An introduction to Artificial Intelligence (AI) with SAP

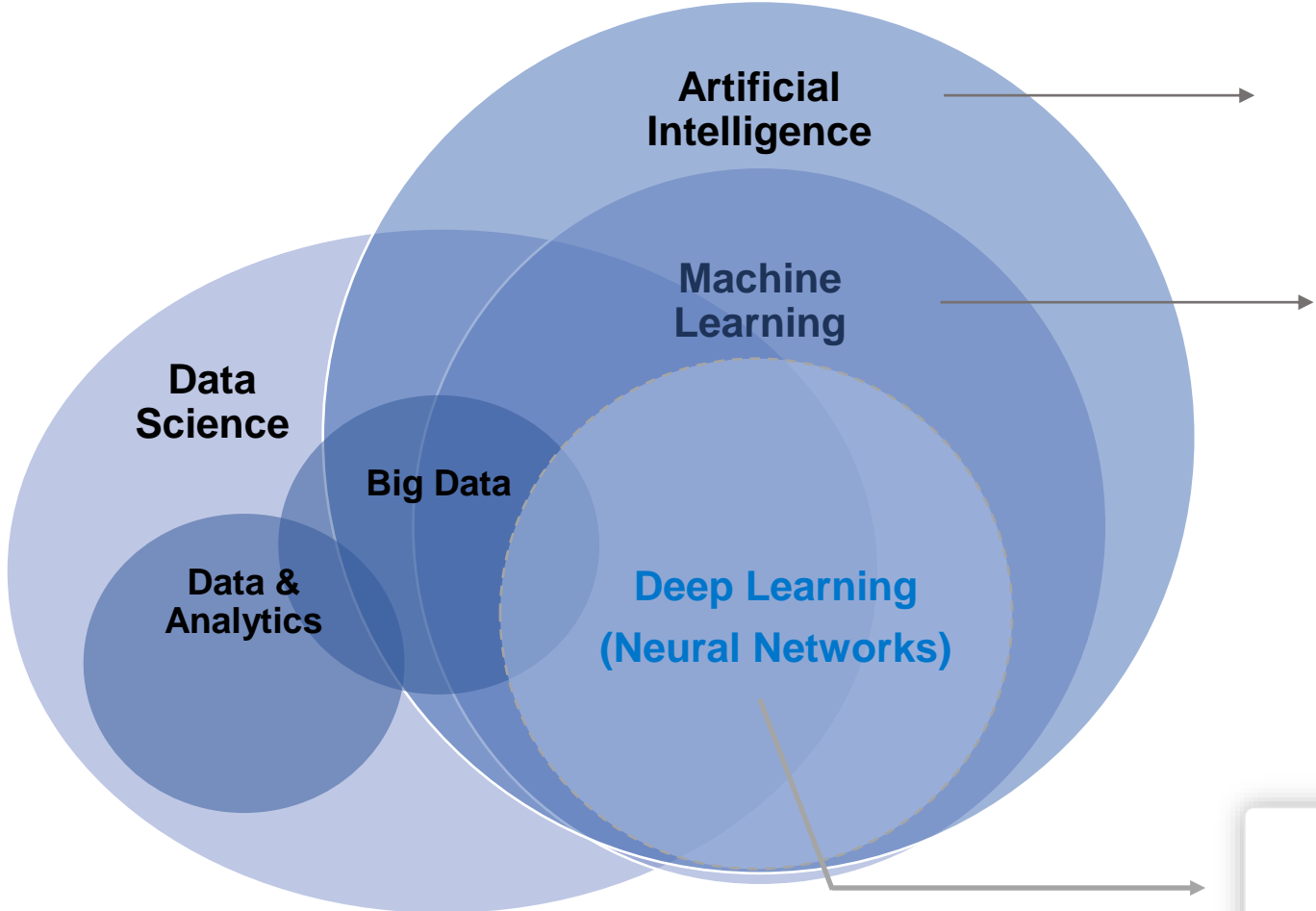*Anurag Barua*
SAP America

Speaker introduction

- ✓ 25+ years of SAP experience in a career of 31 years in a variety of roles including SAP product development, delivery/advisory/consulting, pre-sales, & sales; currently work for the SAP S/4HANA Center of Excellence, North America
- ✓ Served 100+ clients globally & across multiple industry verticals including Public Sector, Utilities, Media, Manufacturing, Pharmaceuticals, Oil & Gas, & Hi-tech among others
- ✓ Areas of expertise include SAP Financials, Logistics/Supply Chain, Reporting & Analytics, Data Management & Governance, Cloud technologies, User Experience, & Project/Program Management
- ✓ Prolific thought leader: Published numerous articles, blogs, & white papers & blogs on SAP topics; written 5 SAP books; spoken at nearly 150 SAP conferences globally
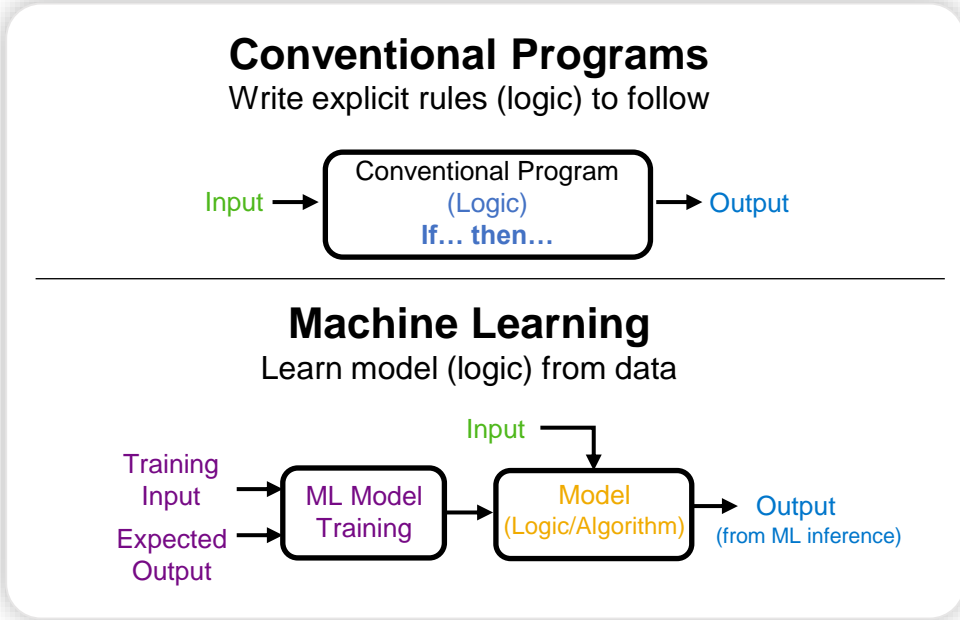
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Agenda

