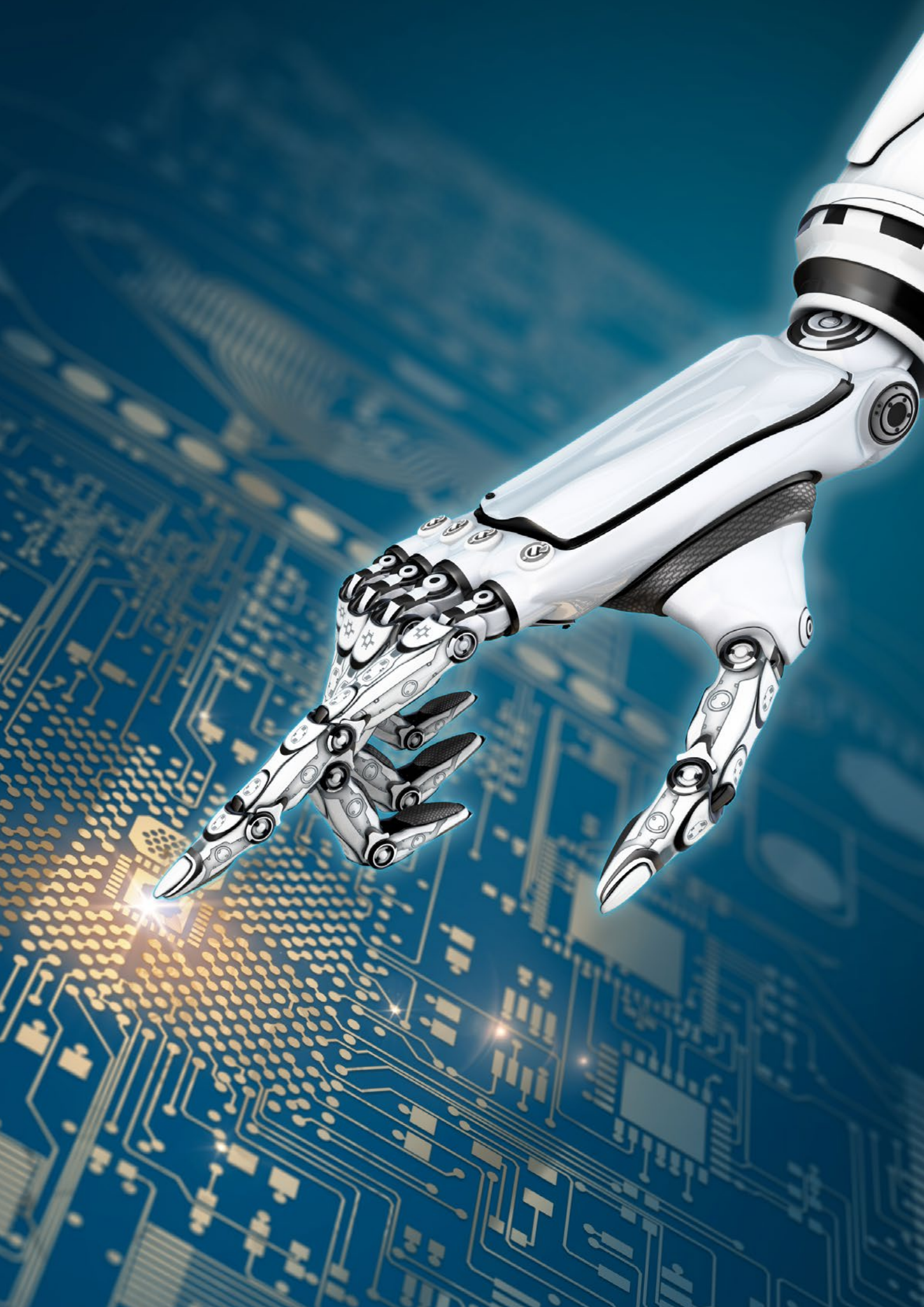
# A Primer: Oracle Intelligent Bots

## - Powered by artificial intelligence

WHITE PAPER | SEPTEMBER 2017

Author: Suhas Uliyar
Suhas.uliyar@oracle.com
Twitter: @suliyar
LinkedIn: https://www.linkedin.com/in/suliyar/

ORACLE



CONTENTS


4 How many ways can we check on the weather forecast?

4 What are Chatbots?

5 Artificial Intelligent (AI) – The power behind Chatbots

8 Oracle Intelligent Bots

10 Channel Configurator

11 Dialog Flow Execution

13 AI Engine

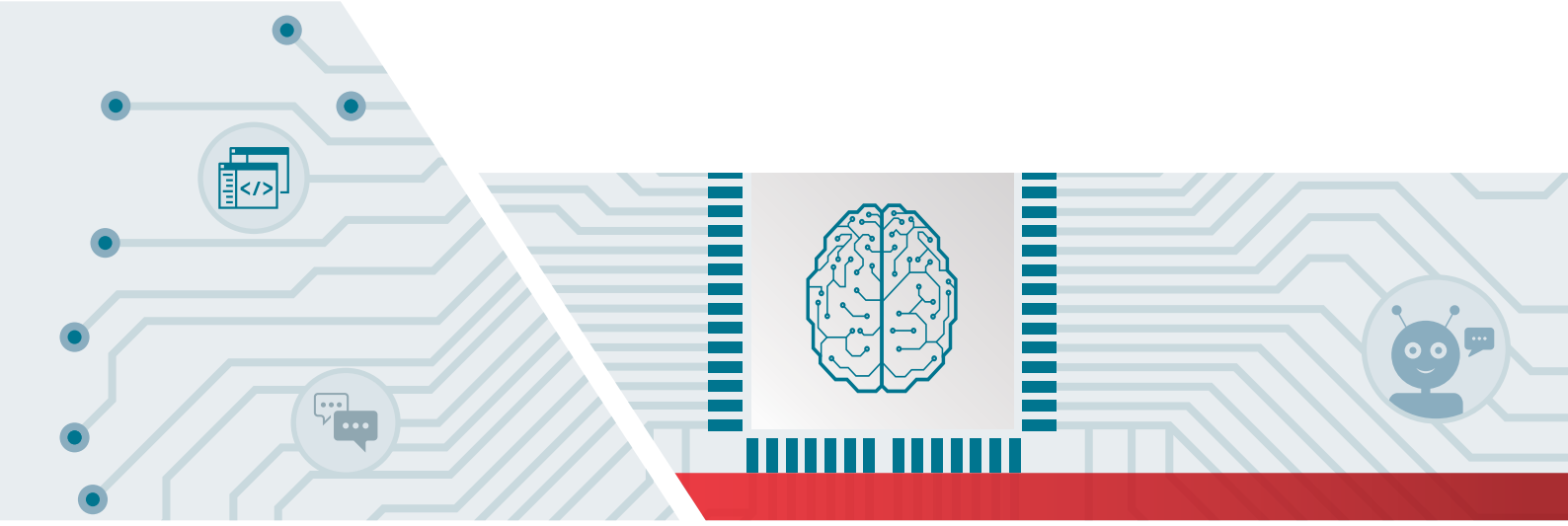
16 Custom Components

16 Oracle Intelligent Bots Builder

21 Intelligent Bots Analytics

23 What's Next? AI Development Platform

25 Oracle Intelligent Bots



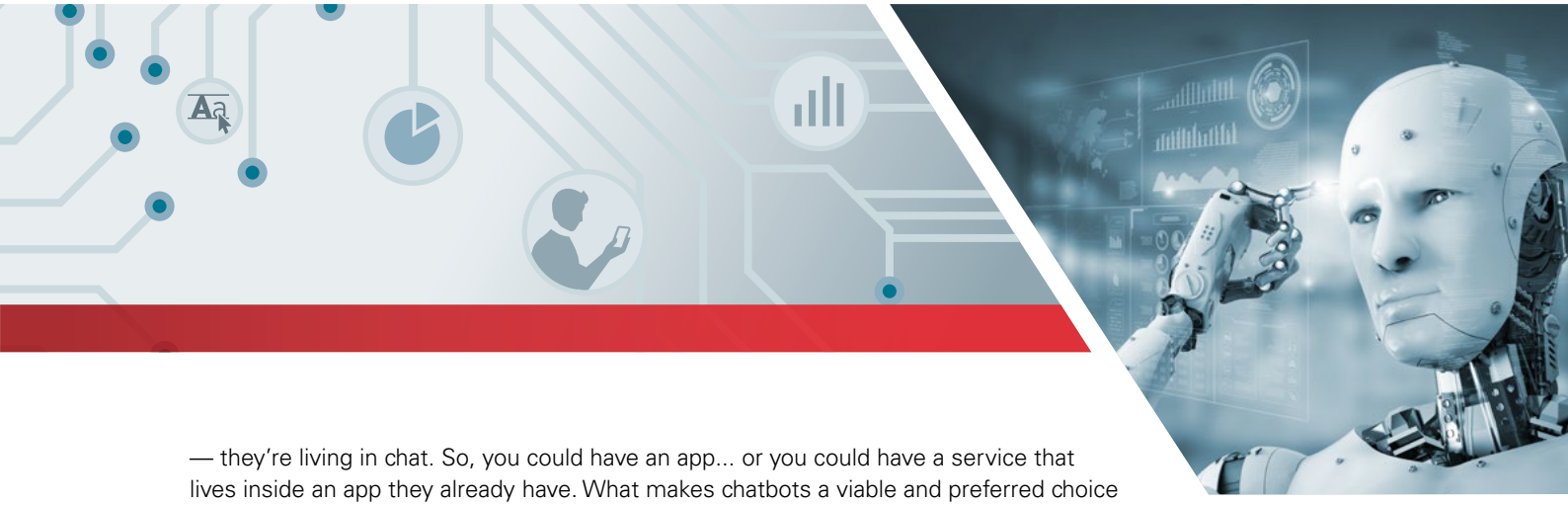
## How many ways can we check on the weather forecast?

I asked my wife and daughter to independently check on the weather, curious to learn the various ways they use technology. My wife asked Siri on her iPhone, my 16-year-old checked on Instagram via the weather sticker and my 13-year asked Google Home. Neither one of them used a Web or Mobile app. Last year this time, they used the Weather Mobile App to check the weather on their smartphone – so last year! What was common was that neither of them used their MacBook or PC. Come to think of it, I can't remember the last time I saw them on their laptops. My two teenage daughters have three native apps installed from the app store – Instagram, Snapchat and Facebook Messenger. The latter and SMS being the only way for me to communicate with them. Phone calls and emails go unanswered. No clutter on their Smartphones unlike my phone that has over 80 apps installed. Of course you could also look out the window.

Over the last decade we have seen the dramatic increase in adoption of Mobile as an engagement channel for consumers and employees within the enterprise. What we are seeing now is the emergence of messaging through channels like FB Messenger, WhatsApp, WeChat, Slack, SMS, as a dominant engagement channel. Over **4.1 Billion** users around the world are on instant messaging apps, adopted a rate that was much faster than on social networks. What makes these channels the default choice is the expected instant response if the other person is on or the push notification that triggers the person on the other side to respond immediately. These users that use instant messaging channels to converse with their friends and family want to use the same familiar user experience and channel to instantly communicate with the enterprise. These channels are doing to apps what browsers did to client server apps i.e. these channels are rapidly becoming the next browser. This is leading to the innovations in chatbots powered by artificial intelligence (AI) that is going to help enterprises automate these conversations in scale through these channels.

## What are Chatbots?

A chatbot also know as a chatterbot, talkbot or Bot is a computer program designed to simulate conversation with human users, especially over the Internet. So why now? A lot of factors have come together to make this explosion of Intelligent Bots possible. One of them is the fact that people are just plain tired of downloading apps, which I define as "app fatigue." On the other hand, people have moved into messenger apps



— they're living in chat. So, you could have an app... or you could have a service that lives inside an app they already have. What makes chatbots a viable and preferred choice of interaction is the innovation in artificial intelligence via powerful machine learning algorithms that make it possible for the computer (the chatbot) to hold conversations with the end user without too much human intervention.

