – Our flagship, proven ASR technology based on closed grammar and/or statistical language models. Closed, constrained grammars provide superior accuracy for voice input of alphanumeric sequences (account numbers, booking codes, license plates, tracking numbers...) or digit sequences (e.g., credit card numbers). Nuance Recognizer delivers the highest possible accuracy and containment for tasks involving order tracking, delivery dates, or financial transactions.

Text-to-Speech (TTS): Native TTS technology, with over 55 languages and dialects and 165 voices for TTS. It's available as part of SpeechSuite for on-premise IVR deployments, and as TTSaaS as a cloud-based service.

Natural Language Processing (NLP): Pioneer in AI and NLP. As of September 30, 2021, held approximately 2,020 patents and 250 patent applications, and our accuracy rates stand with the best in the world. 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 approach to the NLU models to perform Semantic Processing. Nuance NLU combines linguistic and machine learning to understand intents and meaning from words a customer speaks, texts, or types. Nuance has also moved to using pre-trained models following the techniques popularized by the BERT research paper published in 2018. Pre-training using large-scale data and Deep Neural Nets enables the NL model to better generalize the user input. The virtual assistant supports 35 languages and a variety of dialects for text and speech input.

Content Design / Dialog Management: Omnichannel, multi-language dialog management enables organizations to utilize one platform to manage customer engagements in any channel (IVR, web, messaging, smart speakers, TV, etc.) and across multiple languages, including the ability to adjust the experience appropriately depending on the specifics of each channel (i.e., text vs. voice, length of answer, simple text messages vs rich media, etc.). This allows enterprises to reuse their investment throughout their omnichannel strategy. Each Mix.dialog project can be defined for a single or multiple channels; and the application behavior can be defined to be consistent across channels or, where required, to be specific per channel. System Messages are organized by channel, modality, and language.

Service Creation Tools: Nuance Mix offers a unique approach to building chatbots, VA, and IVR applications in a NoCode service creation environment. It enables organizations to create dialog logic in a web-based tooling environment that allows users to define conditional logic and channel- and language-specific behavior without having to code. The only place where coding is required is to facilitate integration with backend systems.

- Mix.nlu allows users to define and train a multi-language ontology with intents and entities, leveraging a comprehensive set of predefined entity types. It features a feedback loop from the production system that allows users to select new utterances/messages to be added to the training set; auto-grouping of intents based on untagged samples; and a workflow that supports manual approvals for auto-assigned intents and entities before adding them to the training set.
- Mix.dialog allows users to orchestrate the dialog logic. In a single Mix.dialog project, organizations can manage the VA's behavior for all supported channels and languages, implement as much consistent behavior as possible, and channel-specific differentiation as needed. It supports building out logic ranging from simple FAQ-type bots all the way to highly personalized, transactional experiences that can be optimized for a large variety of digital and voice-based deployment channels.

Conversational Intelligence Elements: Nuance Insights is an intuitive, omnichannel reporting and analytics solution that provides monitoring and near real-time actionable intelligence to inform ongoing optimization and improve ROI. With reporting across IVR, VA, chatbots, and more, organizations are provided a unified view of customer engagement through a highly secure and scalable data platform. Dashboards visualize KPI trends over time for IVR & VA and summarized views including intent analysis, traffic analysis, fallout analysis.

Enterprise Search and Discovery: Nuance can integrate with CRM and knowledgebase systems and supports direct integrations, replication, search, and retrieval. For VAs that have requirements for bulk FAQ responses, integrated Nuance Mix with Microsoft Custom Question Answering (formerly known as QnA Maker), one of the Azure Cognitive Services. Via this integration, we support ingesting FAQ documents, PDFs, web pages etc. to feed FAQ Bot logic, and can integrate it with VA (or IVR) logic that is more personalized and/or transactional.

Integration with CRM: The platform provides a flexible and highly customizable integration framework that enables organizations to integrate with 3rd parties and/or their existing deployments through various APIs. Nuance Mix separates the tasks of backend integration and data transformation on the one hand and fitting backend data and transactions into Conversational AI logic on the other.