- Key AI terms & phrases

- SAP's approach to AI

- An overview of selected SAP AI capabilities

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AI building blocks

Artificial Intelligence

Machine Learning

Data Science

Big Data

Data & Analytics

Deep Learning (Neural Networks)

Various techniques used to make a computer do something smart

Conventional Programs
Write explicit rules (logic) to follow

Input → Conventional Program (Logic) **If… then…** → Output

Machine Learning
Learn model (logic) from data

Training Input
Expected Output
→ ML Model Training → Model (Logic/Algorithm) → Output (from ML inference)
Input

Next wave of ML innovation: **Generative AI**

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Deep learning & Gen-AI: An overview
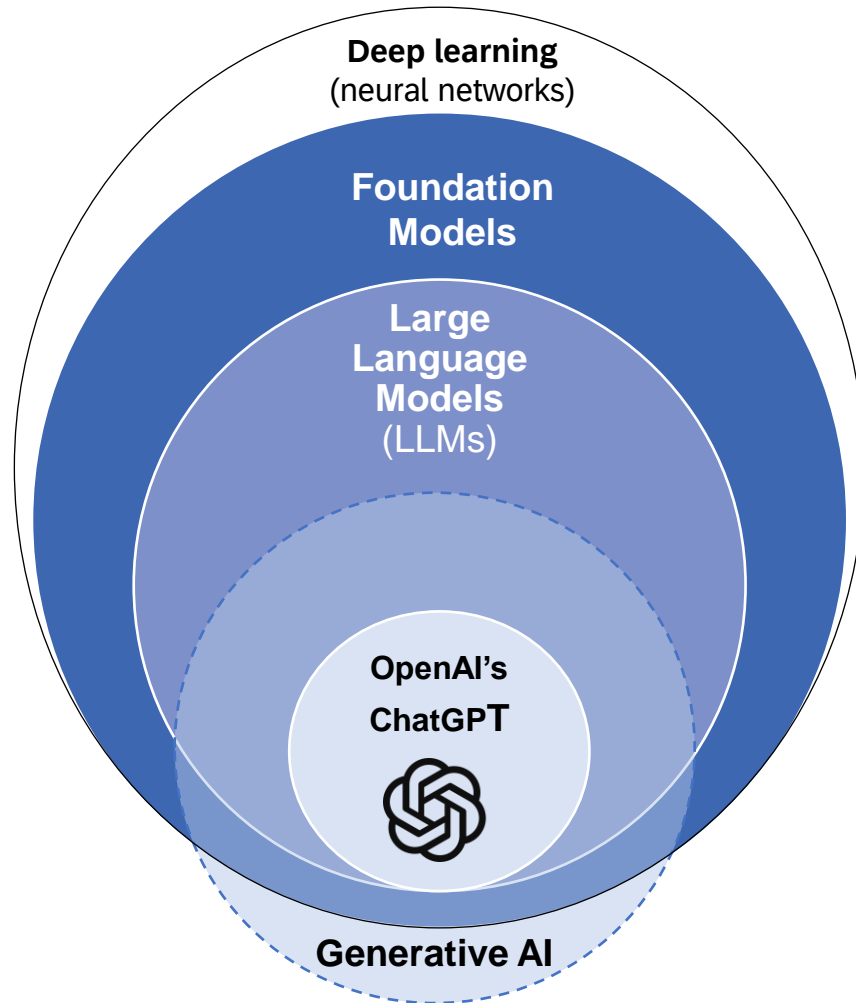
- **Foundation models** are deep learning models (i.e. neural networks) trained on large volumes of unlabeled data (text, code, image, sound, video...)

- **Large language models** are a subcategory of foundation models for text (including XML, Code, etc.).

- **ChatGPT** is a specific chat assistant based on GPT-3.5 and GPT-4 large language models (LLM) created by the vendor OpenAI; other examples are Gemini from Google, Claude from Anthropic, Microsoft copilot from Microsoft
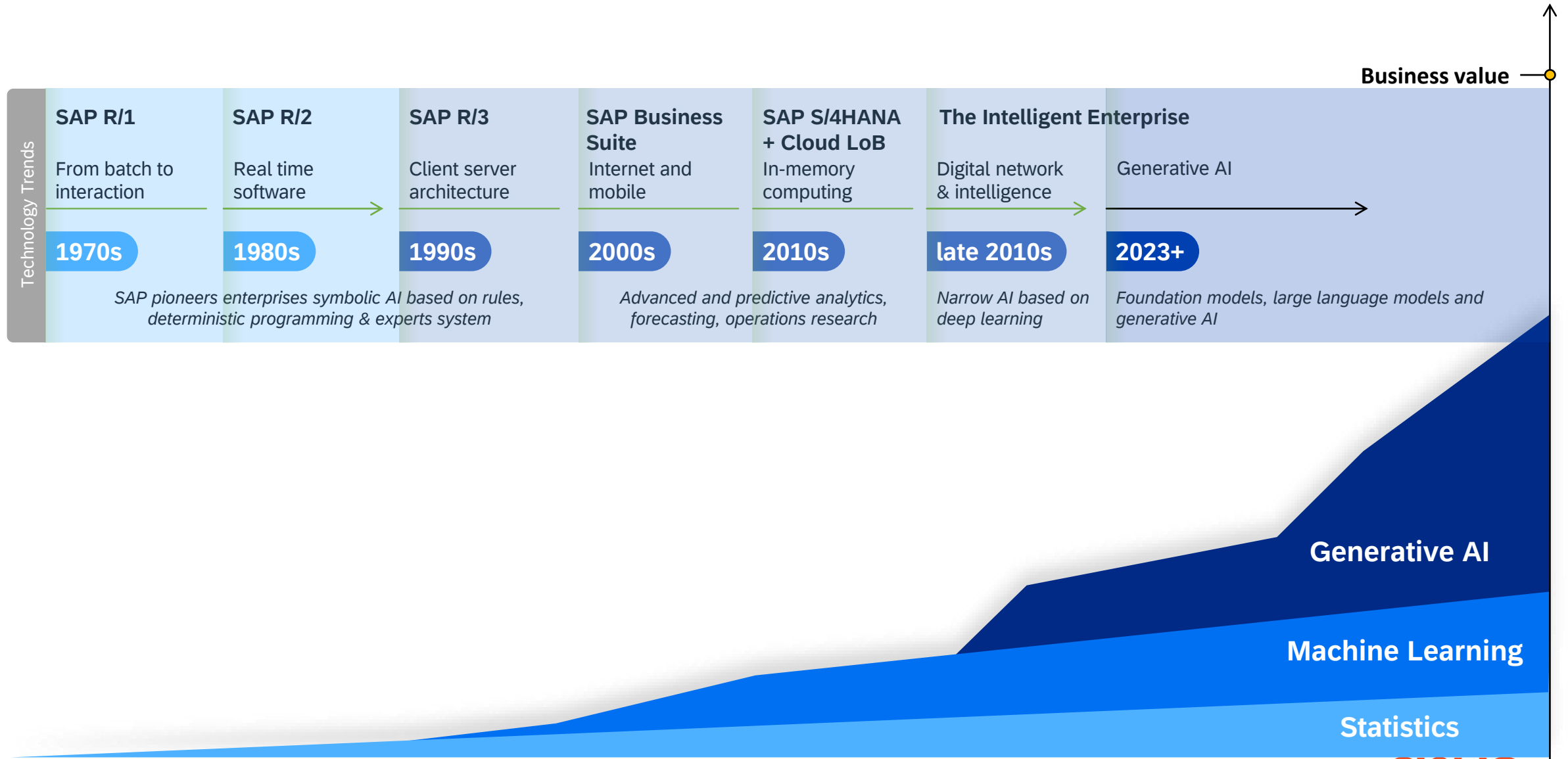
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How SAP delivers business value: an evolution