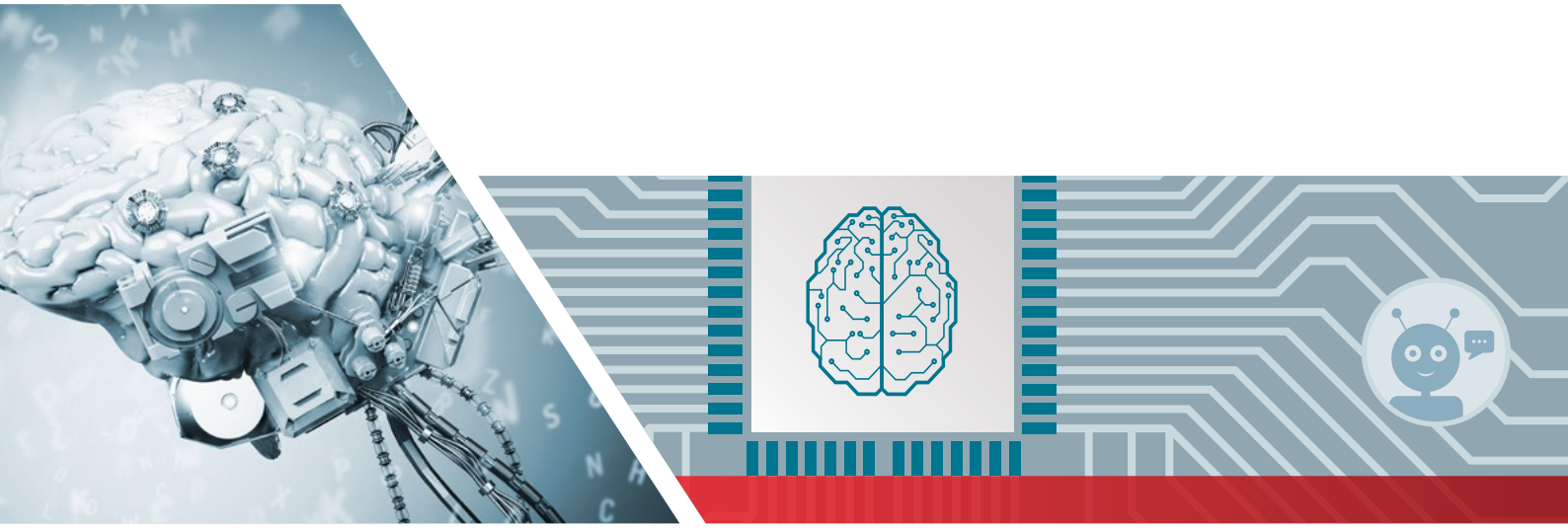
## Artificial Intelligent (AI) – The power behind Chatbots

Artificial intelligence (AI) has been around for a long time – the Greek myths contain stories of mechanical men designed to mimic our own behavior. Very early European computers were conceived as "logical machines" and by reproducing capabilities such as basic arithmetic and memory, engineers saw their job, fundamentally, as attempting to create mechanical brains. Artificial Intelligence is the broader concept of machines being able to carry out tasks in a way that we would consider "smart". As technology, and, importantly, our understanding of how our minds work, has progressed, our concept of what constitutes AI has changed. The rise of machine learning – a subfield of AI where systems or devices which can in theory handle any task is where some of the most exciting advancements are happening today.

Machine learning (ML) is based around the idea that we can create algorithms that can learn from data and then make predictions as they encounter new data. Arthur Samuelson, a pioneer in artificial intelligence, coined the term "Machine Learning" in 1959 and defined it as the *field of study that gives computers the ability to learn without being explicitly programmed.*

Machine learning involves at its core, algorithms that apply advanced statistical and mathematical theory to perform pattern recognition within data. Machine learning is used all around us, and its use will increase substantially in the future. Some examples include: self-driving cars, speech recognition, handwriting recognition, facial recognition, optical character recognition, spam detection, market segmentation, forecasting, astronomy (enabled development of theories about the formation of universe), fraud detection, jet engine failure prediction. And within machine learning, modern neural networks have emerged as a state of the art technique for many applications.

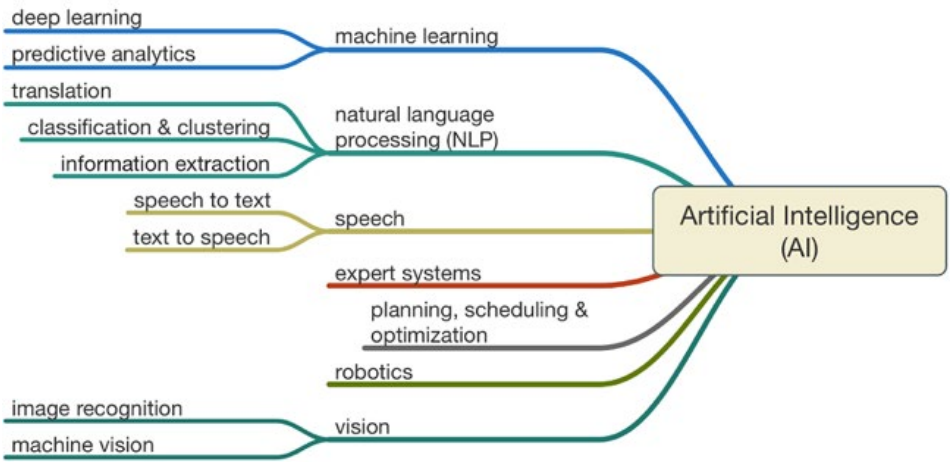
Neural networks were inspired by human intelligence and the brain's ability to rewire to learn new skills: if we are to model intelligence, why not mimic the human brain, which is capable of learning so many things. Additionally, there exists a theory that our brains may have just a single algorithm that can be trained to learn different skills given different sensory training inputs. Experiments have shown that our auditory cortex, whose



primary role is hearing, can be retrained to allow us to see, that our tongues can also be retrained to allow us to see, that we can be trained to echo locate.

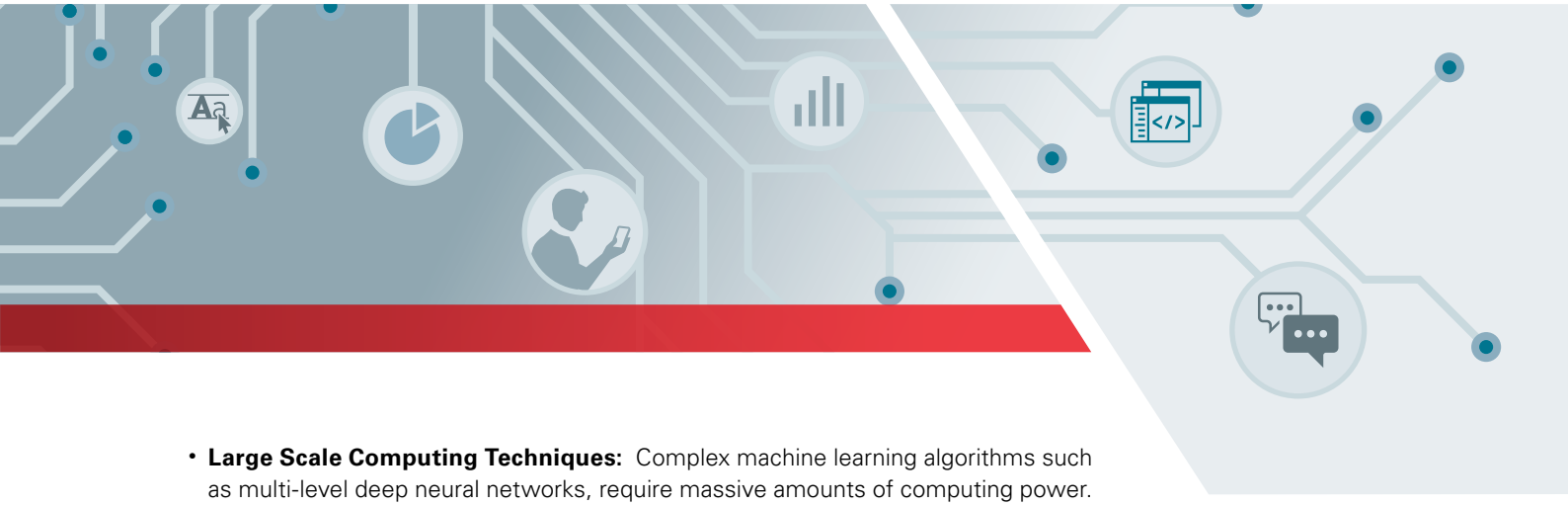
So indeed, neural network machine learning architectures have their equivalents to our biological brains, namely layered networks of neurons, dendrites, axons, and synapses. Like our brains, they have also proven to be highly malleable, able to solve a variety of historically very difficult machine learning problems. Hence, they are used to address complex nonlinear machine learning problems such as computer vision, self-driving cars, detecting the emotions expressed in our faces and speech, speech recognition, facial recognition, and much more.

For a machine to be truly intelligent there are a few different types of intelligence services that collectively make the machine 'intelligent' as shown in the diagram below.




Three important breakthroughs have led to the emergence of Machine Learning and the resurgence of neural networks, which were widely used in the 1980's and 1990's, as the vehicle to driving AI development forward:

- **Availability of Data:** The first, was the emergence of the internet, and the huge increase in the amount of digital information being generated, stored, and made available for analysis. IBM states that 90% of the world's data was created in the last two years. Data is fodder for statistical analysis which is the key for higher accuracy in machine learning models.



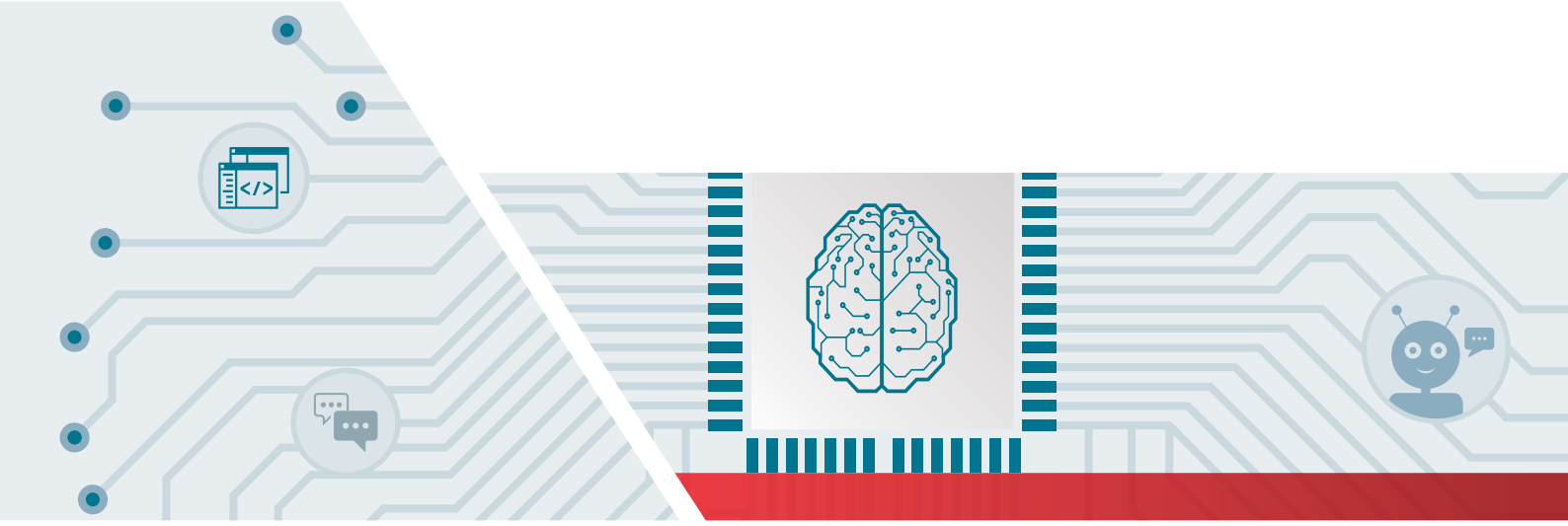
- **Large Scale Computing Techniques:** Complex machine learning algorithms such as multi-level deep neural networks, require massive amounts of computing power. Recently developed computing techniques such as MapReduce, invented by Jeff Dean and Sanjay Ghemawat at Google in 2004, allow for large scale parallelization of computations needed to train the multi-level deep neural networks.
- **Moore's Law plus Specialized AI Chips:** The continued exponential growth in compute power combined with GPU-accelerated computing have also allowed for practical application of complex machine learning algorithms. More recently, companies like Nvidia, Intel, AMD are developing microprocessors with GPUs that specialize in machine learning computation. These chip-level developments combined with large scale, high-performance numeric computing techniques means you no longer have to wait years or decades in between iterations of the training process for the historically unattainable compute-intensive algorithms such as deep neural networks.

Machine learning(ML) applications can read text and work out whether the person, who designed it, is making a complaint or offering a congratulations. These ML apps can also listen to a piece of music, decide whether it is likely to make someone happy or sad, and find other pieces of music to match the mood. In some cases, they can even compose music to express similar themes which the ML app anticipates will likely to be appreciated by admirers of the original piece.

These are all possibilities offered by systems based around ML and neural networks. Thanks, in no small part to science fiction, the idea has also emerged that we should be able to communicate and interact with electronic devices and digital information, as naturally as we would with another human being. To this end, another field of AI – natural language processing (NLP) – has become a source of hugely exciting innovation in recent years, and one which is heavily reliant on ML.

NLP applications attempt to understand natural human communication, either written or spoken, and communicate in return with us using similar, natural language. ML is used here to help machines understand the vast nuances in human language, and to learn to respond in a way that an audience is likely to comprehend.

One of the first use cases for NLP has given the rise of the chatbots – a new generation of conversational interactions with computers.

