H2O
WORLD
2017

Enterprise Chatbots:
Beyond Telling the Weather

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It is inevitable that the number of humans using natural language to interact with machines will explode over the next few years.

This will change the way we live, the way we work and the way machines work.

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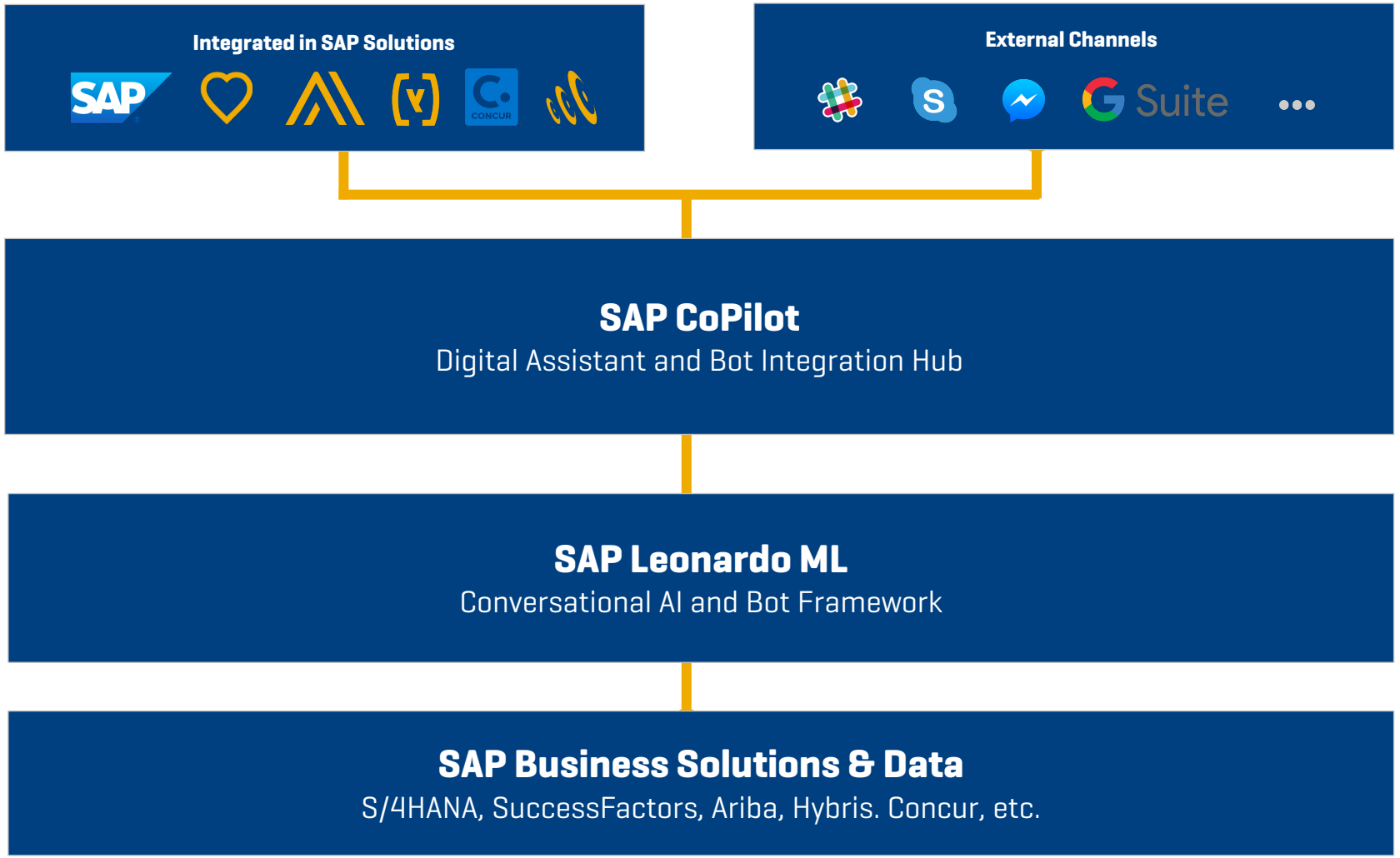
SAP Leonardo Conversational AI Landscape



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SAP's Vision: Journey towards Enterprise AI