Technology Trends	SAP R/1	SAP R/2	SAP R/3	SAP Business Suite	SAP S/4HANA + Cloud LoB	The Intelligent Enterprise	Generative AI
	From batch to interaction	Real time software	Client server architecture	Internet and mobile	In-memory computing	Digital network & intelligence	Generative AI
	1970s	**1980s**	**1990s**	**2000s**	**2010s**	**late 2010s**	**2023+**
	SAP pioneers enterprises symbolic AI based on rules, deterministic programming & experts system			*Advanced and predictive analytics, forecasting, operations research*		*Narrow AI based on deep learning*	*Foundation models, large language models and generative AI*

Business value

Generative AI

Machine Learning

Statistics

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SAP's AI approach & principles

Relevant | Reliable | Responsible

AI-powered insights and assistance

Embedded AI capabilities

| Cloud ERP (S/4HANA Cloud) | Human capital management | Spend management & business network | Customer relationship management | Business Technology Platform (BTP) |

AI foundation
on Business Technology Platform

AI ecosystem partnerships and investments

ALEPH ALPHA   ANTHROP\C   aws   cohere   databricks   DataRobot   Google Cloud   Hugging Face   IBM   Microsoft

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What does 'relevance' mean?

RELEVANT

Empower every employee to interact with SAP application in the most natural way possible

Benefit from AI embedded in your applications that improves and optimize your desired business outcomes

AI trained from real data that learns and adapts from your utilization

Accelerate your cloud journey with automated code generation and migration tools
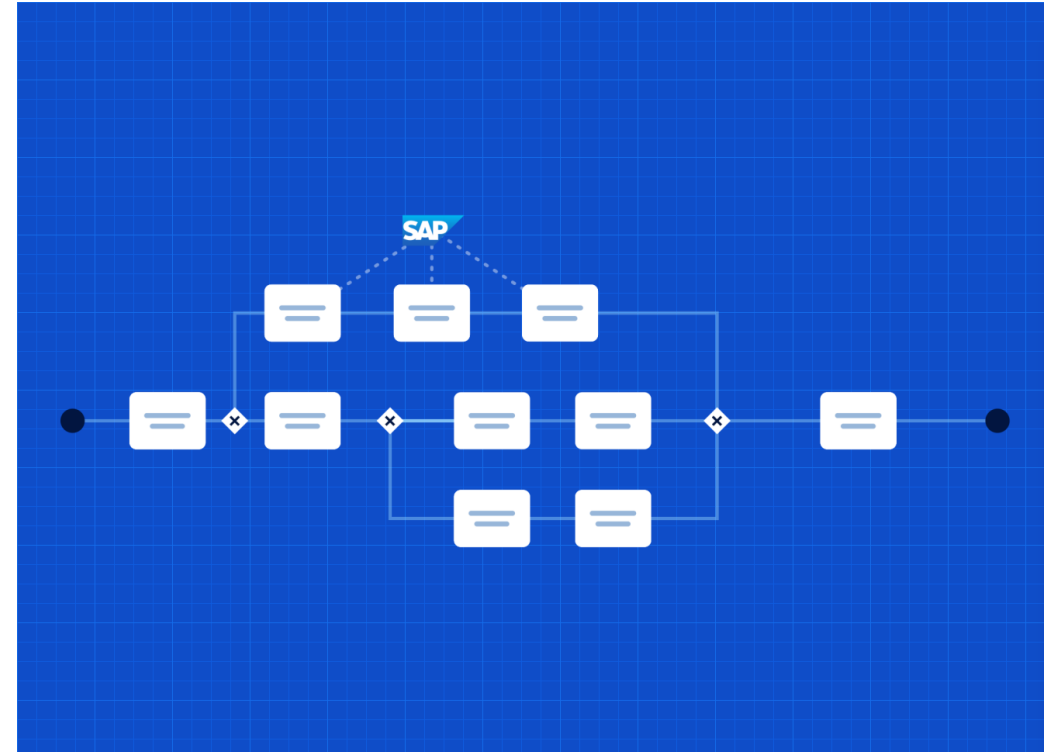
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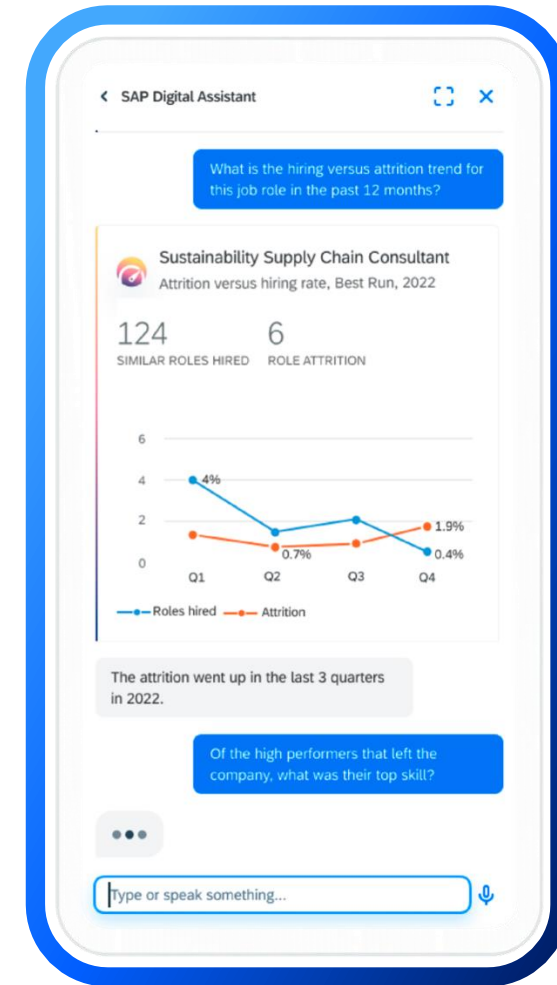
What does 'reliable' mean?