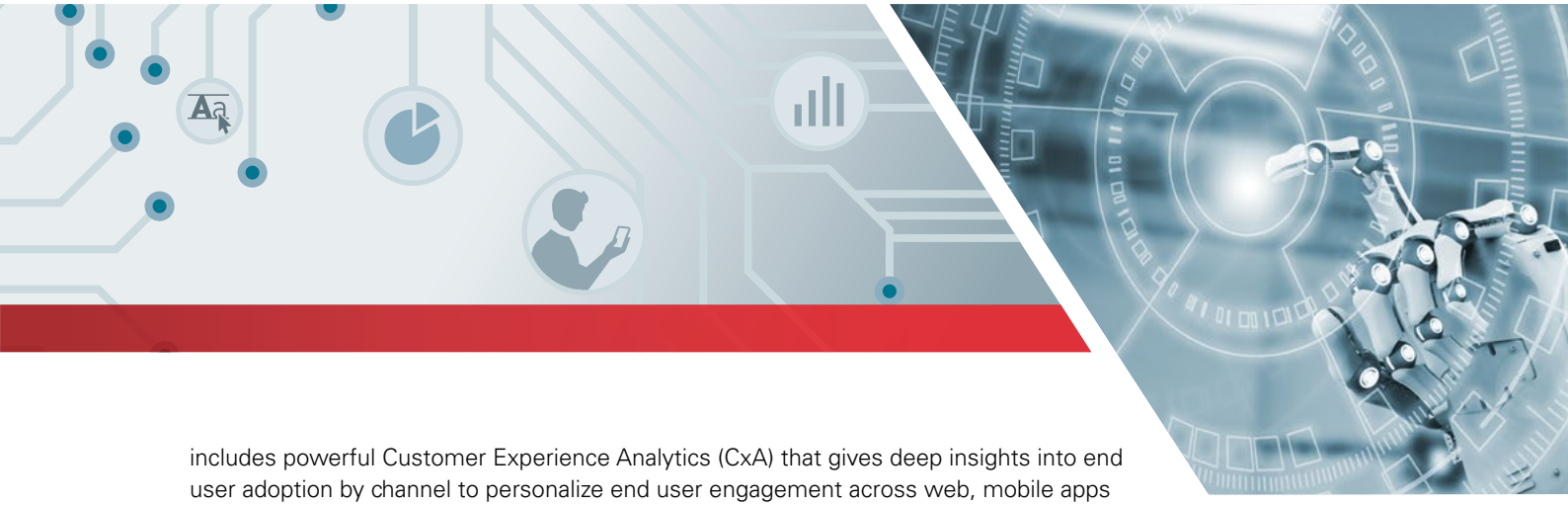


## Oracle Intelligent Bots

As an integral part of Oracle Cloud, we developed a mobile service that has seen excellent adoption with customers, globally and across all industries. Both Gartner and Forrester have named Oracle Mobile Cloud Service (MCS) as a leader given its global customer success and momentum, product capabilities, vision and strategy. Our goal as a leader in providing platform as a service (PaaS) is to enable customers to deliver engaging digital experiences to their internal and external customers. The design goal of MCS is to make it easy to deliver mobile apps across smartphones, tablets, wearables and web pages. Today we have continued to innovate and expanded our cloud platform capabilities by adding Intelligent Bots powered by artificial intelligence.

*Figure 1: Enabling Multi Channel Experiences & Insights*

The Oracle Mobile Cloud Enterprise (OMCe) now includes the Intelligent Bots that uses machine learning algorithms to help our customers engage with their customers and employees through chatbots. There are advanced machine learning algorithms in the solution to process natural language from the users and to provide immediately useful responses whether the user is looking for information (e.g., bank account information) or executing a transaction (e.g., a purchase). As a result of our advanced AI technology, our Intelligent Bots will continue to improve its intelligence as the volume of conversations grows. Oracle Intelligence Bots will enable sensing of user sentiment / emotion, translation of language and many more cognitive capabilities. In addition, OMCe also



includes powerful Customer Experience Analytics (CxA) that gives deep insights into end user adoption by channel to personalize end user engagement across web, mobile apps and bots.

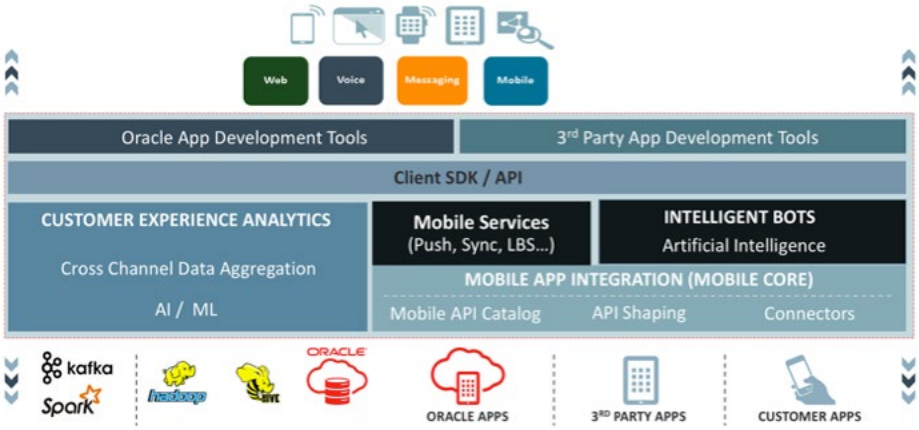



*Figure 2: OMCe – One Contextual Platform across Mobile, Web & Intelligent Bots*

One of Oracle's differentiated value with this service is to provide a complete end to end solution in the cloud, making it very easy and simple for enterprises to rapidly implement chatbots for their consumers and employees. Like web and mobile technology adoptions in the past, employee experiences quickly mirror consumer experiences and Oracle Intelligent Bots has been built to solve the external (B2C) and internal (B2E) use cases across industries and functions.

Mobile has impacted our work and personal lives and impacted all industries. Oracle Mobile Cloud Service has been adopted across many industries including Retail, Financial Services, Utilities, Manufacturing, Automotive, Construction, and others. Similarly, Oracle expects most industries to be impacted by chatbots across B2B, B2E and B2C use cases. We are already seeing several customers with B2C use cases in the banking, travel, retail, utilities, and hospitality sectors for both transactional as well as service related conversations. In parallel, there are several use cases for employees in HR, like on boarding, talent acquisition, Sales CRM use cases for the sales teams, like approvals, time cards, and leave management for ERP. The beauty of a chatbot solution is that anyone who knows how to send a text message or use FB Messenger or WhatsApp or Slack will be able to interact with the Oracle Intelligent Bots without having to learn anything new.

## Oracle Intelligent Bots: Key Components

**The Oracle Intelligent Bots has 4 primary components:**

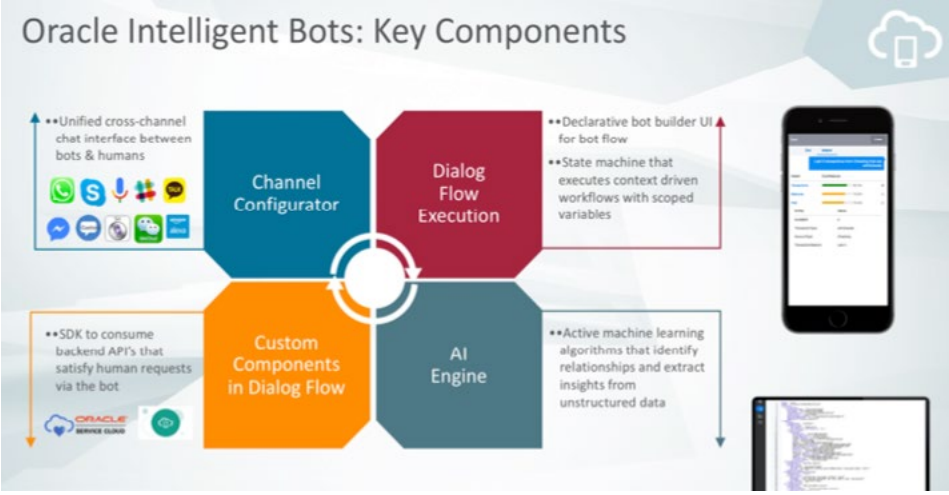
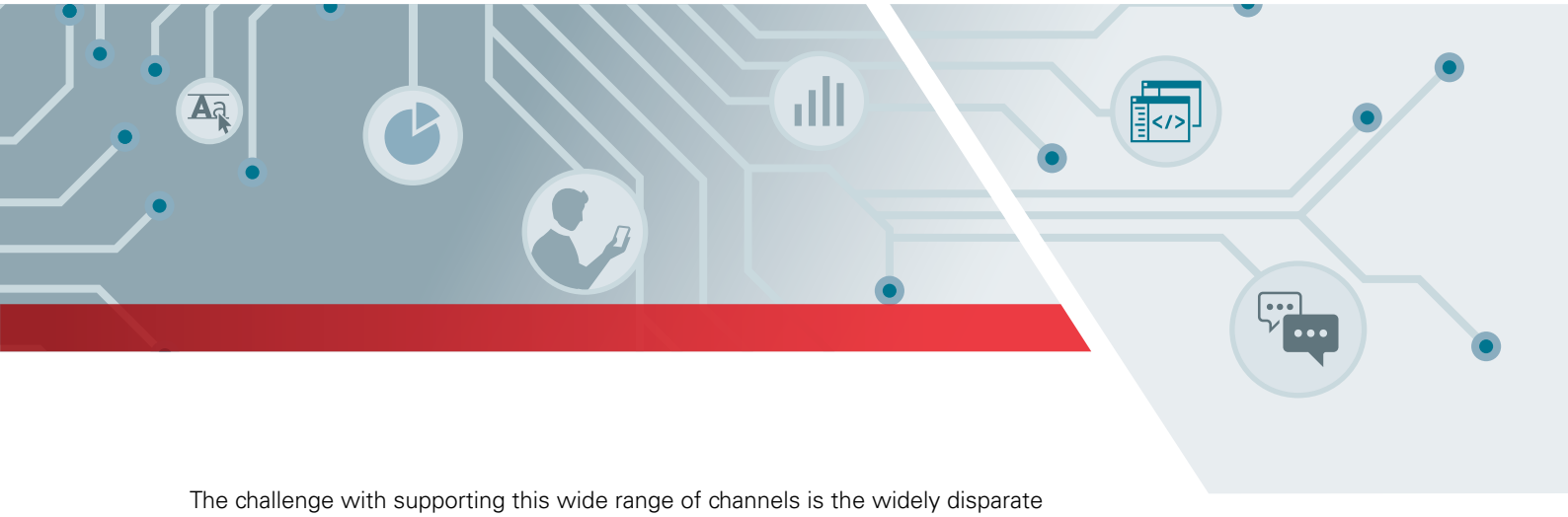



*Figure 3 : Oracle Intelligent Bots Components*

## Channel Configurator

End users have a choice of messaging channels they prefer to use. Certain geographies have specific channels as their preferred messaging channel while other geographies prefer other messaging channels. There are different categories of channels as well. Broadly, these can be categorized as follows:

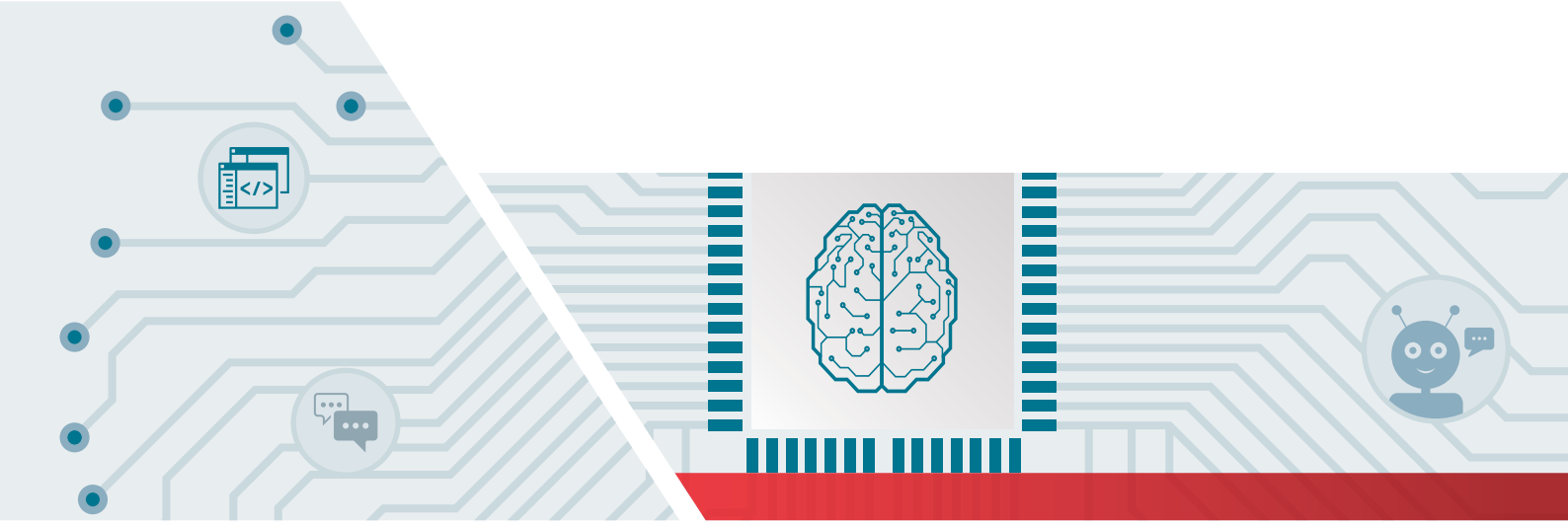
- **OTT Channels:** Over the top (OTT) messaging channels such as Facebook Messenger, Facebook WhatsApp, WeChat, Line, Kik, Telegram, Talk, Skype, Slack, SMS.
- **VPA:** Virtual Private Assistants such as Amazon (Dot, Echo, Show), Google Home, Apple HomePod.
- **Mobile & Web app extensions:** Extending native or hybrid/responsive mobile apps or web applications with chat capabilities.
- **Voice Based Input:** Custom devices or apps with interfaces that use Siri, Cortana, Google Voice or other speech input for interaction.



