The Future of Work is Here

Introducing Digital Skills

Intelligent, Adaptive, and Human-Centric

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DELL Technologies

Before diving into today's topic …

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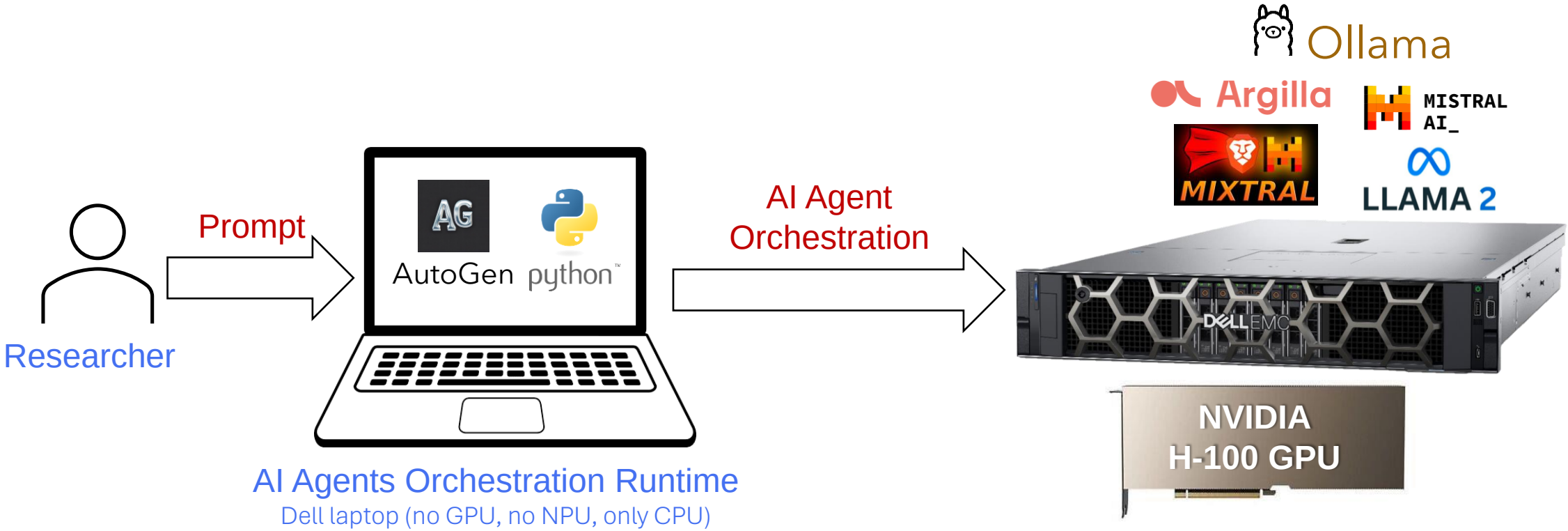
Question

Can AI be used to jumpstart corporate strategy development activities like corporate strategic recommendations, corporate strategic priorities and even … strategy gamification through scenario simulations ?