RELIABLE

Grounded in the truth of customer business context and SAP's business and process data

Data protection and privacy standards that you can trust to run your business on

World-class authorization concepts protect employees and business partners from unwanted consequences

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What does 'responsible' mean?

RESPONSIBLE

Guiding principles and policies that steer the development and avoid biases

AI designed for people to get their most valuable work done while keeping humans in the loop

Governance model with external AI ethics advisors and cross-functional operationalization

The AI Ethics Policy.

The AI Ethics Policy clarifies how SAP's Guiding Principles for Artificial Intelligence relate to AI use cases. The policy applies to SAP and all its employees worldwide. It defines intent, expectations and obligations for employees involved in development, deployment and sale of AI systems.

The Pillars of the Policy.

01.
Human Agency
& Oversight

02.
Addressing Bias
& Discrimination

03.
Transparency
& Explainability

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Today, more than 30,000 customers are using **SAP Business AI** across multiple scenarios, and SAP is further committing to AI as a pillar for future innovation

30,000+ customers

>$1B investment via venture capital

$6.1B in annual total R&D investment

3 direct investments in Generative AI leaders

ALEPH ALPHA   ANTHROP\C   cohere

Intro to SAP Business AI

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- Key AI terms & phrases

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Let's use Gen AI (ChatGPT) to learn about SAP's AI approach

You
Summarize SAP's Artificial Intelligence capabilities

ChatGPT
ChatGPT

SAP, a leading enterprise software company, has integrated artificial intelligence (AI) capabilities into its offerings to enhance various business processes. Key aspects of SAP's AI capabilities include:

1.**Intelligent Automation:** SAP leverages AI to automate repetitive tasks and streamline business processes. This includes robotic process automation (RPA) for tasks such as data entry and validation.

2.**Machine Learning (ML):** SAP incorporates machine learning algorithms to enable predictive analytics, anomaly detection, and data-driven decision-making. ML is used across various modules, such as finance, supply chain, and customer relationship management.

3.**Natural Language Processing (NLP):** SAP integrates NLP to enable communication between users and its applications. This facilitates voice commands, text analysis, and sentiment analysis, improving user experience and insights generation.

4.**Chatbots and Virtual Assistants:** SAP employs AI-driven chatbots and virtual assistants to enhance customer support, automate inquiries, and assist users in navigating through applications or obtaining information.

5.**Advanced Analytics:** SAP provides advanced analytics capabilities powered by AI, allowing organizations to gain deeper insights from their data. This includes features like predictive analytics, prescriptive analytics, and data visualization.

6.**Intelligent ERP (Enterprise Resource Planning):** SAP's ERP solutions incorporate AI to enhance functionalities such as demand forecasting, inventory management, and financial planning, making business processes more efficient and responsive.
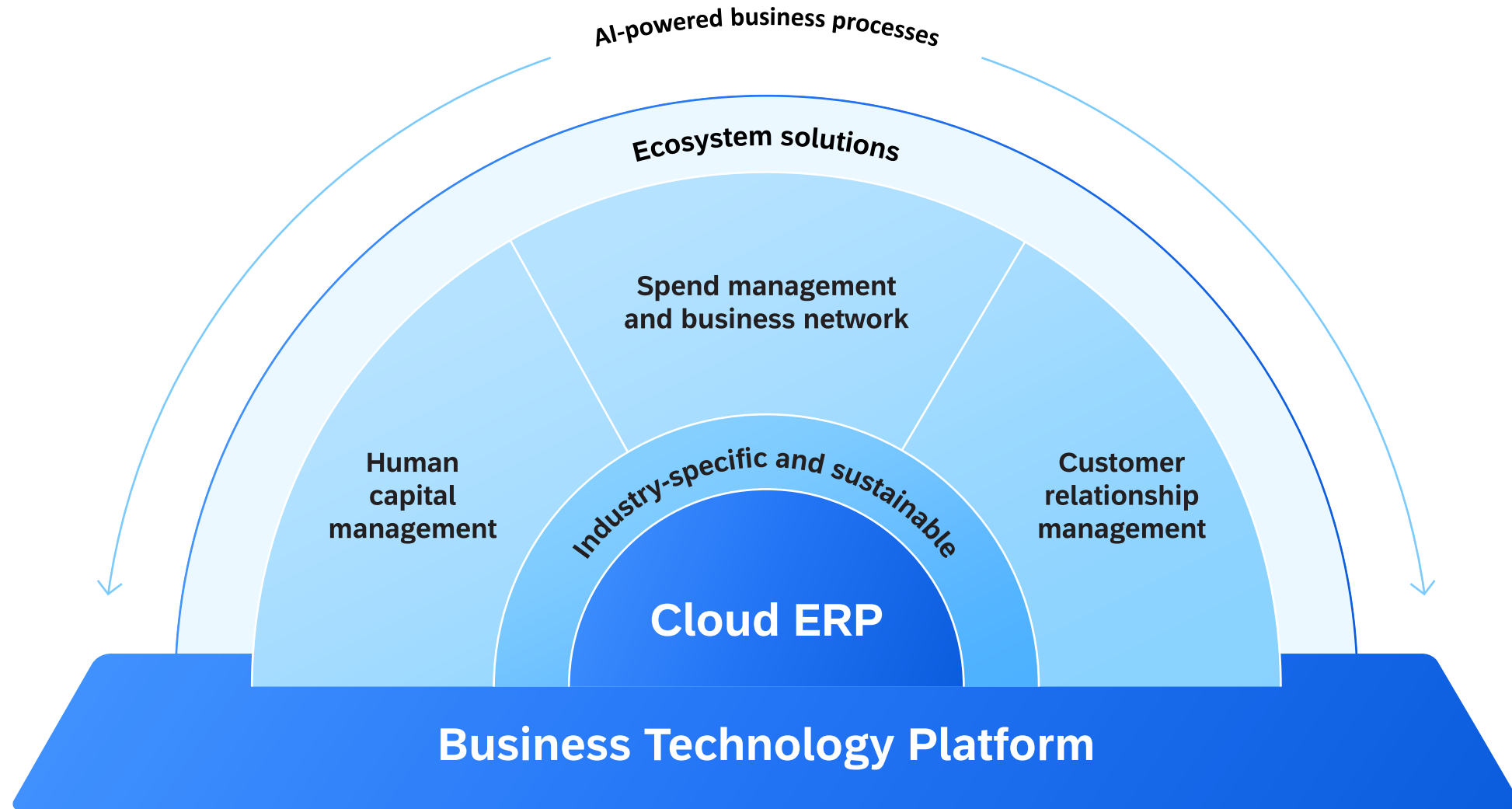
7.**Qualtrics Experience Management:** SAP acquired Qualtrics, a platform for experience management, and integrates AI to analyze customer feedback, employee sentiments, and other experience-related data for better decision-making.