The challenge with supporting this wide range of channels is the widely disparate functionality supported as well as infrastructure differences encompassing queue management, routing, rate limits, fallbacks, retries, uptime, errors and exceptions, to name a few. User experience is a critical part of end user adoption like mobile apps and for the channels that support a text based input, the UI can be very different based between channels. Developers are responsible for managing these disparities. Oracle Intelligent Bots makes it easy by abstracting this integration, providing out of the box integration to these channels, and managing these disparities as part of the solution, thus enabling enterprises to reach a broader audience and focusing on the conversational interaction aspect instead of the integration to these channels. This not only reduces the time at which they can deploy, but also their total cost of ownership as this part of the channels continues to change and evolve globally. What is #1 today could very soon be superseded by a new channel tomorrow.

## Dialog Flow Execution

Users interact with the Intelligent Bots Platform through a conversational interaction. This interaction, also called the conversational user interface (UI), is a dialog between the end user and the chatbot, just as between two human beings. It could be as simple as the end user saying "Hello" to the chatbot and the chatbot responding with a "Hi" and asking the user how it can help, or it could be a transactional interaction in a banking chatbot, such as transferring money from one account to the other, or an informational interaction in a HR chatbot, such as checking for vacation balance, or asking an FAQ in a retail chatbot, such as how to handle returns – essentially the Chatbot becomes the first line assistant to provide immediate answers to questions, 24/7.



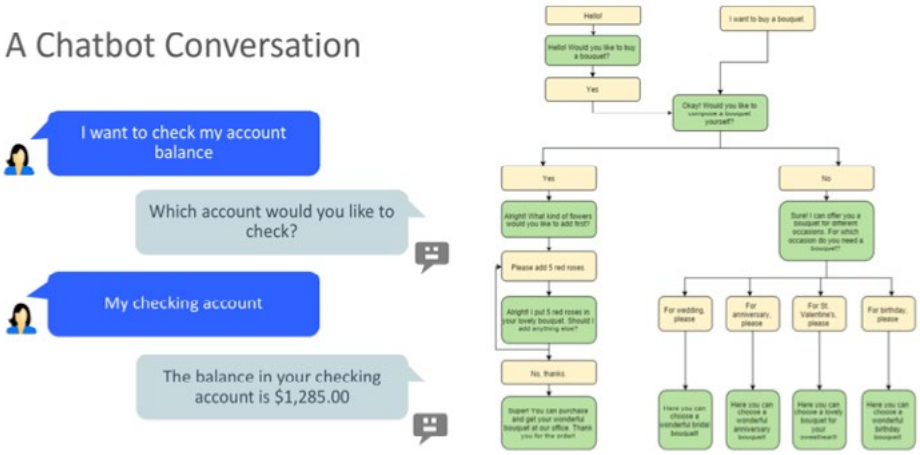
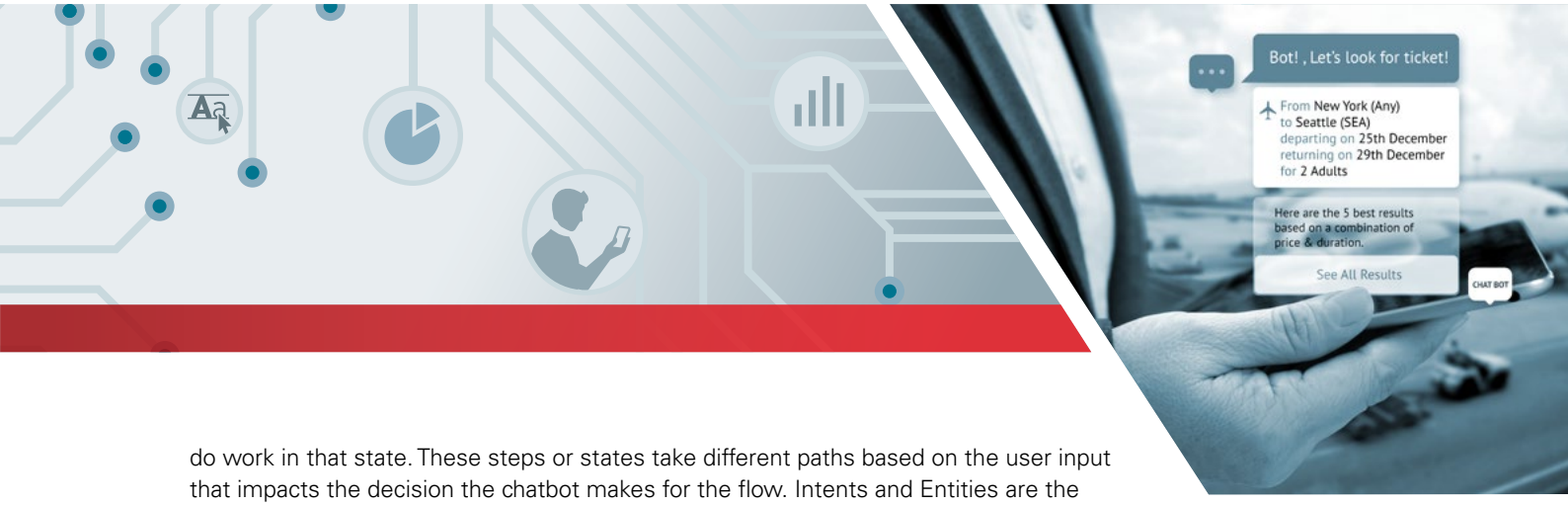



*Figure 4: Intelligent Bots Conversation with Dialog Flow*

The Oracle Intelligent Bots dialog flow editor and the execution engine makes it simple to model these conversational flows while providing a high level of control over the conversation logical paths. The dialog flow includes several different pieces, including

- Steps or States
- Decisions
- Intents
- Entities
- Variables

A conversation with a chatbot goes through a specific flow with the conversation having different states and context. This flow defines what should happen next based on an input and the flow itself is implemented in the platform as a state machine, which can be thought of as a workflow or process flow. The steps are the states in the workflow which the system guides the end user through as part of the conversation. The system that guides you through those states is called a state machine. To define your flow in the chatbot, you will define specific states and assign actions (called Components) to




do work in that state. These steps or states take different paths based on the user input that impacts the decision the chatbot makes for the flow. Intents and Entities are the user-configurable components of the machine learning (ML) based natural language processing (NLP) algorithm that is used in the chatbot flow to manage the state or the steps. Variables store values that can change, depending on conditions or on information passed to the system.

The Oracle Intelligent Bots Process Flow in chatbots is a 'dialog flow', as you will be creating applications that interact with users in the form of a dialog. The process itself is implemented as a state machine via a set of rules and it is defined in the Intelligent Bots Platform console in a format known as Oracle Intelligent Bots Markup Language, Intelligent BotsML for short. Intelligent BotsML is a form of YAML. YAML is a markup language that is, fundamentally, a way of expressing data and data relationships in a format that is highly focused on human readability.

One of the differentiated value of this dialog designer and execution engine is that the dialog designer and execution engine is tightly integrated with the ML based NLP engine. Human conversations are often non-linear in nature. End users could potentially branch into different states / context in course of a conversations. For example, let's say I want to transfer funds from account A to someone. Let's say I start by asking the chatbot - pay Tom for dinner. The chatbot responds with "from which account?". Let's say the user picks checking but realizes he is not sure of how much he has in the account; he switches context to ask for balance and further wonders about and asks for recent transactions, and so on. In other words, the user triggers changes in the state, from transferring money, to checking balance, and then to recent transactions. At some point, he decided to pay Tom, which is the original state he started with. The Oracle Intelligent Bots platform makes it very easy to model this with built in state management so the developer does not have code and maintain the complexities of state management, reducing the time to deploy and the cost of ownership in managing the code.

## AI Engine

The Oracle Intelligent Bots expose multiple natural language understanding (NLU) models to predict user-intent from incoming chatbot requests and accurately execute the required dialog flow. To achieve this, we utilize multiple natural language processing (NLP) and machine learning (ML) algorithms combined with other approaches to classify end user intent. These approaches are described below:

- **Trainer Ht for Speed:** For use cases where the volume of data is low, our first model called Trainer Ht, derives a combination of generative rule templates from NLP-based linguistics to help customers get started very quickly by providing a small set of data (corpus) for the model to train on. The user-intent prediction using the model is highly accurate for incoming requests that are like the utterances provided in the Intelligent Bots' corpus.
- **Trainer Tm for Generalized Intelligence:** For use cases that have large volume data sets and require better generalization of intent prediction (i.e., higher accuracy of intent classification wrt incoming queries not in the corpus data), and for customers that have built a high quality initial data set tuned on Trainer Ht for conversation flows, Oracle Intelligent Bots provides a more advanced machine learning (ML) based model for user intent prediction. The second model (Trainer Tm) utilizes a combination of algorithms that learn unsupervised from large amounts of unlabeled text (e.g. WSJ, NYT, Wikipedia, Reuters etc.) to then produce context sensitive mappings or vectors for user-intent prediction based on the corpus of data provided by the end-user in a chatbot (ex: "river bank" and "JPM Chase bank" to differ vectors based on context of sentence in corpus).

The NLP engine is configured by setting up **intents** and **entities**. This is configured by non-developers or business people for the NLP to understand and categorize the natural language conversation from the end user and to extract the necessary information from the conversation to be able to take precise action such as performing a transaction or looking up data from a backend system of record.

An intent at a high level is what the end user would like to accomplish (e.g., get account balance, make a purchase). An intent is essentially, a mapping of customer input to a unit of work that the backend should perform. Therefore, based on the phrases uttered by the user in the chatbot, you want to map that to a specific and discrete use case or unit of work, for e.g. check balance, transfer money and track spending are all "use cases" that your chatbot should support and be able to work out exactly which unit of work should be triggered from the free text entry that the end user types in natural language. We use the NLP engine to map this free form text entry to a specific intent. Based on the model, the engine is set up with a small corpus of common phrases for the NLP engine to train for each intent. For example, for the check balance intent, the administrator provides a few sample utterances like 'What's my balance' or 'How much do I have" in the Intelligent Bots Builder to train the engine.

Entities can be thought of as parameters associated with intents that specifically define, or clarify, what precise action the backend should execute. Entities are extracted from the utterance to pass as parameters to the integration component or for making decisions in the dialog flow. An example of a check balance intent could involve the further clarification of which of several accounts to check the balance of (e.g., checking or savings). So, if the user inputs 'What's my balance in my savings account'. In this example, the chatbot extracts "Savings" and maps it to a variable called 'AccountType'. Using entities, we can define that certain elements of the input should be identified as these variable values. If the user initially only uttered, "what's the balance in my account?", the bot would prompt the user to further specify which of their accounts would they like the balance for.