Multi-agent demo high-level architecture



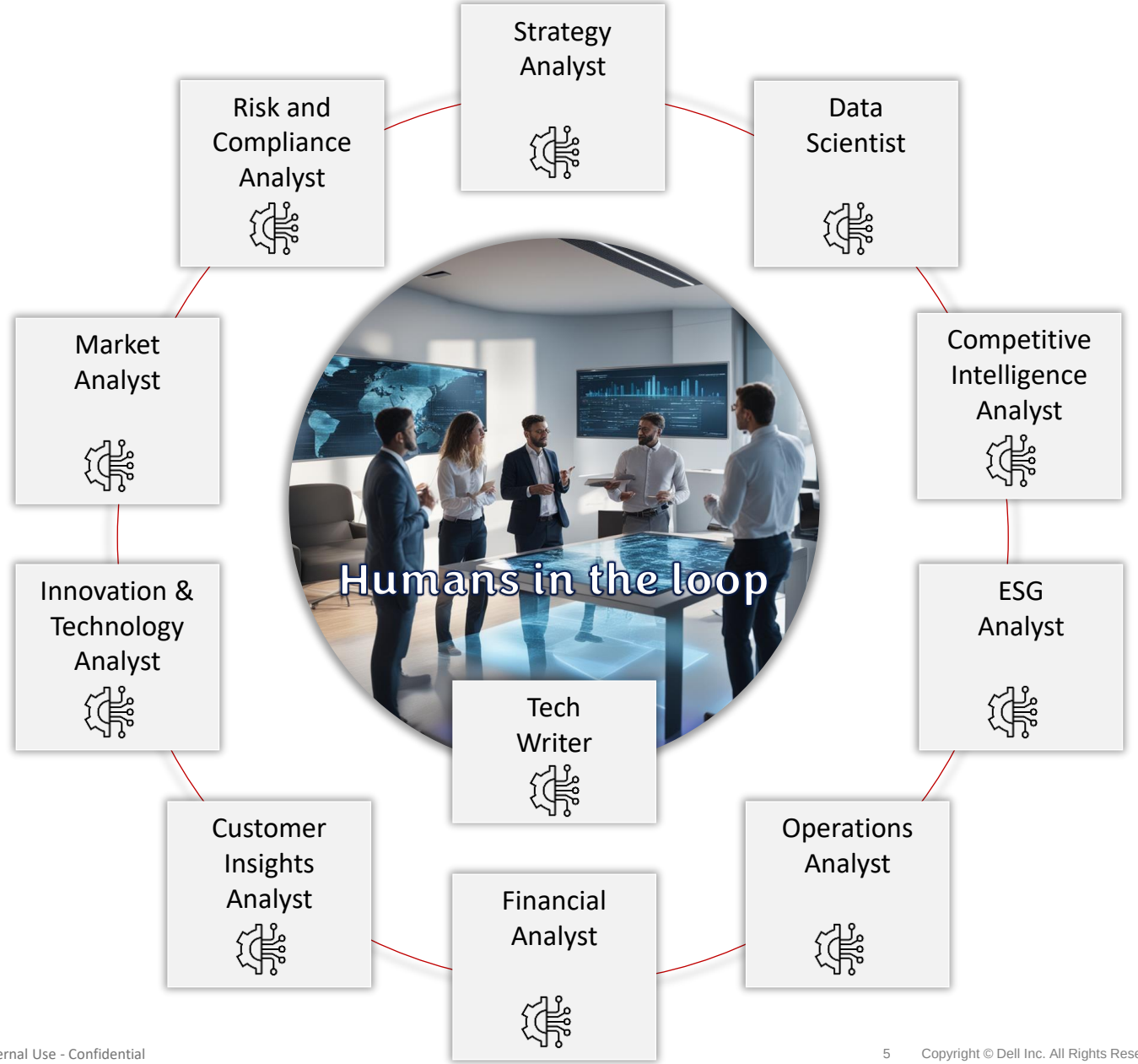
AI Agents Orchestration Runtime

Dell laptop (no GPU, no NPU, only CPU)

AI Agents Inference Runtime Environment

Dell server w/ Nvidia H-100 GPU running in the PS2 Lab (behind Corp firewall)

