

566254877

Powered for Change

Electricity networks in the age of AI

accenture

Contents



- Context** _____ 4
- The challenge** _____ 5
- From static network efficiency to dynamic system value** _____ 7
- What needs to change?** _____ 9
- The case for AI-native** _____ 10
- What will an AI-native future look like?** _____ 13
- What to do next?** _____ 15



Authors



Robert (Rob) Hopkin

Global Lead, AI & Data

Utilities



Rob leads AI and Data for the utilities industry globally, partnering with utility clients to reinvent with AI across the value chain.

robert.hopkin@accenture.com



Vijay Sharma

Global Lead, AI & Data

Industry & Enterprise



Vijay leads the AI and Data agenda across all Accenture's 13 industries globally, helping clients unlock the full potential of AI.

vijay.l.sharma@accenture.com



Executive Summary

The growth trajectory of power-hungry AI data centers has compounded the existing challenges of the energy trilemma: a rapidly changing generation mix, aging assets, increased threats to security of supply, the demands of electrification and sustained pressure on affordability and competitiveness. The root cause of the challenge is fragmentation.

Across regulation, asset management, engineering, capital projects and operations, processes, platforms and data exist in silos, making the orchestration required to scale, compress and optimize work too hard and too complex.

Value leaks and risks increase, compromising the energy company's ability to connect faster and add capacity while maintaining security of supply and affordability. The consequences are visible everywhere: chronic plan churn, underutilized network access, repeated asset interventions and designs that fail to maximize utilization of existing and future network capacity.

The instinct to tweak processes and inject point-digital solutions is understandable, but insufficient. Current processes are designed around current limitations, assuming tasks and handoffs execute to the clock speed of human-orchestrated organizations where things take days, weeks and months. Incremental improvement cannot overcome a structural constraint.

The answer lies in becoming AI-native, not AI-infused. An AI-native business operates seamlessly across one integrated value stream that converts the drivers for work into system outcomes. The critical shift is in end-to-end optimization and orchestration, performed by AI agents, steered by humans, and underpinned by platforms and data. These agents can make sense of fragmented data, automate complex technical tasks, dynamically optimise across multiple dimensions and orchestrate processes across organisational boundaries with immensely compressed cycle times, reducing decisions that take weeks today to hours.

The change is underpinned by fixing the data layer, creating a set of data products upon which AI agents and humans can operate, and then deploying an agent organization piece-by-piece with people and platform change driven in parallel. The level of transformation is significant, but so is the value at stake. This is an industry-defining moment, and the time to act is now. If energy grid operators act now, they have the opportunity to enable the next generation of energy provision.





Context

Electricity network utilities have evolved to efficiently maintain supply. They are frugal businesses, optimized for efficient management of an existing asset base where growth has been steady and predictable.

Teams are lean and costs are minimised with limited investment in data, processes and systems for organizational velocity and end-to-end (E2E) integration. This model has worked well. Networks are reliable and efficient.





The challenge

The incredible growth trajectory of power-hungry AI data centers has compounded the existing challenges of the energy trilemma—a rapidly changing generation mix, aging assets, increased human and natural threats to security of supply, the demands of electrification and sustained pressure on affordability and competitiveness.

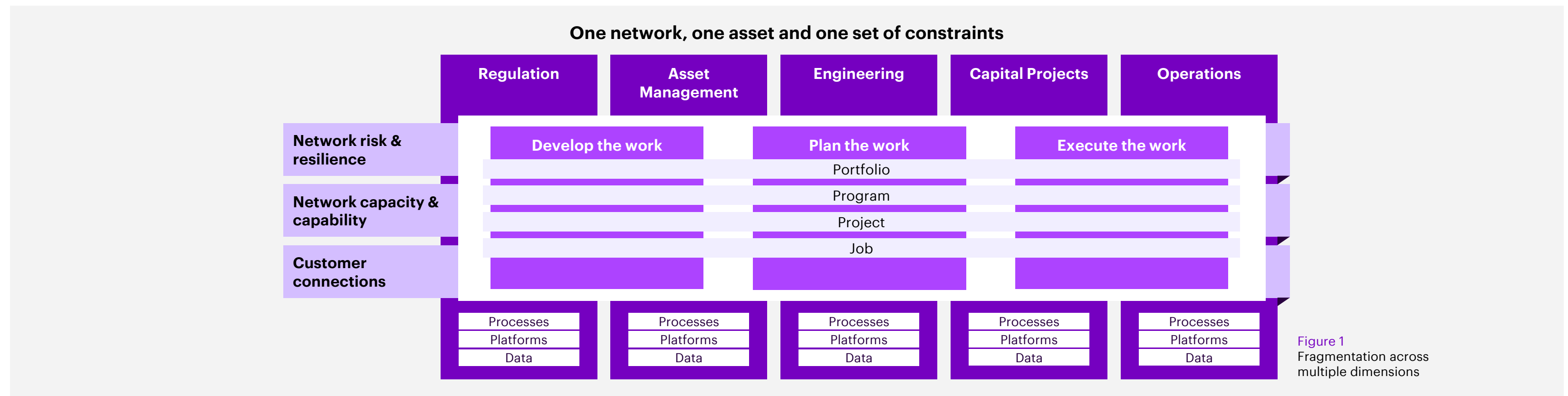
There is more work required than there is capacity and time available, with choices shrouded in uncertainty—from what