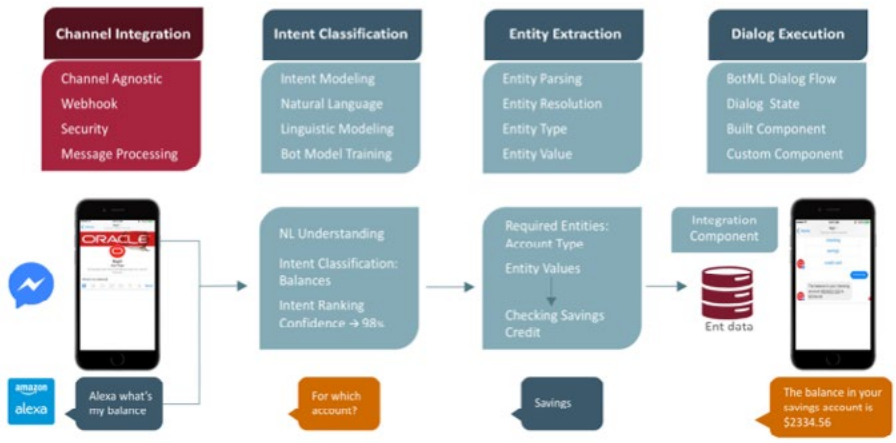
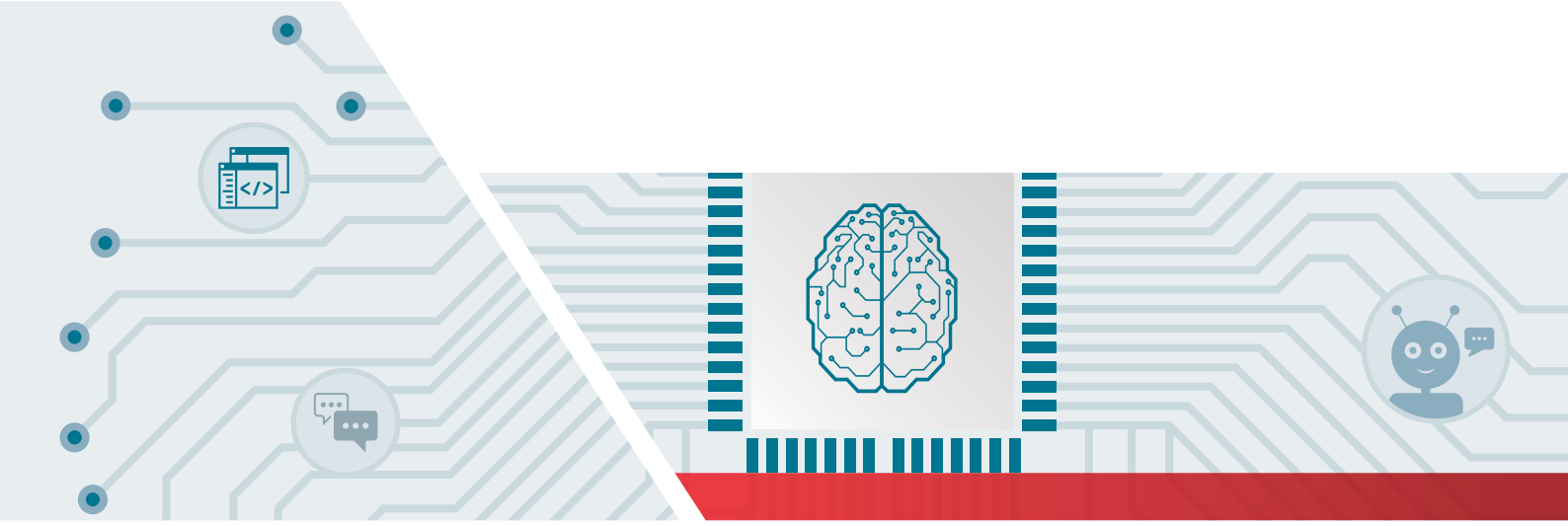



*Figure 5: Intent Classification & Entity Extraction – Putting it all together*

With these dual approaches customers can get started quickly and then build on the initial corpus with a powerful machine learning model to predict user-intent more accurately as their data sets grow. In addition to the NLP algorithms, there are other artificial intelligence capabilities that Oracle will be building into the platform, including AI that enable large-volume question-and-answer type conversations, conversations that account for end user sentiment, incorporate image analysis, perform auto complete, all in an effort to extend far beyond the initial NLP, strengthening our solution over other chatbot approaches, in helping our customers quickly and easily delivering the most natural conversational interfaces across a variety of domains and use cases.



## Custom Components

For chatbots to add value to a conversation, it must be able to integrate to the system of record that holds information required for the targeted use cases. These are typically enterprise backend systems that own customer's banking information, or employee information in a HCM system, or sales information in a Sales CRM system. Oracle is the leader in integration to enterprise and cloud data sources and this is also provided out of the box, reducing the effort, time and cost to expose data to the chatbot. With built in integration to Oracle Mobile Cloud, Enterprise (OMCe), the Intelligent Bots Platform can leverage the shaped mobile APIs, and in addition, making use of mobile-first services, like Push Notifications to send asynchronous notifications from the backend systems to the chatbot. These custom components can also consume any REST service and is deployed as a micro service.

## Oracle Intelligent Bots Builder

The Oracle Intelligent Bots Platform provides a low-code tool, the Oracle Intelligent Bots Builder that allows customers to develop their chatbots from a web browser. These tools provide the ability for the customers to create a new chatbot, define the intents, entities, the dialog flow, define the custom components and configure the chatbot to connect to one or more channels. The Intelligent Bots Builder provides the ability to test the system in a real time and agile way by entering phrases in the test box and getting results from the NLP engine. Based on the results, the developer can fine tune and re-train the chatbot in real time. In addition, the Intelligent Bots Builder also provides a way for the developer to test the complete conversational interaction by testing that same phrase and testing the end user experience dialog from the dialog flow execution engine.

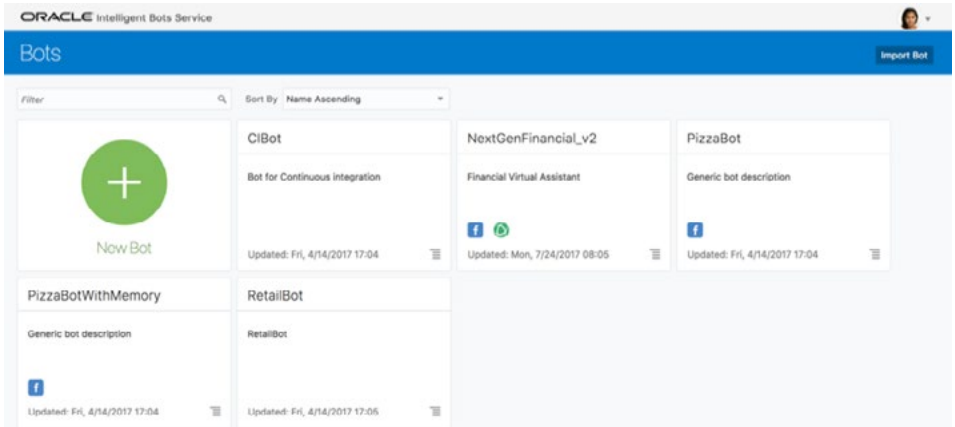



*Figure 6: Intelligent Bots Home Page – Create a New Intelligent Bots or Clone an existing Intelligent Bots, Import / Export Intelligent Bots*

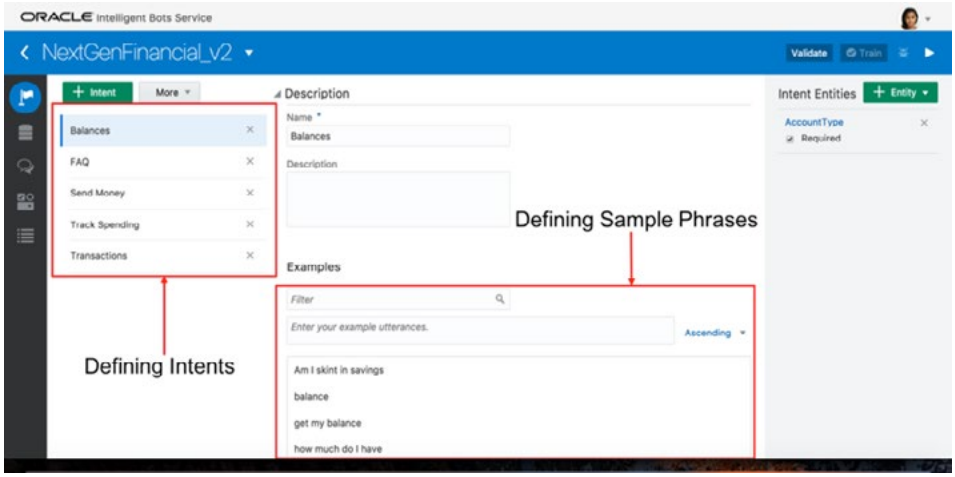
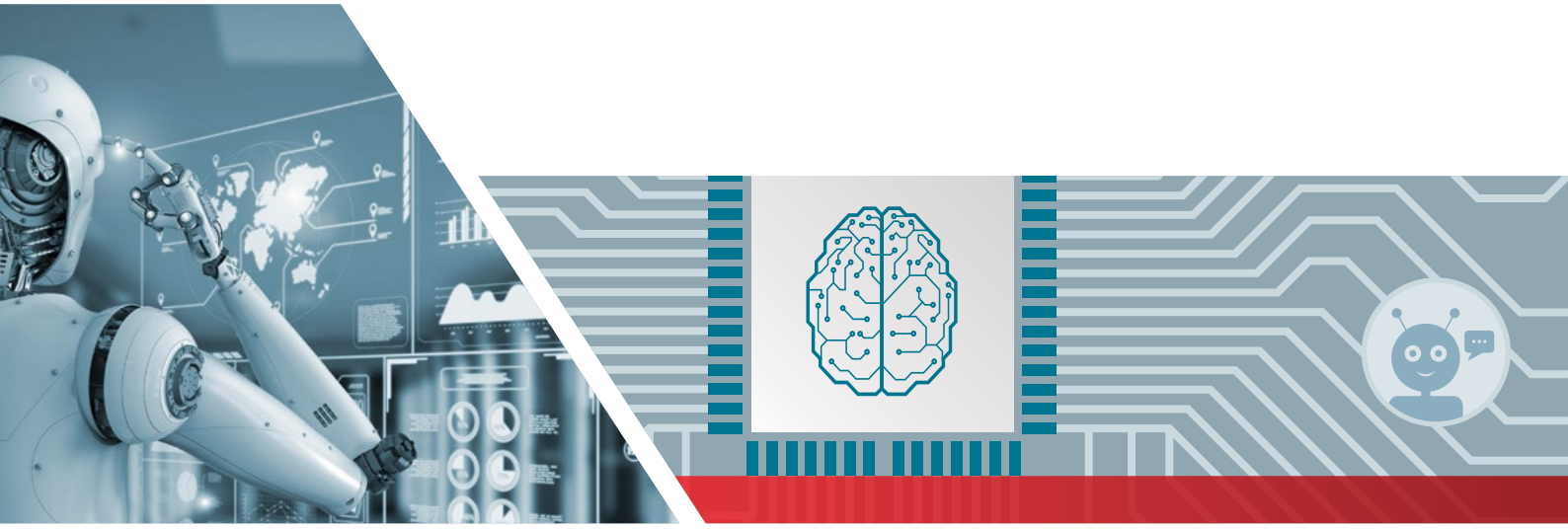