Case Study: Multi Agent-based Corporate Strategy Development

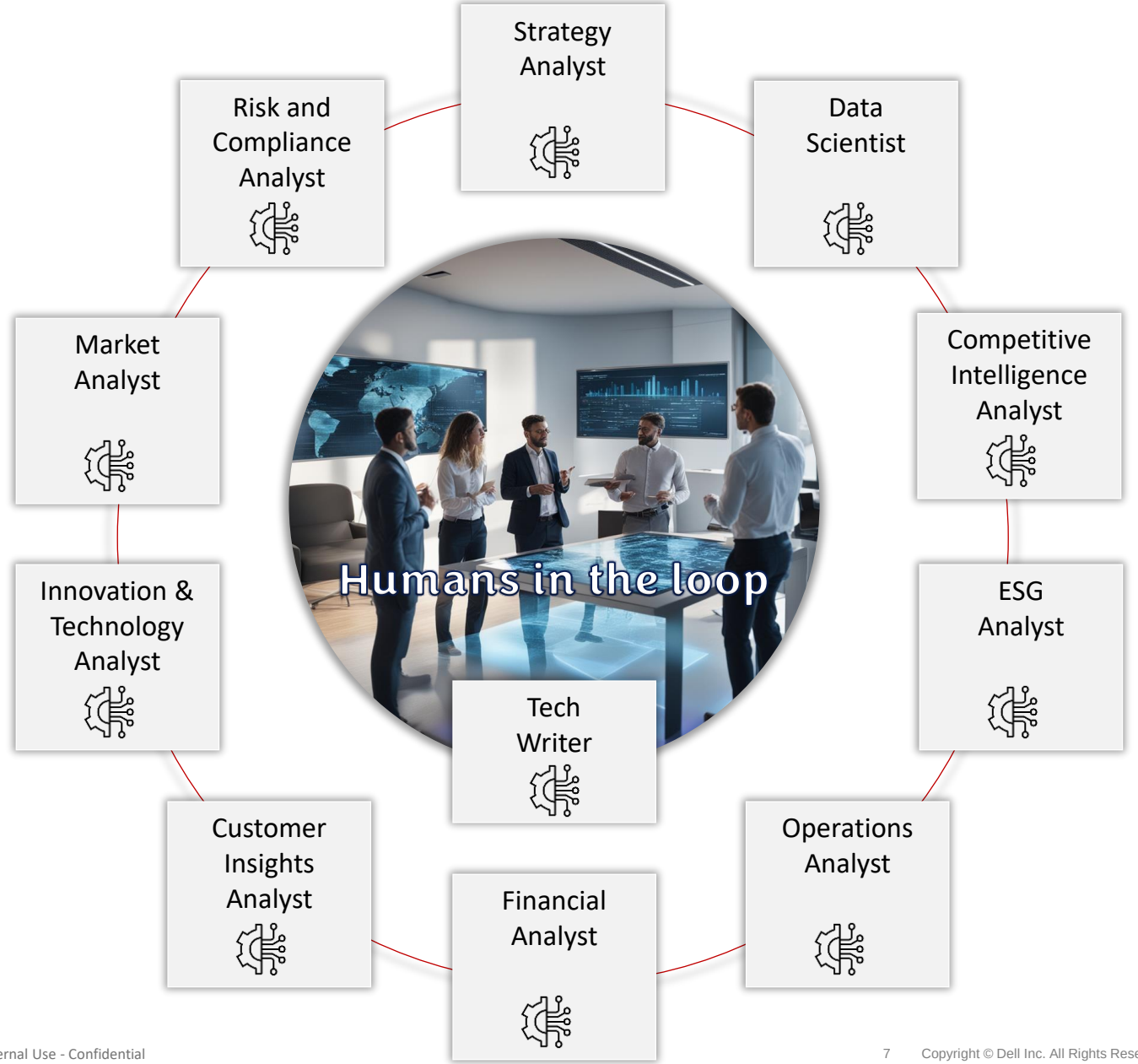


Ask

Recommend five strategic initiatives for Dell based on the comprehensive analysis of its business execution performance over the past three years, focusing on aligning the recommended initiatives with the Dell's strategic objectives, market performance, and competitive landscape.

Demo

Case Study: Multi Agent-based Corporate Strategy Development



Ask

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Observations

1. Despite their massive scale, even the largest available open-source Large Language Models (LLMs) struggle with conversational continuity
    1. They often exhibit an apparent short-term memory loss midway through interactions.
    2. They may lose sight of the original query or become distracted by subtle conversation shifts, leading to responses that veer off topic.
2. These limitations of LLMs highlight the need for human oversight and intervention
    1. Humans provide contextual understanding and common sense
    2. Human intervention ensures contextual coherence
    3. The future of conversational AI depends on human-AI collaboration

Challenge #1: Conversational continuity

Solution: use **Data Pipelines** to move away from free-form, unstructured dialog and change the conversational flow to minimize agent-level "distractions"

(1) Data Collection

The **Data Scientist** gathers and processes data from financial reports, market research, customer feedback, operational metrics, and other relevant sources.

(2) Initial Analysis

Each specialized **Analyst** conducts a preliminary analysis within their domain.

(3) Synthesis & Recommendation Development

The **Strategic Analyst** consolidates inputs from the **Data Scientist** and other **Analysts** to construct strategic recommendations.

(4) Comparative Analysis

The **Market Analyst** and **Competitive Intelligence Analyst** collaborate to benchmark the company against competitors and market trends, create competitive recommendations.

(5) Initiative Proposal

The team collaborates to propose several strategic initiatives, detailing the rationale, expected outcomes, risks, and necessary resources.