Basic Chatbots

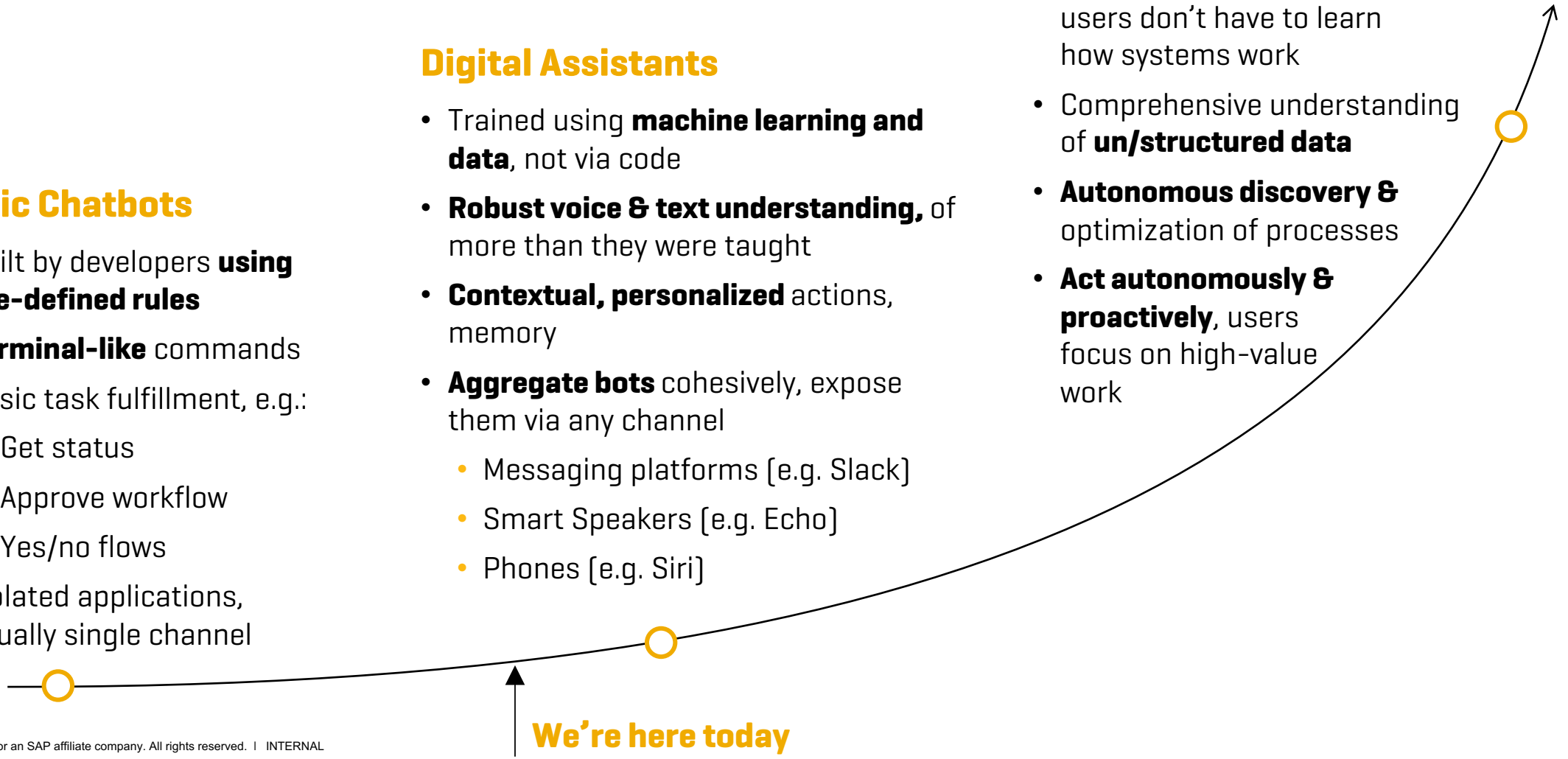
- Built by developers **using pre-defined rules**
- **Terminal-like** commands
- Basic task fulfillment, e.g.:
  - Get status
  - Approve workflow
  - Yes/no flows
- Isolated applications, usually single channel

Digital Assistants

- Trained using **machine learning and data**, not via code
- **Robust voice & text understanding,** of more than they were taught
- **Contextual, personalized** actions, memory
- **Aggregate bots** cohesively, expose them via any channel
  - Messaging platforms (e.g. Slack)
  - Smart Speakers (e.g. Echo)
  - Phones (e.g. Siri)

Enterprise AI

- **Systems learn how users work**, users don't have to learn how systems work
- Comprehensive understanding of **un/structured data**
- **Autonomous discovery &** optimization of processes
- **Act autonomously & proactively**, users focus on high-value work



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Challenges in the enterprise