*Figure 7: Setting up Intents and Sample Phrases (Utterances)*



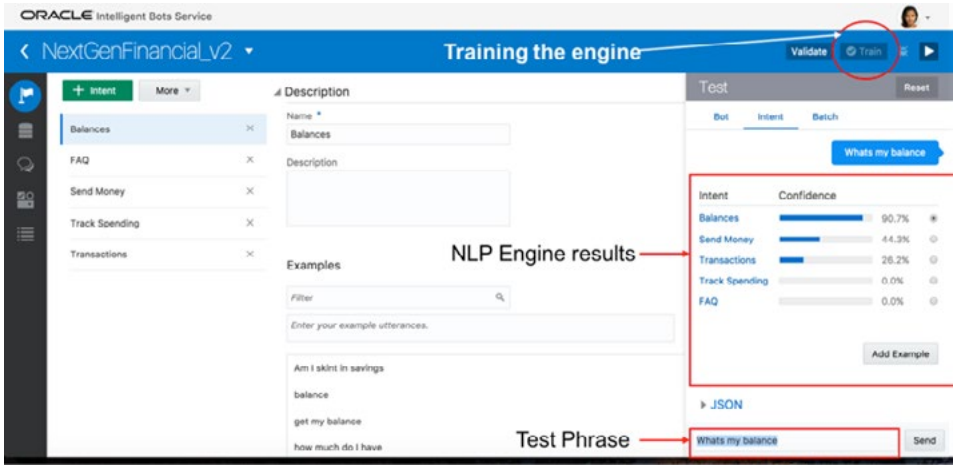



*Figure 8: Testing Intents and training NLP engine in real time*

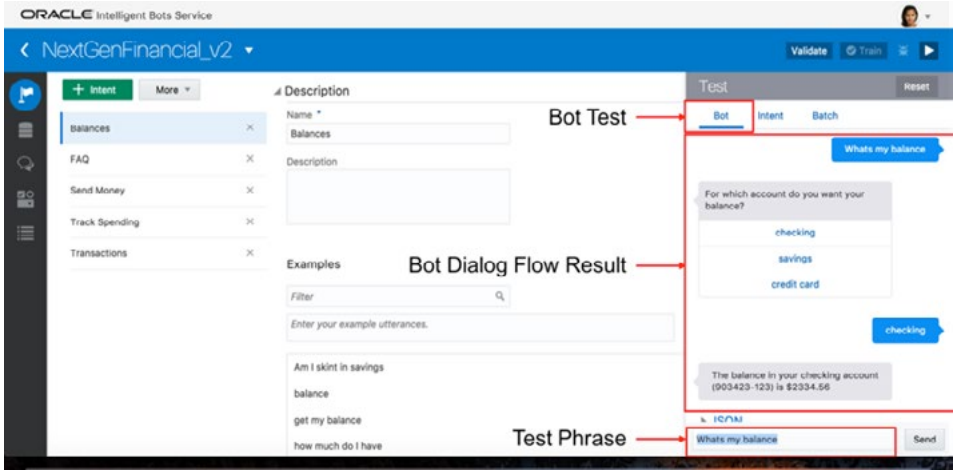



*Figure 9: Testing Intelligent Bots Dialog Flow with NLP*

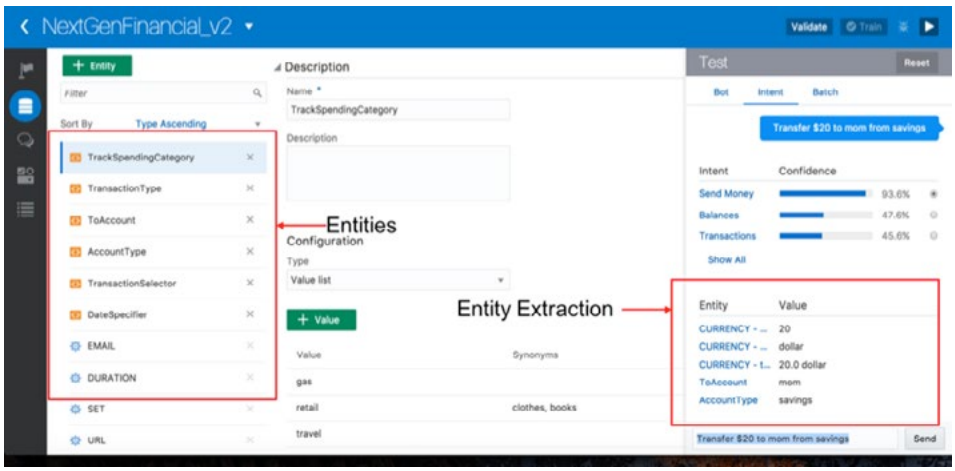



*Figure 10: ML Based Entity Extraction*

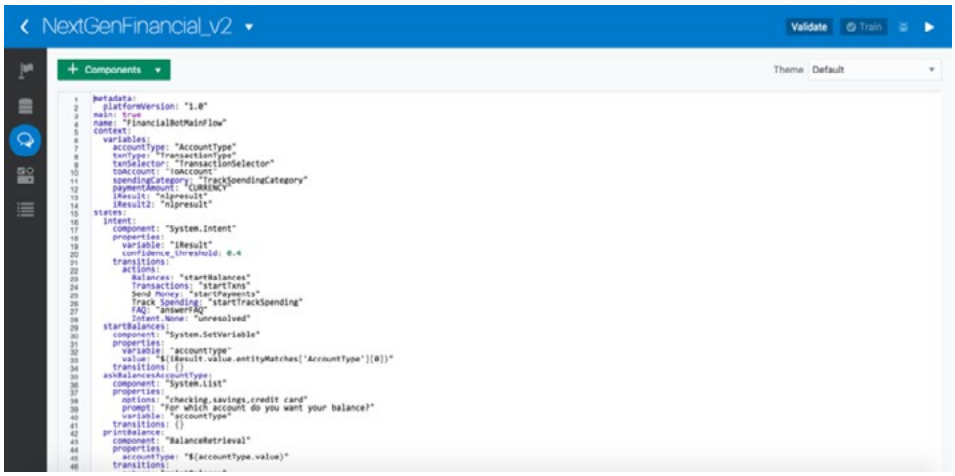
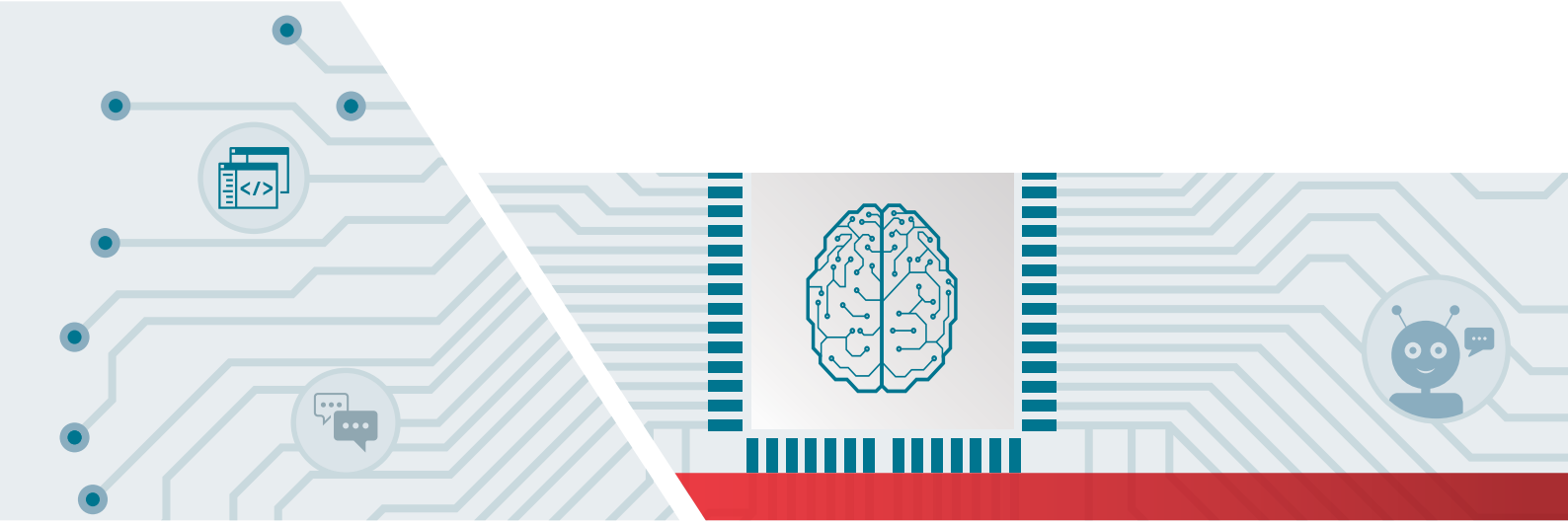



*Figure 11: Dialog Builder – YAML*



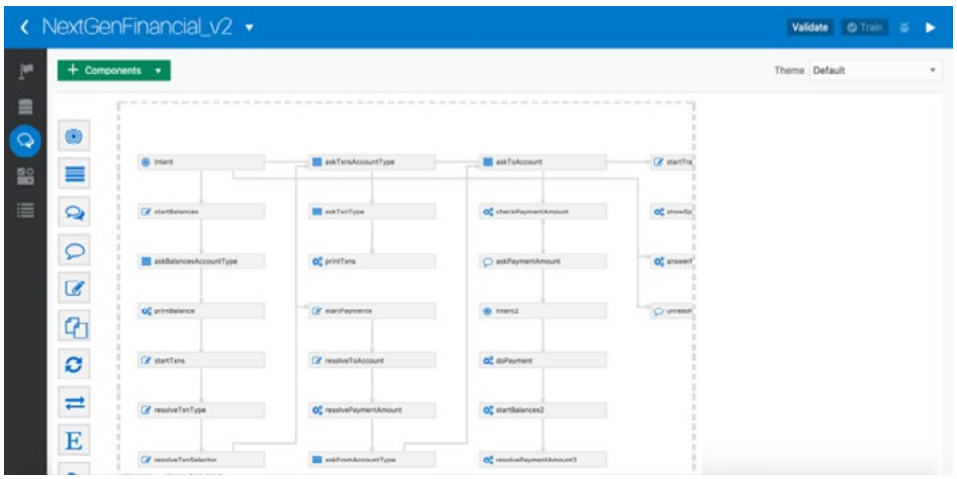



*Figure 12: Dialog flow editor – Coming Soon*

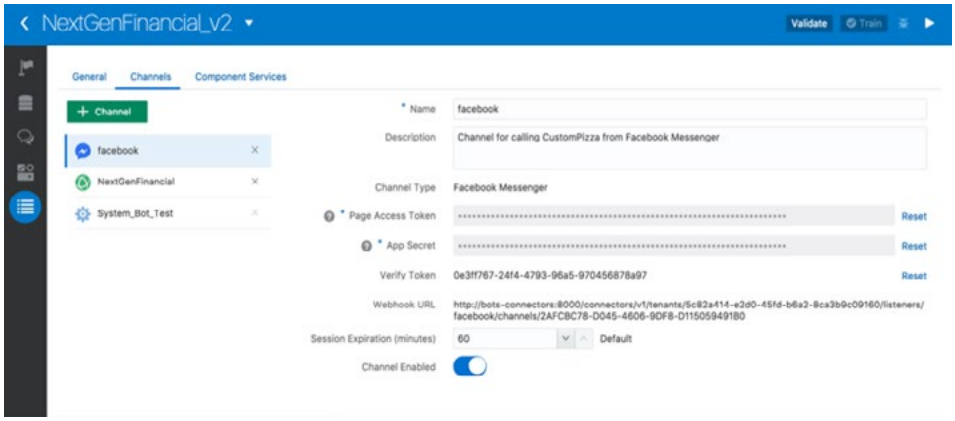



*Figure 12: Channel Integration e.g. Facebook Messenger*

## Intelligent Bots Analytics

The Oracle Mobile Cloud Enterprise (OMCe) includes Customer Experience Analytics (CxA) that provides deep insights into multichannel user adoption across mobile, chatbots and web. Customers can answer questions like, "Which channel is being used the most", "What use cases are more popular as interactions in mobile vs. chatbots", "Do end users use multi channels and if so are there specific characteristics like time or preference when they use channels". These channels provide insights to personalize the engagement with the end user. With CxA, businesses can create segments of user, perform cohort analysis and deep funnels, to get deeper insights, and integrate with marketing applications to create personalized promotions that engage the user within the most appropriate channel.

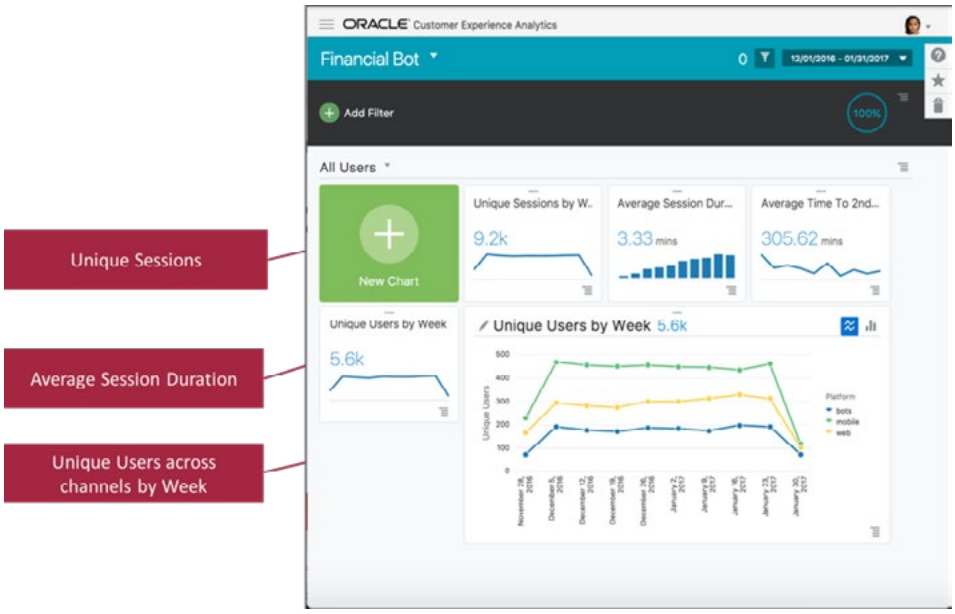
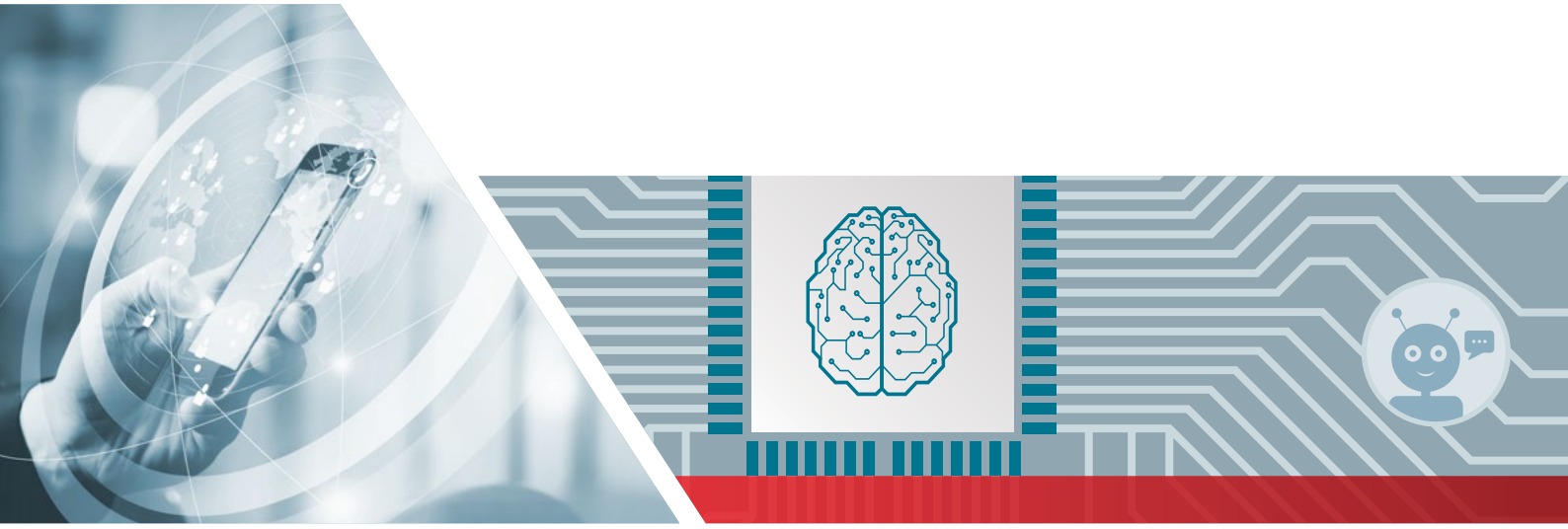