8.**SAP Leonardo:** SAP Leonardo is an umbrella brand that encompasses various technologies, including AI, IoT (Internet of Things), and blockchain, to help organizations in their digital transformation journey.

9.**SAP HANA:** SAP's in-memory database platform, HANA, supports real-time data processing and analytics, and it is often used in conjunction with AI to enable faster and more informed decision-making.

Overall, SAP's AI capabilities aim to empower businesses by improving efficiency, providing actionable insights, and enabling intelligent automation across a wide range of enterprise functions.

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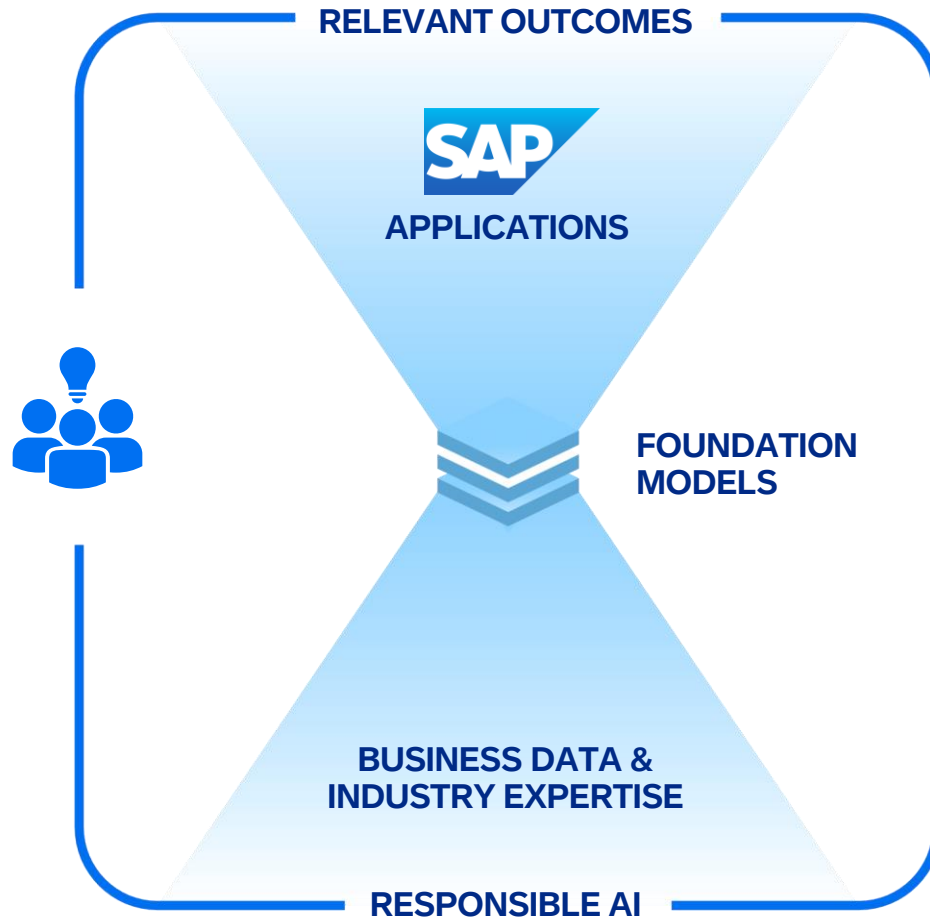
AI as part of SAP's cloud portfolio

AI-powered business processes

Ecosystem solutions

Spend management and business network

Human capital management

Industry-specific and sustainable

Cloud ERP

Customer relationship management

Business Technology Platform

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Catalog of AI-powered business scenarios

Finance	Supply Chain	Customer Experience	Procurement	Human Resources	IT and Cross-Function
▪ Tax Compliance ▪ Cash Application ▪ Intelligent accrual ▪ Travel expense auditing ▪ Travel expense verification ▪ Invoice processing ▪ Business Integrity screening ▪ Goods and invoice receipt matching ▪ Mobile expense entry	▪ Stock in transit ▪ Visual Inspection ▪ Demand forecasting & sensing ▪ Project-cost prediction ▪ Predicted delivery processing ▪ Demand-driven replenishment ▪ Forward scheduling ▪ Field service scheduling ▪ Asset prediction & optimization ▪ Slow-moving materials prediction	▪ Predicted delivery processing ▪ Discount recommendations ▪ Intelligent sales execution ▪ Relationship intelligence ▪ Sales route optimization ▪ Sales order automation ▪ Opportunity scoring ▪ Customer insights ▪ Guided selling ▪ Lead scoring ▪ Product recommendations	▪ Guided buying ▪ Sourcing item and supply prediction ▪ Material group recommendations ▪ Invoice object recommendations ▪ Job matching for contingent workforce ▪ Resume ranking for contingent workforce ▪ O'Net labelling	▪ Skill and career path recommendations ▪ Learning recommendations ▪ Job analyzer	▪ Joule ▪ Process automation ▪ Business rule mining ▪ Intrusion detection

...Find out more on SAP Business AI

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SAP's approach to Generative AI

RELEVANT OUTCOMES

SAP

APPLICATIONS

FOUNDATION MODELS

BUSINESS DATA & INDUSTRY EXPERTISE

RESPONSIBLE AI

✓ SAP combines the power of **generative AI with the context of business data and business processes** and applies fine-tuning and prompt engineering at scale. This allows SAP to turn otherwise generic results into ones that are tailored to your business. These results are built into the SAP applications that business users use every day.