will connect and when, to the actual condition of assets.

As we look ahead at reconciling competing demands in our current landscape, it is clear that our approach will need to evolve. Tackling these challenges effectively will require a focus on scaling processes, compressing timelines and optimizing resources. The current industry model faces scalability constraints across talent, supply chain and network access, with manual and fragmented processes limiting work

compression and optimization.

The challenge of the current model is shown in Figure 1, with fragmentation across the organization and associated processes, platforms and data; the drivers of work—risk and resilience, capacity and capability and connections; and the delivery of work across stages and layers.





Fragmentation leads to processes that don't scale, compress, integrate or effectively handle uncertainty—the orchestration required is too hard and too complex. One challenge is value leakage and the compounding risk to operations. These issues are increasingly compromising the ability to connect faster and add capacity while maintaining security of supply and affordability. It's essential these challenges are addressed promptly to ensure the delivery of reliable and cost-effective services.

Examples include:

- Continued deferral of large asset health interventions that are hard to fit into a constrained plan, with limited visibility of the overall system risk of these choices.
- Underutilization of network access, curtailing the flow of work.

- Designs that fail to maximize use of existing network capacity with intelligent solutions.
- Inefficiently touching the same asset multiple times across different drivers.
- A failure to drive a multi-generational approach to designing and building, with replicated designs and repeat teams and supply chains.

Network utilities need to find a route that overcomes today's fragmentation and rapidly increases scale, compresses timelines and enables effective optimization.





From static network efficiency to dynamic system value

Network processes need to dynamically maximize the total value provided to the system from the network assets, while also working to mitigate constraints and deal with uncertainty. To do this requires three things (See figure 2):

1. Find the optimal solution.

This involves repeatably solving a set of integrated hard problems e.g., prioritizing asset health interventions to maximize risk reduction per unit of investment; cross-driver optioneering for sites and circuits; bundling of work against constraints and designing for replication and pre-fabrication. These are discreet hard problems that then must be integrated to create a solution for a single network, asset and set of constraints.