*Figure 13: Multi Channel Adoption & Usage Insights*



**Intelligent Bots Operational Insights:** CxA provides real time insights on how the Intelligent Bots are performing, where the usability challenges lie, and the ability to test the paths of conversation to train the model in real time. Specific to the Intelligent Bots, CxA provides out of the box reports and tools to optimize Intelligent Bots performance and end user journey. With CxA, business users can determine:

- How is my Intelligent Bots being used?
- What's my Intelligent Bots's engagement / utilization metrics?
- Intent resolution accuracy over time
- Popular phrases of user input
- Popular conversational paths and choices being selected
- User Reports: Active, New and Inactive by Geo, Device, and Channel
- Message Reports: # of Sessions by Intelligent Bots by Channel & Message load (# of Messages) / Intelligent Bots / Channel

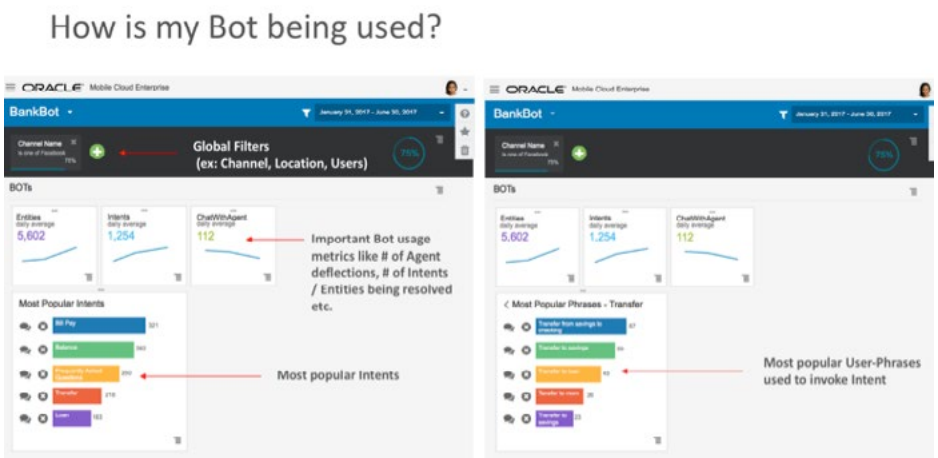



*Figure 13: Intelligent Bots adoption & Usage*

Automated diagnostic reports to developers to troubleshoot issues that the chatbot is running into such as:

- Where are the problems and how do I fix them?
- For Completed Paths: Most (Green) and Least (Orange) traversed Paths.
- For Abandoned Paths: A history of all abandoned sessions (Red) with error-metrics and transcripts to trouble-shoot
- Metrics displayed will include Incorrect slotting, System Errors, Dialog Flow Errors Component Errors, Channel Errors and Sentiment

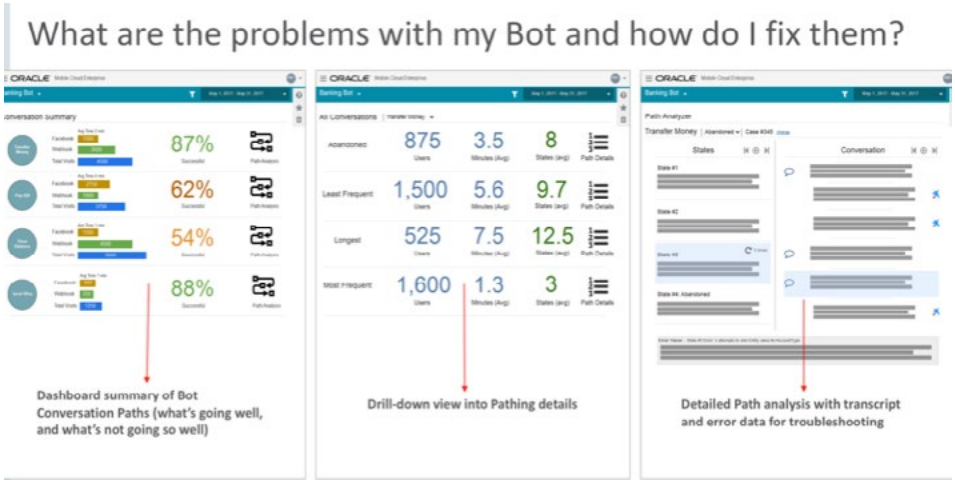
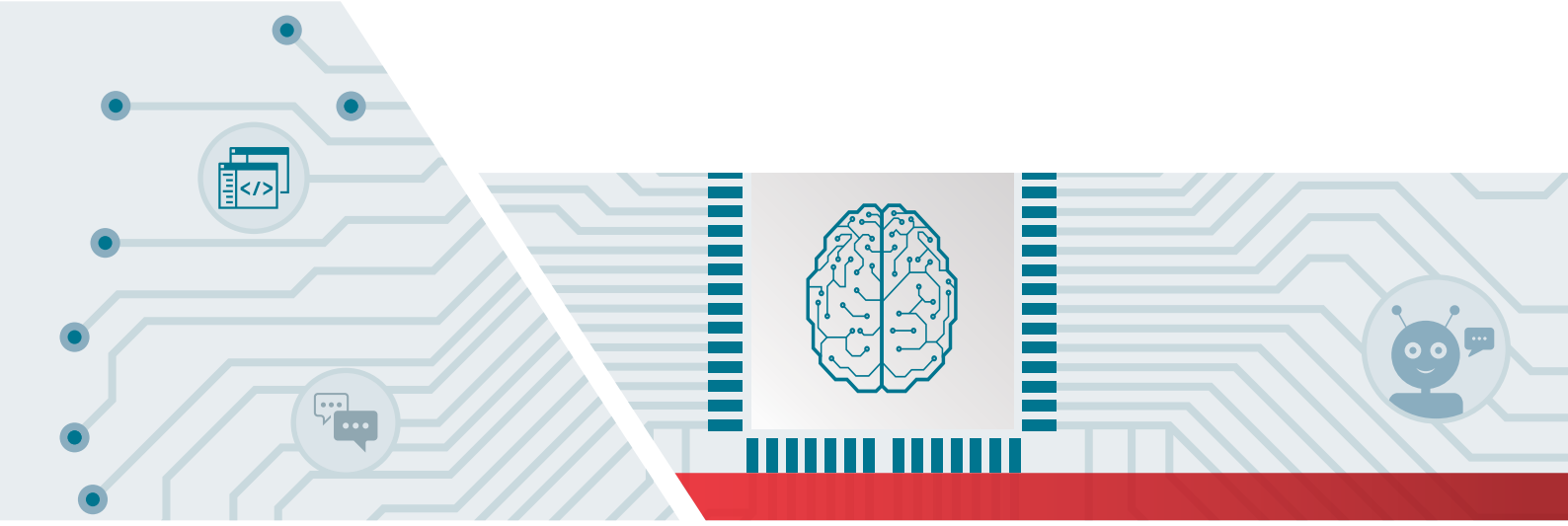


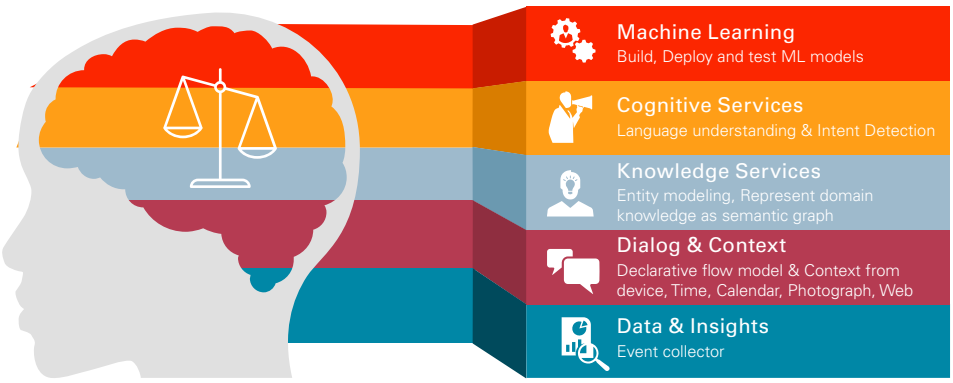

*Figure 14: Intelligent Bots diagnostics – detail pathing*

## What's Next? AI Development Platform

We have taken a use case-based approach to AI. Realizing the industry momentum and the large opportunity with chatbots, we have made use of machine learning algorithms to deliver a new range of conversational applications driven by AI. We are boiling down our AI services into five key components: Machine Learning, Cognitive Services, Knowledge Services, Dialog & Context, Data & Insights.