Platform Features and Functions

What works out of the box: The Nuance 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. The solution supports out-of-the-box reports with several KPIs, metrics, and reports that enable program administrators to evaluate the performance of the solution, and to identify areas for further optimization. These metrics align with business goals like deflection from phone contact center, digital self-service, etc.

Channels support

- Desktop web and mobile web: Customer mobile Apps via JS, API and SDK
- Voice and speech services support: Standard integration via Nuance Mix VXML Connector available for all standard VXML-based IVR platforms (Nuance, Genesys, Cisco, Avaya, ...) that support Nuance SpeechSuite 11; gRPC-based integration for IVR usage into Genesys Cloud and other 3rd party CCaaS platforms
- Messaging platforms support: Apple Messages for Business, Facebook Messenger, Twitter Direct Messaging, Google's Business Messages, WhatsApp, Instagram, Viber, Line
- Smart devices, such as TV remote control: Custom integrations for proprietary hardware, for example voice control for gaming consoles

Deployment Platforms: Because of its cloud-native foundation, solutions can be deployed in Nuance datacenters, 3rd party cloud, or on-premises, offering a broad choice of deployment scenarios. To support customers with on-premise or self-hosted runtime deployments, the Nuance tools support the notion of supported "engine packs" that allow limiting tooling functionality to only features that are supported by the targeted runtime environment.

Intelligent Routing: Depending on the channel in which the conversation starts, the Nuance Intelligent Engagement Platform can route consumers from VA to live agent (or vice versa), and/or from one channel to another, such as from IVR to digital channels, from SMS to mobile webchat and vice versa, while passing on contextual information. Within a web-based (i.e., website, brand-owned app) engagement, it utilizes real-time data from the customer journey (such as understood intent, user behavior, website page info, time spent, \$ in cart, etc.) to route consumers to an agent (VA or live agent) with the best skill set to help with that inquiry. The routing takes into account not only the skill set of an agent, but also availability, estimated wait time, and history (i.e., if a user has chatted with a specific agent before).

Authentication and Security: Nuance VAs and IVRs can leverage Nuance's own industry-leading voice biometrics technology for active or passive user verification, providing an additional factor of convenience (no more password to memorize), while at the same time increasing the security and resilience against fraud. Voice biometrics-based caller verification can be deployed in active and in passive mode. Active: caller is explicitly prompted to speak a certain phrase for verification; passive: caller utterances in the IVR are collected in the background and used for verification, providing a less intrusive way of doing the verification.

Support for live agent hand-off or intervention: Agent AI helps enterprises accelerate their digital transformation journey by leveraging virtual and human agents' strengths. For example, by supporting agents and their managers with relevant real-time information (directly in their desktop) in their moment of need, providing feedback to virtual assistants when they are stuck, and more. This enables organizations to support their customers more effectively without interrupting a seamless customer experience or increasing cost.

Human assisted chatbot session: Agent AI, if the VA doesn't know the answer 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 real-time recommendations, fraud indicators, next best action suggestions, etc. This includes showing proactive, contextual next-best-response recommendations that are based on conversations by the client's best-performing agents.

- **VA Coach:** 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 and allow the VA to 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).
- **Agent Coach:** Agent Coach leverages an ML-based prediction model to provide next-best-response recommendations to live agents.

Analytics & Reporting: Nuance Insights, our analytics solution, automates the analysis of omnichannel customer interaction data from the IVR, VA, chat transcripts, and messaging conversations. In addition, with the increased importance of having a full view of the customer journey, Nuance Insights provides near real-time visibility into application performance – validating that conversation flows are working as designed, identifying usage patterns, facilitating troubleshooting, and informing ongoing application tuning.

Customer Success Metrics and Workflows

Recommended organizational roles: Project Manager, Oversee the initial deployment as well as any expansion and/or enhancement efforts; UI/Marketing Lead, Provide branding and style guidelines, partner/design UX; Content Manager, Lead team that designs/participates in content design, authoring and implementation of the content, and participates in ongoing VA performance enhancements; NLU Specialist; Subject Matter Experts; Technical Team; Testing Team; Reporting Specialist; Optimization Lead.