✓ SAP **keeps humans in the loop responsibly** to review and approve generated information.

✓ SAP's use of **generative AI follows the same principles of business AI** and the same rigorous development and responsible AI review processes.

Note: This is current state of planning and may be changed by SAP at any time without notice.

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Joule – SAP's AI copilot

Work faster with an AI copilot that truly understands your business

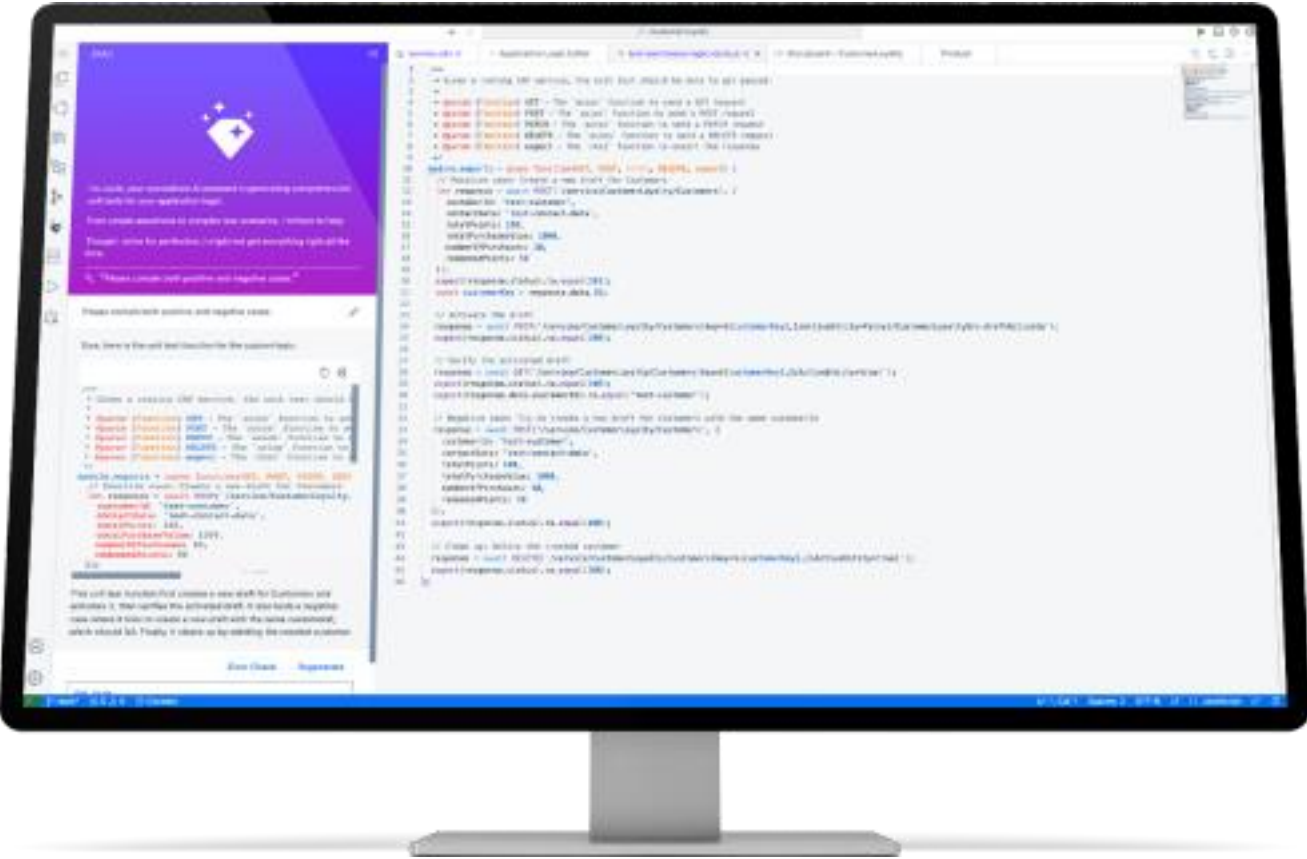**Benefit from smarter insights** and quick answers on demand