2. Keep it optimal.

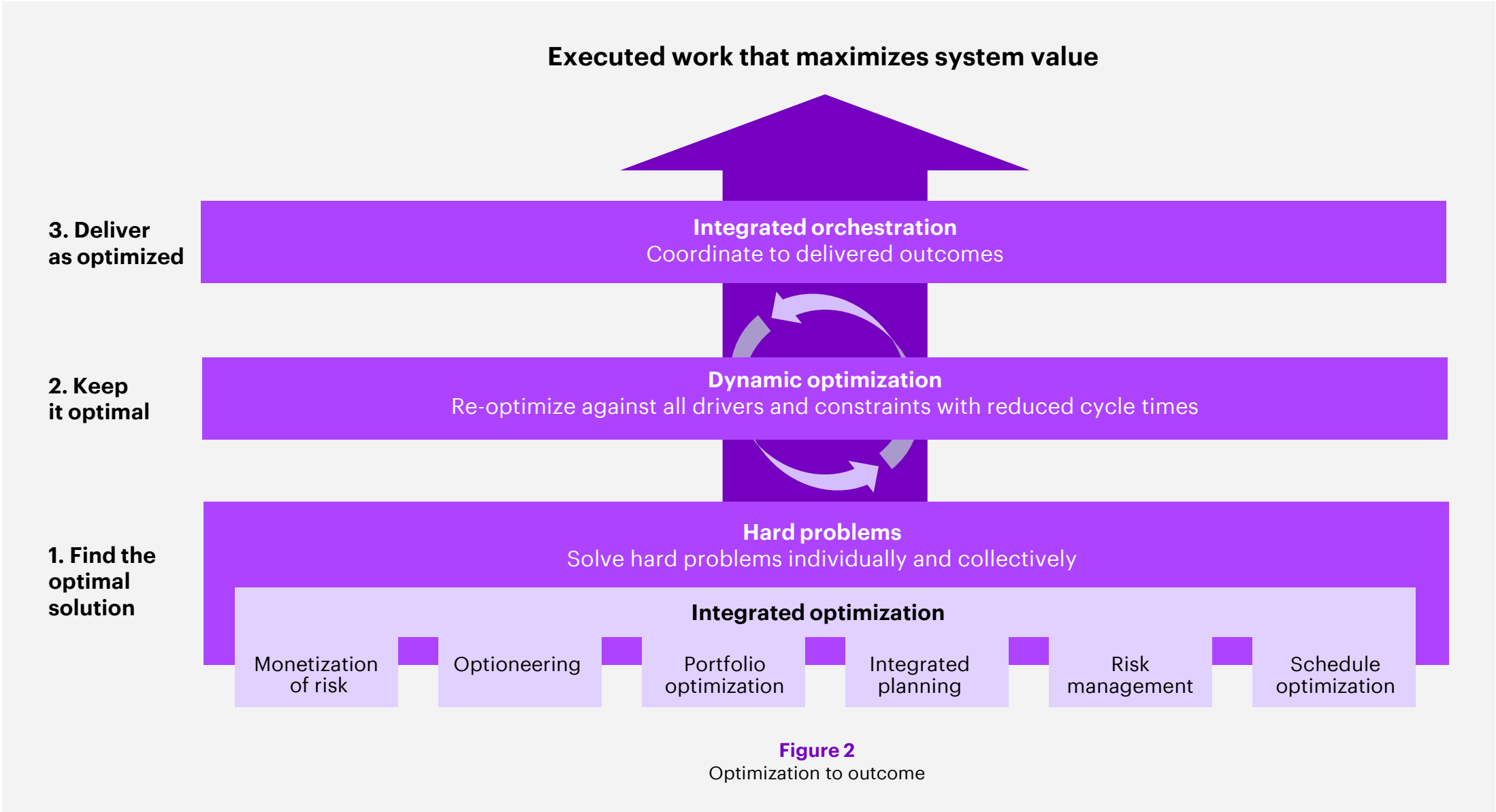
Solutions must be dynamically optimized for these interlinked hard problems sufficiently fast that they remain optimal as things change (over the long lifecycle of network projects.) For example, a new customer connection request may mean that the previous substation design no longer makes sense, which subsequently impacts the integrated plan.

3. Deliver as optimized.

This requires integration across the organization, supply chain partners and other stakeholders, e.g., customers and communities to execute the work in alignment with the optimized solution. Dealing with on the ground realities—e.g., a piece of work overruns, an outage is pulled or ground conditions impact engineering choices—must be managed through delivery optionality and flexibility.



To do these three things in parallel requires the business to be wired differently. Parts of it are there. For example, many network utilities have advanced capabilities to identify which assets to prioritize for health intervention. But finding a theoretically optimal asset health plan means little if the planned interventions get bumped from the plan by prioritized connections work. Annualized plan churn of greater than 50% is not uncommon across the industry and is testament to the challenge of going from a great plan to delivered outcomes.





What needs to change?



It's tempting to tweak processes, throw more people at the challenge and make point infusions of digital and AI.

Given the time available—data centers and generators need to be connected right now—a solution that minimizes the level of change feels faster and less risky. Evolution, not revolution. This makes sense if it is possible to evolve to the required state. If tweaks and incremental capacity and capability are sufficient.

But tweaks are incremental capacity and capability increases are not sufficient. There is a necessary pathway where wholesale changes are made, that has the potential to be superior, built on what AI makes possible.



The case for an AI-native approach

Some problems are tailor-made for AI. Making wholesale changes is one of them. It requires:

- 1.** Rapidly integrating and enhancing fragmented data providing a clear business logic (e.g., asset registers and cost books) and unstructured data (e.g., gate papers, project plans, maintenance notes and engineering designs).
- 2.** Increasing productivity for talent doing complex work that requires to portfolio management and project controls.
- 3.** Solving hard analytical problems that require dynamic optimization across multiple dimensions, e.g., cross-driver prioritization and work bundling by site and circuit.
- 4.** Implementing process orchestration across organization boundaries with immensely compressed cycle times, updating the plan to reflect delayed work or a new connection request.