Recommended success metrics: For custom KPIs, Mix.dialog allows VA or IVR developers to define custom metrics, custom attributes and custom dimensions right in the call flow, without having to touch the reporting framework. E.g., a session variable that represents a brand or a tenant could be mapped to a custom dimension in the tooling environment, allowing for filtering metrics separately for each tenant or brand. Other metrics include agent satisfaction and reduced agent churn.

Track Record, Partnerships & Enterprise IA Maturity

- **Market presence:** 6500+ enterprises use Nuance's Intelligent Engagement Platform, 85% of the Fortune 100 companies; customers include more than half of the world's largest banks and telco companies as well as many global travel, logistics, government, and retail organizations.
- **Geographic regions:** Present across all geographic regions.
- **Use cases:** Range from customer sales to care, and internal-facing VAs supporting IT, and other departments; support both reactive (inbound) and proactive (outbound) scenarios.
- **Mix of Modalities:** Nuance supports modalities such as voice, video, text, across channels including phone, web, messaging, and smart devices.
- **Engagement model:** Supports the full spectrum, from Nuance Mix, our DIY tool, to the licensing of individual components (i.e., ASR, TTS, NLU, etc.) to full solution design across multiple channels and modalities. It depends on the organizations' individual needs. The time to deployment depends on the project's scope, ranging from immediate access with DIY tools. Integration with CCaaS and flexible APIs enables organizations to snap in Nuance VA technology quickly.
- **Pricing Model:** Varies, offerings include: Bundled offerings for combinations of solutions - i.e., live chat, proactive notifications, biometrics, etc.; Session-based pricing; Subscription: For a fixed time period (e.g., 1 or 3 years) customer pays a fixed monthly fee for a fixed amount of usage (or capacity).
- **Customer support models:** Deployment services and continuous optimization services in which include roadmaps, monthly and quarterly business reviews, and other services that assist organizations when improving and enhancing their customer engagement strategy.
- **Go-to-market partners:** Full range of partners from Contact Center and Contact Center as a Service partners such as Microsoft, Avaya, Cisco, Genesys, NICE InContact, Mitel, Enghouse Interactive and Five9; to system integrators like IBM, Telstra, Verizon Business, AT&T, Presidio, Accenture and ConvergeOne. Also partner with OEM organizations that utilize Nuance technology, examples include Kore.ai for conversational AI and CallMiner, OpenText, and Tether for analytics.
- **Technology partners:** Developed and acquired extensive technology assets, intellectual property, and industry expertise in ASR and NLU technologies that provide us with a competitive advantage in our markets.

Highlighted customer deployments: Vodafone, Wings Financial, Rakuten, USAA, Cabify, hundreds more

Future Plans & Vision

Continue to focus on driving innovations for AI-powered omnichannel engagements augmented by human assistance to predict, engage, and analyze interactions between customers and organizations. Dedicated to expanding the capabilities for personalization, self-learning, dialog management, customization, testing, and optimization for mid- and enterprise-size deployments based on a truly omnichannel toolset.

Key Differentiators

- **Omnichannel customer engagement, with seamless interactions between AI and live agents:** Delivers a truly integrated omnichannel customer engagement solution for automated and human-assisted conversations, supporting all modalities.
- **DNN-based Advanced NLU:** Moved to using pre-trained models following the techniques popularized by the BERT research paper published in 2018. Pre-training using large-scale data and Deep Neural Networks enables the NL model to better generalize the user input (more flexibility in how the user articulates their input) and more accurately identify the words, intents, and entities with LESS adaptation required by the author of the NL model.
- **Open Platform with Rich API Integration Framework:** Provides organizations the option to deploy out-of-the-box packaged virtual assistant or use conversational AI APIs to deploy custom solutions. The platform delivers the kind of flexibility and high customizability that is often critical for successful enterprise deployments.
- **Team of AI experts:** 700+ AI experts worldwide to help deliver the best industry-specific business outcomes and results at scale.



About Opus Research

Opus Research is a diversified advisory and analysis firm providing critical insight on software and services that supports digital transformation. Opus Research is focused on the merging of intelligent assistance, NLU, machine learning, conversational AI, conversational intelligence, intelligent authentication, service automation and digital commerce. www.opusresearch.net

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