Achieve better outcomes when creating content, code, and more

Maintain full control over decision-making and your data privacy
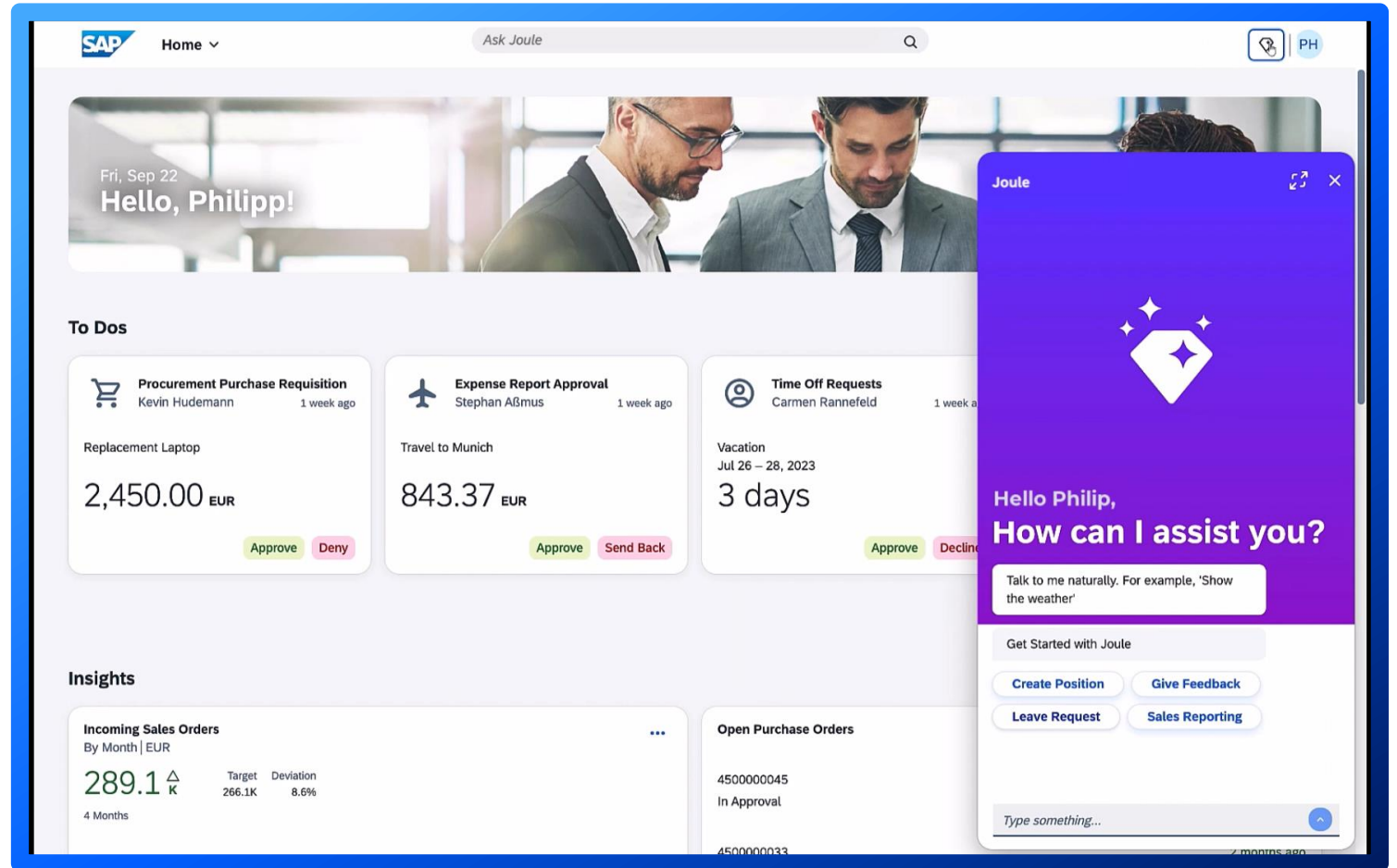
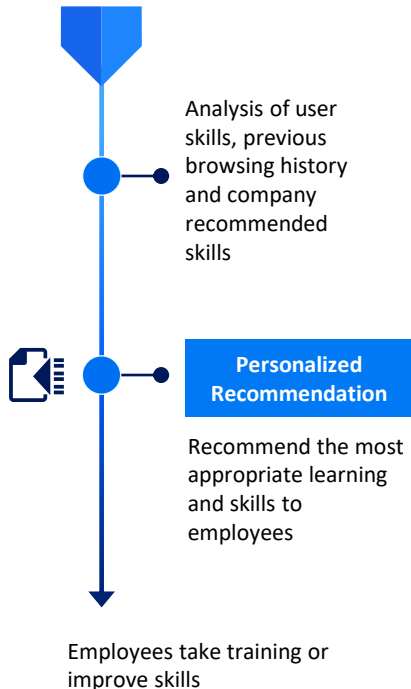

Joule

SAP Build Code with SAP Gen AI

Generative AI-code development with Joule copilot

- Use AI to generate code and app logic aligned with SAP-centric programming models from natural language descriptions
- Create data models and sample data conforming to apps with Joule copilot
- Produce rapid unit tests with AI for existing code to increase quality and precision

SAP Build Code with Joule

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AI capability example: SAP SuccessFactors Learning Recommendation

Analysis of user skills, previous browsing history and company recommended skills

Personalized Recommendation

Recommend the most appropriate learning and skills to employees

Employees take training or improve skills

Challenge

- Overwhelming volume of learning information that makes it difficult to notice and keep track of useful information, thus lack of individualized learning experience
- Learning is primarily organization driven today with a focus on maintaining compliance and is manual / tactical rather than being strategic and programmatic
- Lack of effective tools that makes it difficult for the employees to find the most useful information or learnings
- Companies need to grow specific skills in their workforce to increase their competitiveness in their market

Solution

Talent Intelligence in SAP SuccessFactors

- Connects employees with personalized learning beyond traditional course catalogues to fit their learning goals and situation
- Lets company push forward skills that are expected for the growth of the business
- Significantly improves often chronically low training completion rates
- Analyzes employee profile & interaction history to recommend personalized learnings beyond traditional course catalogues

Benefits

- Employees see that the company is supporting with suitable learning recommendations for their growth plan
- Personalized / Individualized experience results in enhanced employee engagement / satisfaction
- Make better use of vast amounts of relevant and current learning content available
- Companies grow the skills they target for their future evolution

Average Business Value for Customers
Calculation Method / Assumption In Notes

78% Completion rate for recommended trainings, delivering targeted skills to complete employee profiles

Talent development to **build a better workforce**
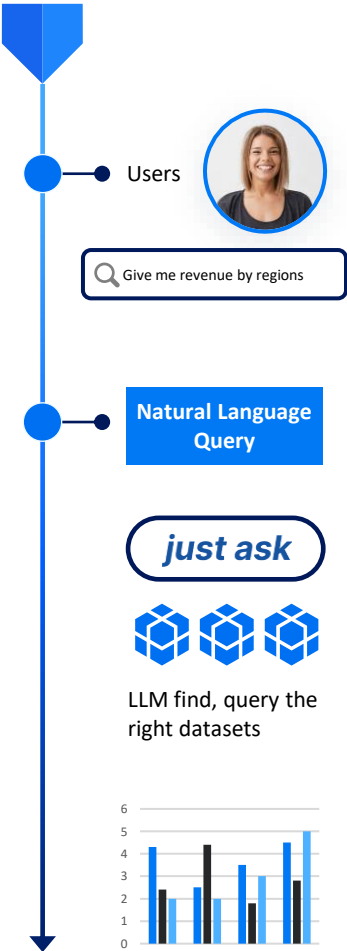
Help organizations **create a culture of learning**

Customer / Telefónica

77% Of talent profiles completed, enabling intelligent matching of candidates to positions

"With support from SAP, we have been able to extend the functionality in SAP SuccessFactors solutions to create an innovative solution that helps employees identify and develop the skills that will be Vital in the digital world and the future of our company"

Gabriel de Diego, HR Strategy and Transformation Director, Telefónica S. A

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AI capability example: Just Ask with SAP Analytics Cloud

Users

🔍 Give me revenue by regions

Natural Language Query

just ask

LLM find, query the right datasets

Answers are instantly provided to the end users

Challenge

- **Missing Skills:** Finding answers in data requires a deep understanding of technological concepts such as data-warehousing
- **Cognitive Overload:** Modern tools are designed for analysis. Dashboards have tried to solve the cognitive load, but they are too rigid to go after general use
- **Data Fragmentation:** Data is fragmented in silos in a way that makes data discovery slow and nearly impossible for non-technical users to enrich the simplest of the answers

Solution

- **Just Ask:** Natural Language-driven access of your trusted insights with SAP Analytics Cloud enabling fact-based decision-making through natural language queries and conversational analytics.