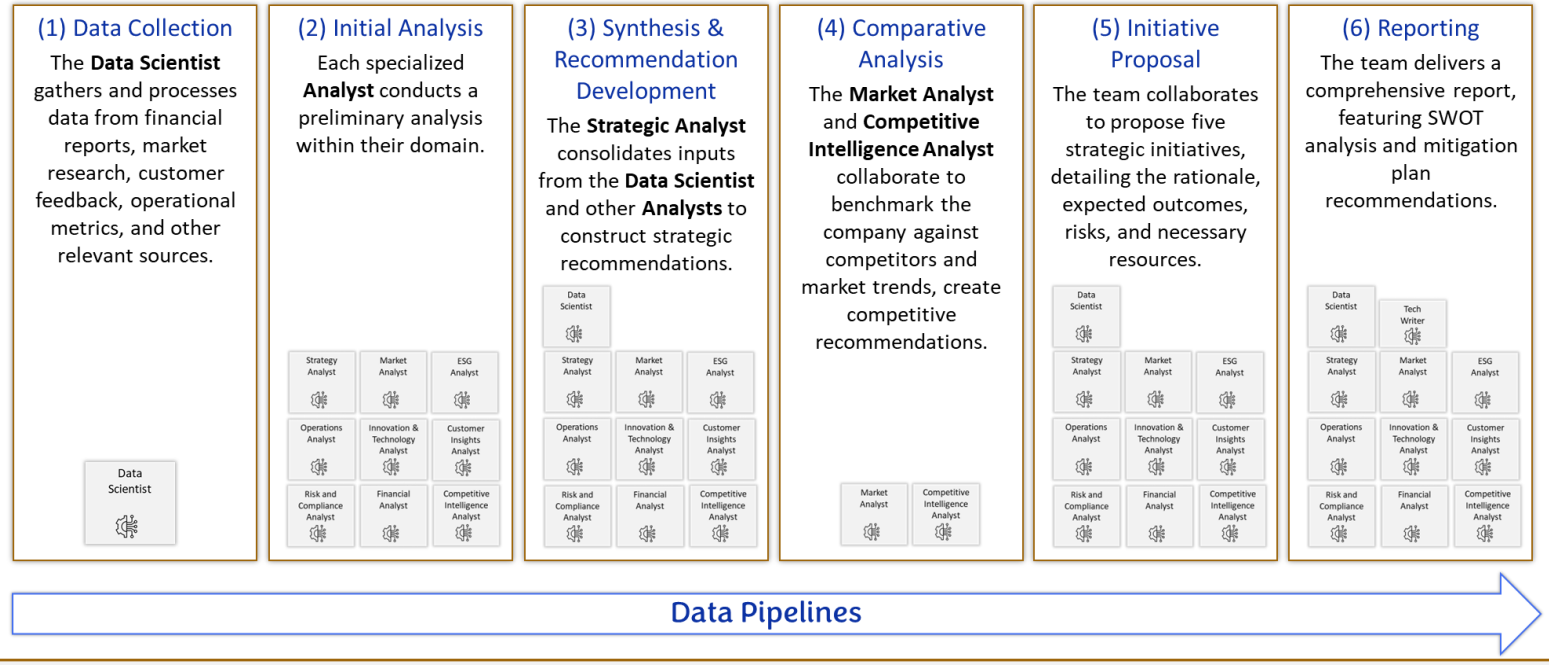
(6) Reporting

The team delivers a comprehensive report, featuring SWOT analysis and mitigation plan recommendations.

Data Pipelines

Challenge #2: Contextual coherency

Solution: use **Knowledge Graphs** and **Knowledge Bases** to provide a structured representation of domain-specific knowledge that can be leveraged to inform and constrain LLMs' responses



Corporate Strategy Development Knowledge Base

Domain Knowledge
Industry insights, business models, strategy frameworks, etc.

Dell-internal Knowledge
Organizational data, financial data, products & services portfolio, etc.

Market & Customer Insights Knowledge
Customer segments, market research, customer sentiment analysis, etc.