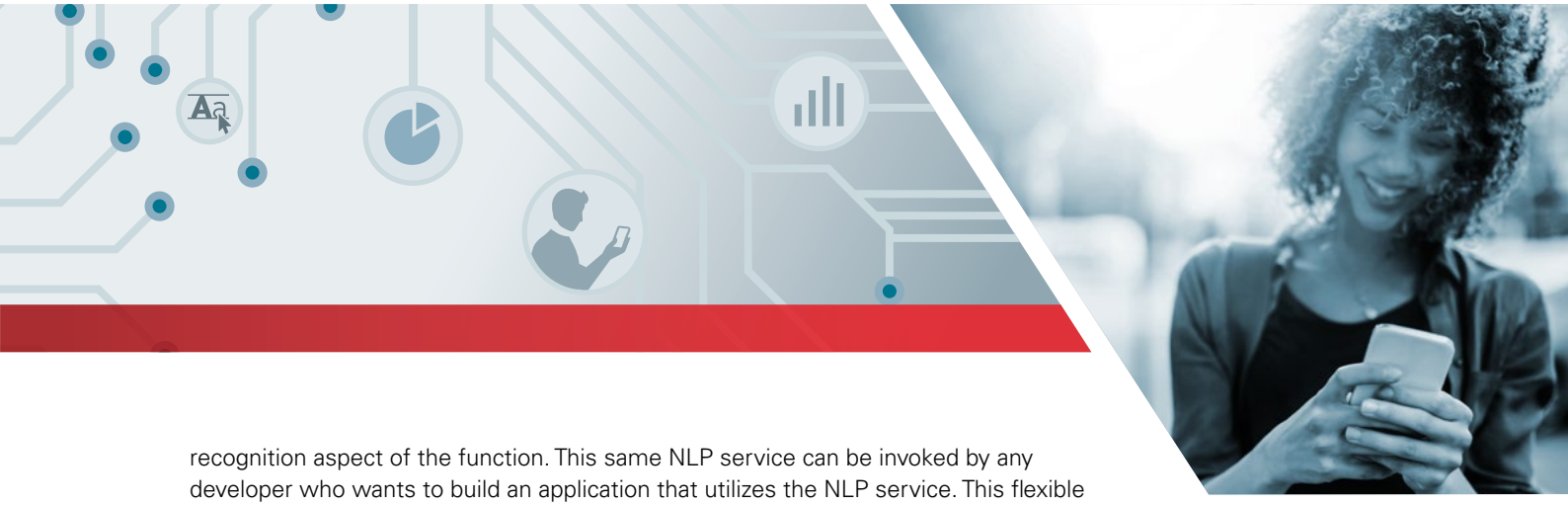


## Oracle's AI Platform



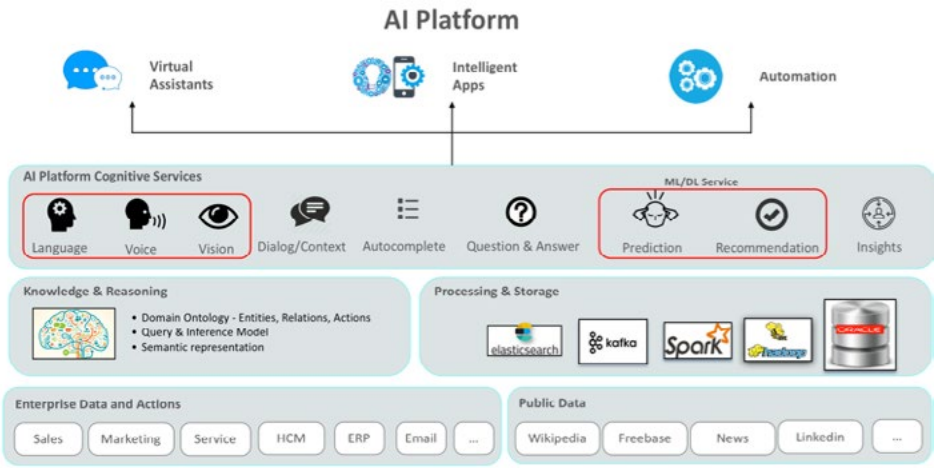

We have made use of NLP, dialog, language translations, ML based Q&A, advanced machine learning techniques to drive our Intelligent Bots AI engine that powers applications and instantly provides value to our customers. We continue to invest in and build additional AI capabilities to expand and deepen the intelligence to our Intelligent Bots platform. This includes features as progressive moderated self-learning, sentiment detection, image processing and object detection, predictive modeling, recommendation capabilities, deeper insights, ML based named entity extraction (NER), auto complete and many more AI capabilities. Over time we plan to employ ontologies, knowledge graphs, and semantic technologies to further enhance the capabilities of natural language processing and understanding available in the platform. By marrying the vast data sources available through Oracle apps with the universe of publicly available data sources, and applying the latest supervised and unsupervised ML, NLP, and semantic techniques, we can build and extend a rich and deep knowledge graph uniquely valuable for use within the enterprise.

Our Intelligent Bots is built on a microservices architecture with each of these ML engines designed and operated as a microservice. With our Intelligent Bots capablities, Oracle provides a channel framework that integrates with Facebook Messenger, WeChat, WhatsApp, native mobile apps, web based apps etc..As these conversations come through the Intelligent Bots platform, the NLP microservice handles the language



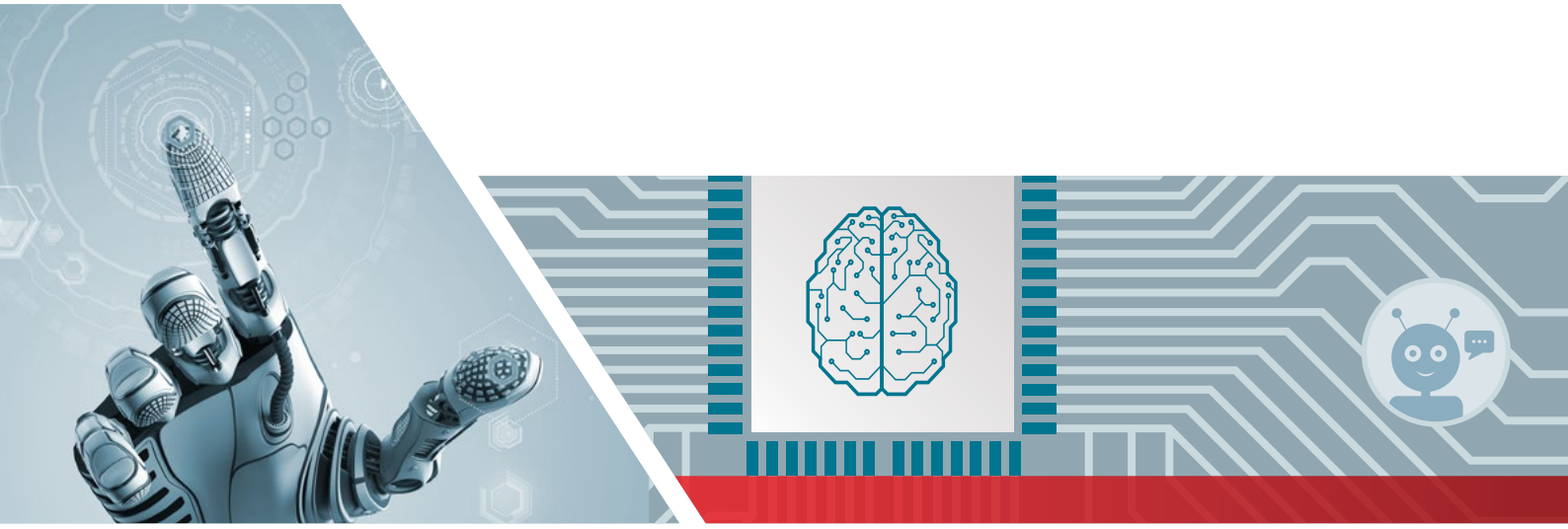
recognition aspect of the function. This same NLP service can be invoked by any developer who wants to build an application that utilizes the NLP service. This flexible architecture allows us to start offering AI as a Service – (AIaaS) to developers who want to use specific ML algorithms for their use cases, e.g. making use of the language translation services to auto translate their applications to different languages, of using sentiment analysis to change their offers to a customer, or using the recommendation engine within their consumer app.

We have taken a top-down approach to developing the ingredients of an AI platform, using Intelligent Bots as the initial driver to optimize/focus on key algorithms, models, frameworks and infrastructure. We will expose these AI components as micro-services for developers in Oracle PaaS to build intelligent apps consuming these services.

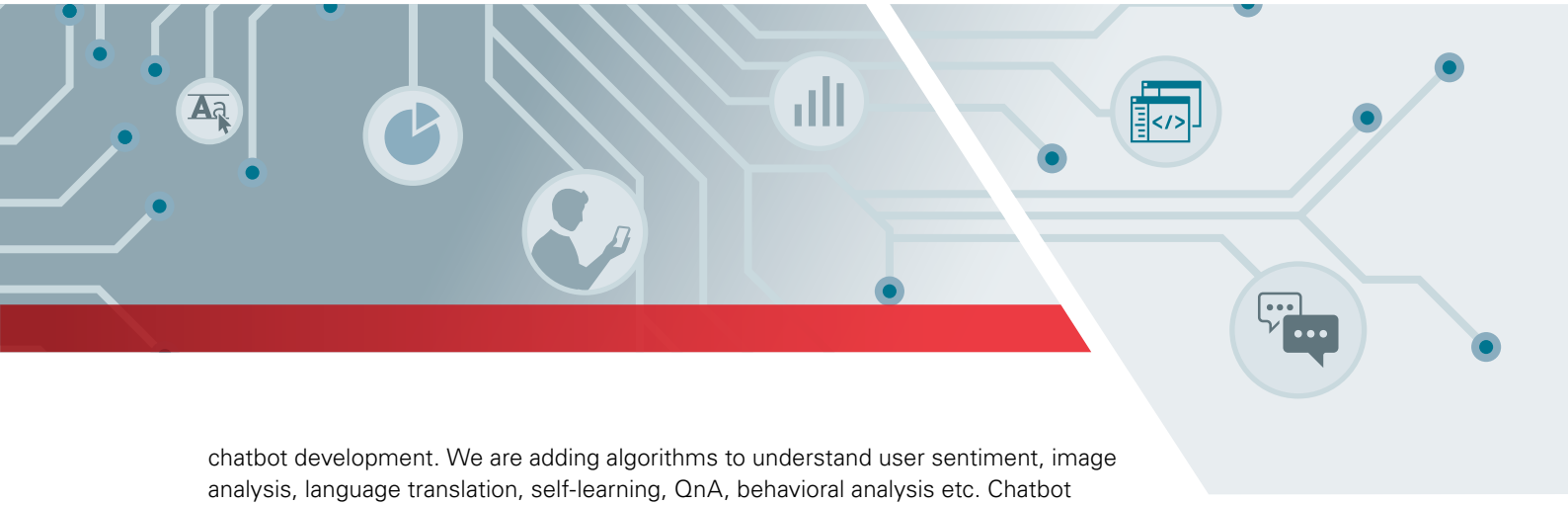



## Oracle Intelligent Bots

- **One integrated solution:** Our solution has everything that customers need to build chatbots with channel integration, dialog flow, AI engine, integration with an Intelligent Bots Builder UI that brings this all together. Our competitors provide you with a menu of components / services that you have to put together that is unpredictable in cost, ease of use, level of effort and time to market.



- **One multichannel solution:** Our Intelligent Bots Platform is an evolution from our mature and successful mobile platform. Chatbots are great at conversational interfaces but not designed for forms-based or structured data capture which requires a mobile app. To provide the best user experience it is essential that that the platform makes it easy, simple and rich to link user experiences across chatbots, mobile and web. Our competitors take a silo'd approach to this. Our solution is the only solution that provides the ability to combine structured data capture in a free form unstructured conversational UI. You can add powerful end user experiences to collect structured data like forms, checklists, wizard automatically into existing chatbot flows. Our competition does not provide this.
- **Enterprise Integration:** The value of the Intelligent Bots Platform is to surface data intelligently to the end users. Oracle is the leader in integration to enterprise and cloud data sources and this is also provided out of the box, reducing the effort, time and cost to expose data to the chatbots. With the Oracle PaaS, we have a complete stack that includes Integration Cloud Service (ICS) that has integrations to over 75+ enterprise and non-enterprise backend systems, Apiary cloud service that makes it easy to design and mock up APIs and API service to secure and configure API policies.
- **Insights:** With Customer Experience Analytics (CxA), which is part of the platform, we provide one place for customers to get insights into multichannel user adoption across mobile, chatbots and web. Customers can answer questions like – 'Which channel is being used the most', 'What use cases are more popular as interactions in mobile vs. chatbots,' 'Do end users use multi channels and if so are there specific characteristics like time or preference when they use channels'. These channels provide insights to personalize the engagement with the end user
  - **Intelligent Bots operational insights:** The ability to know in real time how the chatbots are performing, where are the challenges and being able to path the conversation to train the model in real time.
- **Chatbot to Human to Chatbot:** The ability to recognize when a chatbot is unable to respond appropriately to an end user and route the conversation to a human agent seamlessly, as well for a human agent to hand off to a chatbot.
- **Lifecycle Management:** Integrated management of the life cycle of the chatbot from development, testing to production, managing version control and integration to the continuous integration / continuous development (CI/CD) appdev life cycle management.
- **Continuous Evolution.** We are continuously adding additional algorithms to simplify



chatbot development. We are adding algorithms to understand user sentiment, image analysis, language translation, self-learning, QnA, behavioral analysis etc. Chatbot developers can decide which additional algorithms they want to add to their chatbot app by simply including these algorithms in their pipeline without having to worry about the research, selection, development and fine tuning of the underlying models. The Intelligent Bots platform is built on a micro services platform using the Oracle PaaS and its underlying micro services capabilities. Developers can choose to use these specific machine learning services like NLP, or image recognition to build their own applications.

- **The Oracle Cloud.** Delivered as a complete solution in Oracle Cloud, it reduces the cost, effort and complexity of managing patching, upgrades and provides a reliable and secure cloud that handles backups, high availability, fail over. The depth of the Oracle Cloud from the power of GPUs in the IaaS layer, to access to the widest and broadest range of PaaS capabilities and the built-in integration to Oracle SaaS applications that provide out of the box chatbots to the applications.
- **Sample Vertical Apps.** Oracle has the broadest support for vertical solutions through the Industry business unit that have built vertical chatbot solutions
- **Reference customers.** We have several reference customers across B2C & B2E, across verticals who have compared our solution against our competitors and have chosen Oracle Intelligent Bots to develop their Intelligent Bots.

Artificial Intelligence has the potential to significantly disrupt all industries – potentially empowering the global workforce and transforming customer engagement. Consider this: A chatbot never sleeps, never makes you wait, can personalize the customer experience and now chatbots powered by AI have the ability to learn and build relationships. So even if AI doesn't disrupt every job or every industry, industry leaders will need to think about their own automation strategy and realize how best to use artificial intelligence – to increase engagement, efficiencies and lower costs.

**Promero, Inc.**
1100 Park Central Blvd
Pompano Beach, Fla 33064

(954) 935-8800
E: sales@promero.com
www.promero.com

Copyright © 2017, Oracle and/or its affiliates. All rights reserved. This document is provided for information purposes only, and the contents hereof are subject to change without notice. This document is not warranted to be error-free, nor subject to any other warranties or conditions, whether expressed orally or implied in law, including implied warranties and conditions of merchantability or fitness for a particular purpose. We specifically disclaim any liability with respect to this document, and no contractual obligations are formed either directly or indirectly by this document. This document may not be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without our prior written permission.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Xeon are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Opteron, the AMD logo, and the AMD Opteron logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group.