UX	Loaded with options, highly customizable, hard to grasp design
Domain Knowledge	More complicated process flows, Taxonomies, Multi-Language Support
Security/Privacy	High Priority, Authorization and Authentication
Technology	Computational Linguistic, Patterns, ML/DL, Production Data, Licenses
Integration	Deployment, APIs, Channels, Customization, 3rd party services (voice)

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Problems we focus on

UX	Loaded with options, highly customizable, hard to grasp design
Domain Knowledge	More complicated process flows, Taxonomies, Multi-Language Support
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Building a Chatbot

Data	Identify the right data which is needed for your use case
Word Representation	Augment bot vocabulary using word vectors
Features	Feature Engineering is the key. (Ex: POS Tags, NER, Reference Resolution)
Algorithms	Use models which work well for text data – CNN, LSTM, Seq to Seq Models

Very little code in an AI solution is ML Code

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Data

Domain Documents	Documents related to the use case which are well structured and have information about the domain
Domain Vocabulary	Terminologies which are commonly used in the domain. This can enhance the vocabulary of the model
Crowdsourced Data	Data which is gathered using crowdsourcing platforms like Amazon Mechanical turk, Crowdflower, etc.

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Computational Linguistics

Segmentation

Part of Speech Tagging, stemming, WSD

Dependency parsing

Entity Extraction

Break phrases into meaningful parts

“change insurance”

“I see that my check shows me 76 hours, but I actually worked 80. How can we resolve this?”

command style, multiple facts, references

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Computational Linguistics

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Entity Extraction

“apple”

“show room”

“How to change name?”

context, meaning

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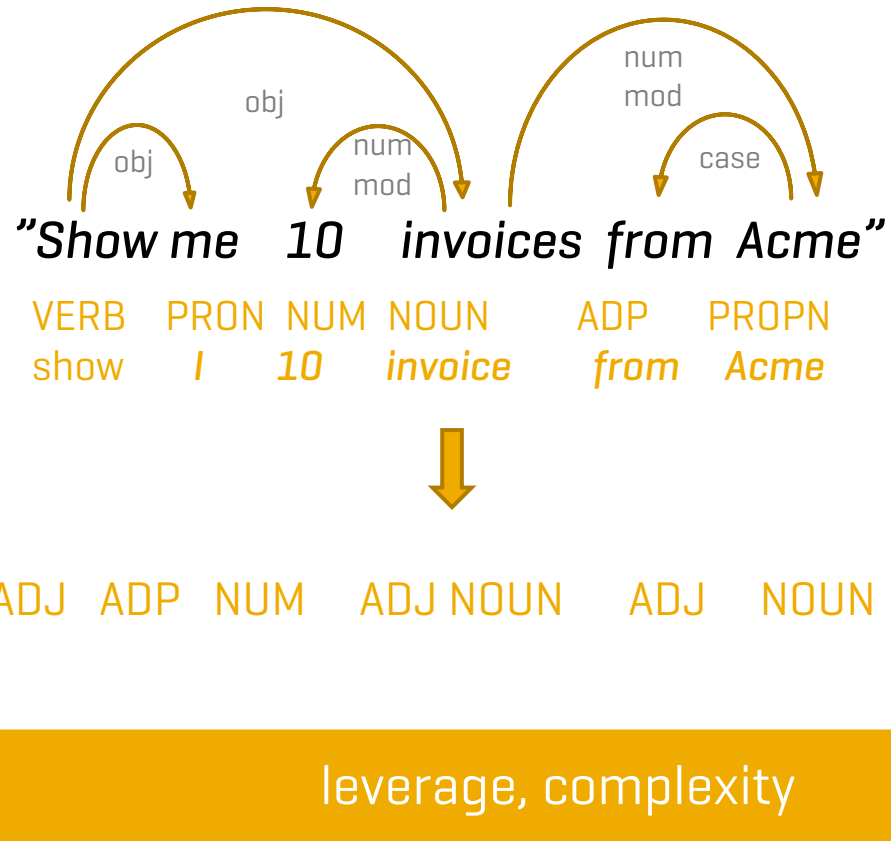

leverage, complexity

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Computational Linguistics

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Dependency parsing

Entity Extraction

"All partly-paid POs in New York for Acme from March"

status attribute	purchase orders	US city	customer | vendor	date (month)

synonyms, standard entities, custom entities

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Machine Learning & NLP

Word Vector Representations
GLOVE
Word2Vec
Bag of words

Training & Evaluation
CPU/GPU
Metrics : Precision & Recall
Hyper-parameter Tuning

Algorithms
TF/IDF
CNN
RNN
LSTM

Algorithm Selection
Multi-Language Support
Partial Training Support
Maintainability

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Questions?

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Thank you!

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