Key Learnings

Effective multi-agent collaboration requires a knowledge-centric strategy (as opposed to an AI-first approach), where shared understanding and collective intelligence are prioritized to facilitate seamless teamwork and decision-making among autonomous agents

The AI agent collective communicates exclusively through natural language semantics, enabling simple, seamless and intuitive interactions between agents, and fostering a more human-like dialogue and collaboration

The scalability of Large Language Models (LLMs) to multiple GPUs can be a complex challenge, requiring careful optimization to ensure efficient and reliable performance

Linguistic precision is crucial, as even subtle variations in prompts can elicit dramatically disparate responses from AI agents, underscoring the importance of carefully crafted language

Digital Skills POCs

What is in for Dell?

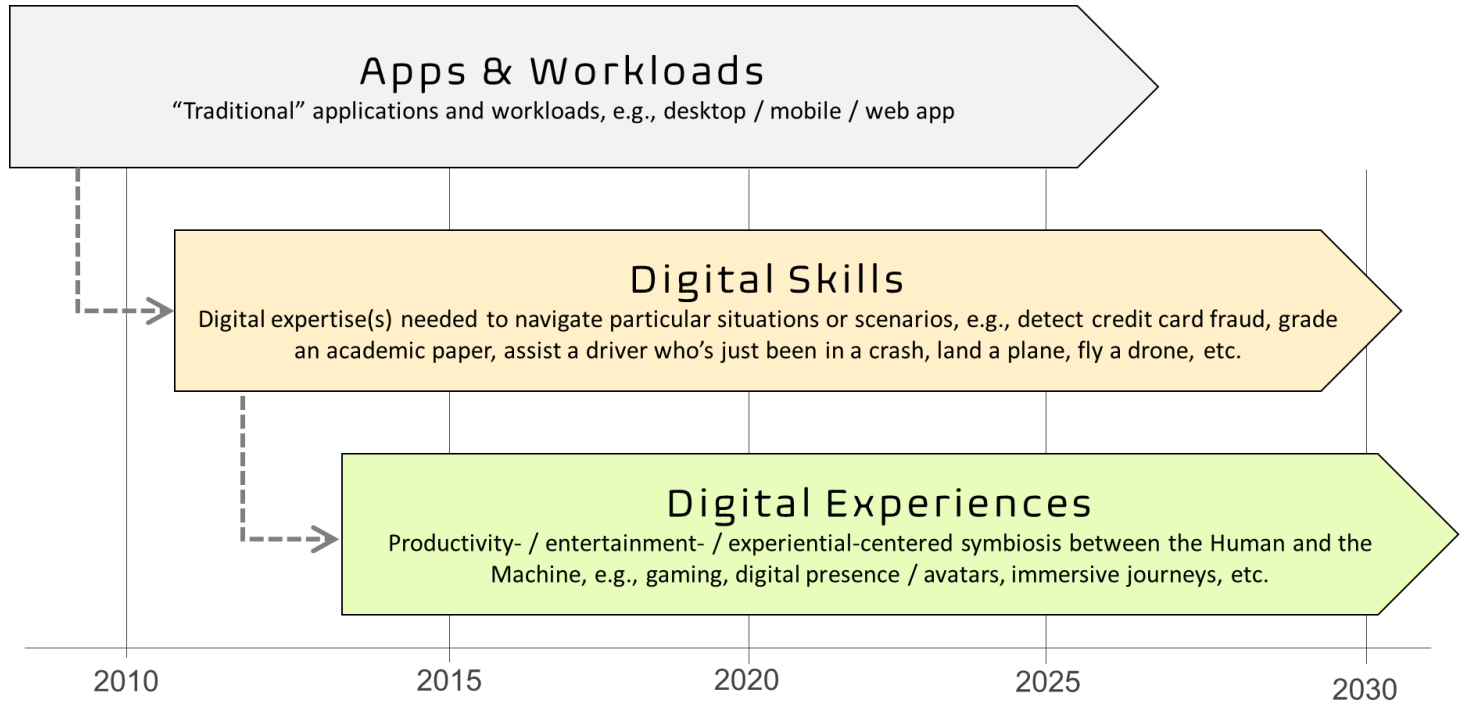
1. Linguistic precision is crucial, as even subtle variations in prompts can elicit dramatically disparate responses from AI agents, underscoring the importance of carefully crafted language
   - Slight changes in wording can lead to vastly different interpretations, as AI agents may misinterpret nuances of language, resulting in unintended responses
   - The complexity of this challenge is further compounded by the presence of multiple agents interacting with each other. In this multi-agent environment, the repercussions of linguistic imprecision can cascade throughout the collective, triggering a domino effect that exacerbates errors and inaccuracies, ultimately eroding the system's reliability and trustworthiness.
   - **Dell Advantage** – a powerful solution that renders most of the LLMs commodity and shifts the control to Dell is the use of **Data Pipelines and Knowledge Bases underpinned by high performance Dell servers, network, and storage**
2. The output produced by a team of AI agents is inherently non-deterministic, with an expected margin of error of +/- 20% (sometime even larger)
   - It is the stochastic nature of AI decision-making that leads to variable degrees of randomness in AI agent response, due to the fact that AI agents are built on probabilistic models and optimization techniques
   - When these agents collaborate, the stochastic nature of their decision-making processes can propagate and amplify, resulting in output variability within a sometime unpredictable margin of error.
   - **Dell Advantage** – a powerful solution that renders most of the LLMs commodity and shifts the control to Dell is the use of **Intelligent DevOps, DataOps, and MLOps solutions**
3. The imperative of human oversight driven primarily by the non-deterministic nature of AI agents
   - Humans can detect and correct errors or inconsistencies in AI agent outputs during digital skill development, which prevents the propagation of inaccuracies and ensures that the digital skills system performs reliably and accurately.
   - Humans possess contextual understanding and judgment, enabling them to interpret AI agent outputs in light of broader goals, constraints, and nuances. This oversight capability is essential for resolving ambiguities, making informed decisions, and ensuring that AI-driven outcomes align with organizational objectives and values.
   - **Dell Advantage** – a powerful solution that renders most of the LLMs commodity and shifts the control to Dell is encapsulating domain expertise and contextual understanding within **Knowledge Bases (powered by Dell servers, storage, and network)**, which serve as references for AI agents to autonomously make informed decisions while still ensuring reliability and accuracy.