Benefits

- **Faster Insights:** Fast natural language querying with all the value of business semantics
- **Trusted Retrieval:** Proprietary LLMs ensure a secure information retrieval preserving data policies
- **Business Agility:** Offers multi-cloud workflow compatibility and integrates external data sources

Average Business Value for Customers
Calculation Method / Assumption In Notes

20% Average time spent in information retrieval by knowledge workers.

That's 1 resource on a team of 5 persons.

Source: CB Insights knowledge worker's report

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SAP Analytics Cloud
Just Ask

Automate finance tasks & make better decisions

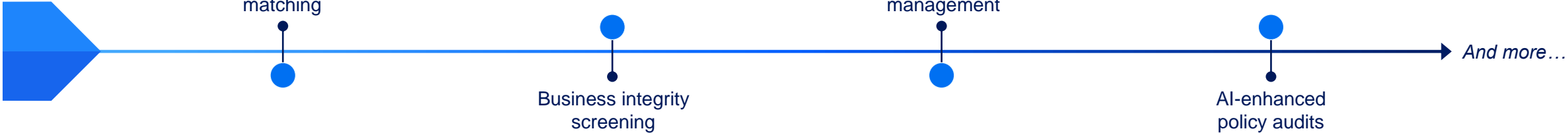**Automate** manually intensive tasks so you can focus on strategic initiatives

Manage capital effectively with improved reporting accuracy

Mitigate fraud risk and reduce losses with anomaly detection

54%
of invoices automatically matched with payments

> accenture

enabled by SAP Cash Application

Additional AI capabilities available today

Intelligent invoice matching

Business integrity screening

AI-powered contract management

AI-enhanced policy audits

And more…

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Business AI with SAP: customer examples

99%
of incoming payments
automatically assigned

SBB CFF FFS

15 minutes
to run forecasts down
from 3 hours

ZF | AFTERMARKET

350 hours
saved each month
by reducing repetitive tasks

ASPEN® PUMPS

91.5%
of employees use
intelligent reskilling
application

Telefónica

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What lies ahead?

AI roadmap:
https://dam.sap.com/mac/app/p/pdf/asset/preview/MVCpjyr?ltr=a&rc=68
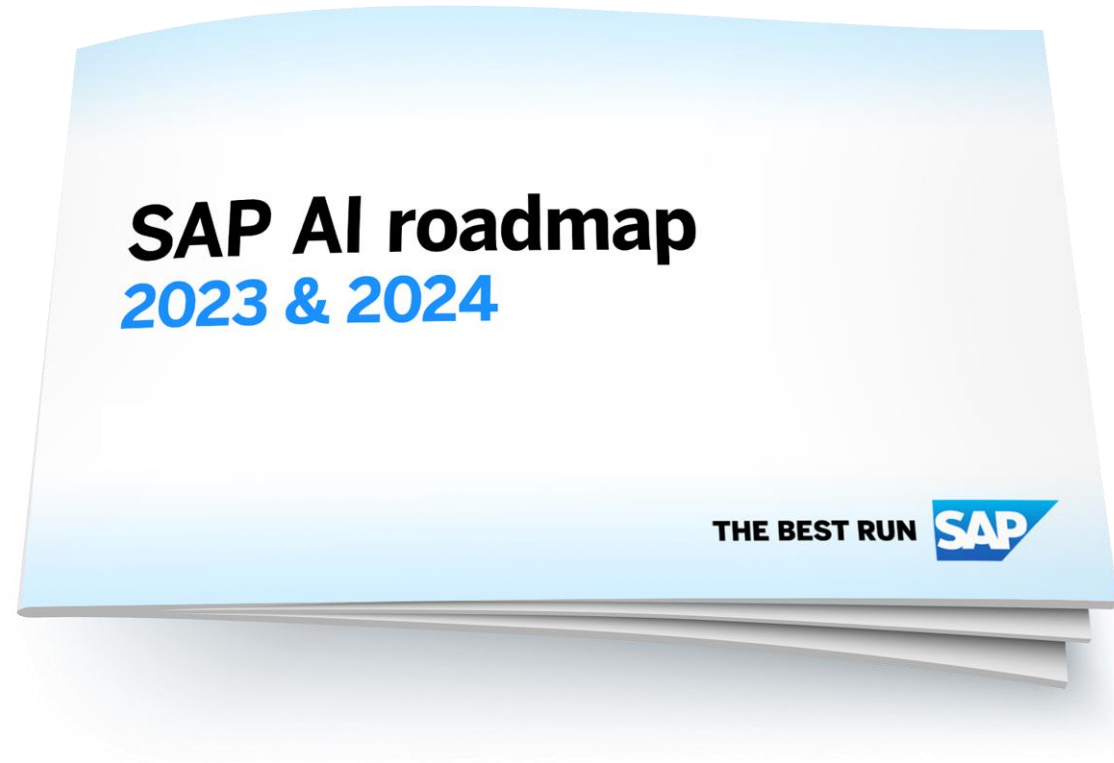
Key Resources/References

- SAP Business AI homepage at https://www.sap.com/products/artificial-intelligence.html
- Learn about Artificial Intelligence at https://learning.sap.com/products/business-technology-platform/artificial-intelligence
- SAP Artificial Intelligence and Machine Learning community at https://pages.community.sap.com/topics/machine-learning
- SAP AI Services community at https://pages.community.sap.com/topics/artificial-intelligence
- SAP AI Launchpad at the SAP Discovery Center at https://discovery-center.cloud.sap/serviceCatalog/sap-ai-launchpad?region=all
- Blog on Generative AI in SAP at https://community.sap.com/t5/technology-blogs-by-sap/how-sap-s-generative-ai-architecture-redefines-business-applications/ba-p/13580679

*This also applies to Selective Data Transition as a third migration technique which combines the Greenfield and Brownfield approach.

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Questions?

For questions after this session, contact me at Anurag.barua@sap.com

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Thank you.

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