Hypothesis

In an AI-powered world, SaaS, PaaS, FaaS, CaaS, etc. are all due for retirement

From today's "traditional" software solutions	To tomorrow's hardware-accelerated everything
FaaS / SaaS / PaaS	**Digital Skills**
IaaS / CaaS / StaaS	Next-gen AIOps
DevOps / DevSecOps / CI /CD / CT	
ITOps	
Software	AI
Software Apps	**Digital Experiences**
Service Catalogs	Knowledge Spaces
Perimeter Security	Intrinsic Security
Functional Programming	Functional Descriptors
Cloud	Cloud-less
Network Infrastructure	Network Intelligence (CDN)
Multi-threading	Multi-presence

2022 prediction



A **Digital Skill** is the ability to effectively utilize technology to perform tasks, solve problems, and achieve goals in various contexts, ranging from basic computer literacy to proficiency in real-life or virtual reality situations.

Digital Skill Point of View

Digital Skills can be thought as **Capabilities** that empower businesses to attain specific outcomes by exceling in three key areas: seamless execution, collaborative problem-solving, and continuous adaptation through learning. These capabilities are inherently dynamic, adaptive, and performance-driven, with a relentless focus on optimizing resource utilization, streamlining processes, and delivering measurable results.

Examples:

- Process Automation
- Cybersecurity Threat Detection
- Digital Twin Simulation
- Intelligent Data Analysis
- Predictive Maintenance
- Cognitive Computing

The six key defining characteristics of a Digital Skill

Performance-oriented

Maximize efficiency, optimize collaboration, and adapt dynamically to achieve tangible results aligned with collective goals.

Self-organizing

Aim to collaboratively solve complex problems, optimize resource usage, and adapt dynamically towards shared goals without centralized control.

Continuously evolving

Iteratively learn from experiences, adapt strategies, and integrate new knowledge to improve performance and achieve collective objectives.

Highly adaptive

Dynamically adjust responses by learning from interactions and changes in the environment.

Contextually aware

Intelligently interpret context, understand situational cues, and adapt actions and responses accordingly.

Deeply explainable

Transparently document decision-making processes, provide clear rationales for actions, ensure behavioral consistency.

Digital Skill IS / IS-NOT

#	IS	IS NOT
1	**A Knowledge Management-first endeavor** A Digital Skill is primarily a Knowledge Management exercise because it revolves around the acquisition, accumulation, organization, transformation, sharing, and application of Knowledge.	**An AI-first approach** While AI can play a valuable role in enhancing Digital Skills, it should be integrated thoughtfully within a broader Knowledge Framework that emphasizes learning, diversity, inclusion, accessibility, ethical considerations, continuous adaptation, and deep explainability.
2	**Versatile** A Digital Skill can be applied across various contexts and platforms, allowing users and other Digital Skills to navigate different environments and demands effectively.	**Limited** A Digital Skill is not restricted to a single application or technology but rather adaptable to diverse scenarios.
3	**Empowering** A Digital Skill enhances users' capabilities and productivity, enabling them to accomplish tasks more efficiently and creatively.	**Restrictive** A Digital Skill does not hinder users' abilities but rather facilitates their digital proficiency and autonomy.
4	**Collaborative** A Digital Skill fosters cooperation and interaction among users or between users and digital systems, enabling seamless sharing of Knowledge and resources in digital environments.	**Isolating** A Digital Skill does not operate in isolation but rather promotes collaboration and connectivity among individuals and communities.

Digital Skills vs Digital Workers

- Digital Skills can be thought as Capabilities that empower businesses to attain specific outcomes by exceling in three key areas: seamless execution, collaborative problem-solving, and continuous adaptation through learning. These capabilities are inherently dynamic, adaptive, and performance-driven, with a relentless focus on optimizing resource utilization, streamlining processes, and delivering measurable results.

Examples:

- Process Automation
- Cybersecurity Threat Detection
- Digital Twin Simulation
- Intelligent Data Analysis
- Predictive Maintenance
- Cognitive Computing

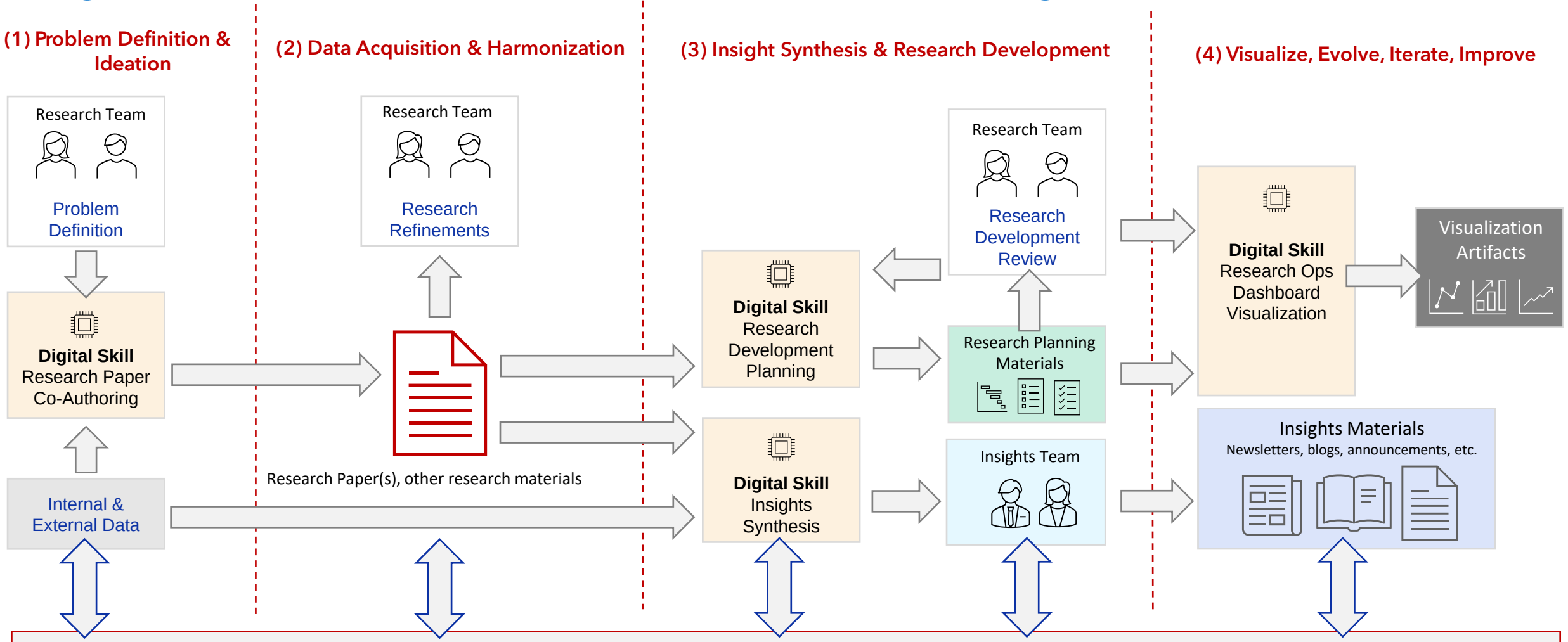
- Digital Workers, on the other hand, can be likened to autonomous Job Roles that are programmed to execute a well-defined set of tasks, responsibilities, and functions, much like their human counterparts in traditional organizational structures. Equipped with (Digital) Skills acquired through various means, they autonomously perform a predetermined set of assignments and functions with minimal or no human oversight.

Examples:

- Virtual Customer Service Representative
- Autonomous Financial Analyst
- Cybersecurity Threat Response Agent
- Predictive Maintenance Scheduler
- Digital Marketing Specialist

Digital Skills in Action: Case Study #1

Digital Skills-powered Research Process Augmentation



Digital Skills in Action: Case Study #2

Adopting Digital Skills in Data Center Ops

Digital Skill

Data Center Automation

Automate routine tasks such as server provisioning, maintenance, and monitoring. Reduce manual intervention, minimize human error, increase operational efficiency, streamline operational processes.

Digital Skill

Data Center Analytics

Allow data center operators to analyze vast amounts of telemetry data. Extract valuable operational insights, optimize resource utilization, identify performance bottlenecks, proactively address issues.

Digital Skill

Cloud Management

Enable efficient management of cloud resources, including provisioning, scaling, and monitoring. Provide flexibility, scalability, and cost-effectiveness, adapt to changing workloads and optimize resource usage.

Digital Skill

Energy Efficiency

Help implement energy-efficient practices in data center operations, including optimizing cooling systems, using renewable energy sources to reduce energy consumption and lower operational costs.

Digital Skill

Security Management

Safeguard data center infrastructure, protect sensitive information. Implement robust security measures, including access controls, encryption, and threat intelligence, to enhance data center security and resilience.

Digital Skill

Performance Monitoring

Facilitate real-time monitoring and performance analysis of data center infrastructure, applications, identify performance issues, optimize resource allocation, ensure HA and reliability of data center operations.

Digital Skill

Disaster Recovery and Business Continuity

Implement comprehensive disaster recovery and business continuity plans, mitigate impact of potential disruptions, ensure data integrity, minimize downtime.

Common Knowledge Base

Data Center Infrastructure Documentation, Best Practices and Standard Operating Procedures (SOPs), Data Center Management Tools and Software Documentation, Performance Optimization Techniques, Energy Efficiency Strategies, Security Best Practices, Troubleshooting Guides and FAQs, etc.

Key Customer Messages

1. AI is a Tool, not a Solution
    1. AI is a powerful amplifier, but it's only as effective as the human ingenuity and creativity that drives it.
    2. By recognizing AI as a tool, rather than a solution, Dell can unlock its true potential to accelerate our Customers' AI journeys, enhance their decision-making, and drive meaningful co-innovation.
2. Successful AI adoption is not just about deploying models or algorithms
    1. It's all about harnessing the collective genius of humans and machines to drive meaningful outcomes.
    2. By infusing AI initiatives with human intuition, creativity, and oversight, organizations can ensure that their AI solutions are aligned with business objectives, ethical principles, and societal values.
3. Dell can jumpstart our Customers' AI adoption initiatives
    1. With a rich heritage in data storage, management, and analytics, Dell is uniquely positioned to help customers unlock the full potential of their data and accelerate their AI adoption.
    2. By leveraging its expertise in infrastructure, edge computing, and cloud services, Dell can provide a comprehensive foundation for AI workloads, empowering customers to drive innovation, improve efficiency, and uncover new business opportunities.

Reference: Hidden Technical Debt in Machine Learning Systems (check out Figure 1)

Next Steps

- OCTO is looking for opportunities to co-innovate / co-create with Customers
- Monthly research updates & knowledge sharing sessions starting in September
  - Internal only
  - Customer EBCs, webinars per request
- Don’t hesitate to reach out with questions, comments, and suggestions
  - Aurelian ‘AD’ Dumitru (aurelian.dumitru@dell.com)
  - Frank Macha (frank.macha@dell.com)

Q&A

Thank You.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