AI agents—steered by humans and backed by platforms and data—are uniquely able to address these requirements. They can do so rapidly with big productivity gains, compression of key processes and the kernel of integrated optimization in place within six to twelve months and E2E reinvention executed and embedded in 18-24 months. Agents can:

- Make sense of large and technical structured and unstructured data sets, closing data gaps, connecting the data and creating a layer that enables humans to understand what the data means.
- Automate complex and technical tasks that require adaptive reasoning, (i.e., cannot be addressed by rule-based logic), massively increasing the tasks that are machine-addressable.
- Dynamically optimize across many dimensions, illustrating trade-offs and presenting choices that increase decision quality.

- Adaptively orchestrate across complex processes, consistently applying brilliant basics (across applicable policies, standards and procedures) and using all available data to execute to an outcome in minutes.

This will involve a major shift in how work is done and in the respective roles of humans, agents and platforms, (Figure 3). In this future world:

- **Humans** will bring empathy and trust, judgement and accountability, and originality and strategic thinking. They will no longer spend time wrangling data, managing handoffs and performing repetitive tasks.
- **Agents** will autonomously and adaptively run processes and journeys, orchestrate the underlying platforms, enrich and connect data, and generate actionable insights and provide a conversational interface for human interaction.

- **Platforms** will remain the workhorse of the enterprise, acting as systems of record and driving scale, execution and control across transactions and repeatable, static and high-volume process steps.

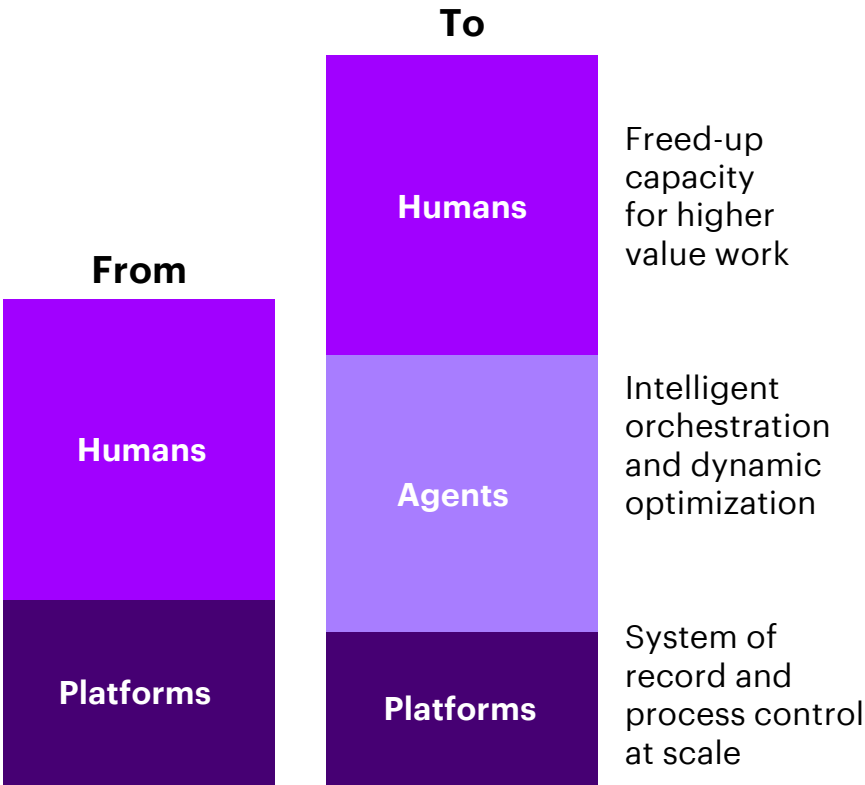


Figure 3
The role of humans, agents and platforms

Infusing AI into existing processes will not be sufficient. Current processes are designed around current limitations. They assume that tasks and handoffs are executed to the clock speed of human-orchestrated organizations where things take days, weeks and months. Steps within these processes can be accelerated and optimized by AI, but the outcomes will remain constrained by the process foundation upon which they sit. For example, the plan can be optimized for value and constraints at a point in time, but if this plan becomes progressively less deliverable as things change, the realised outcomes can diverge significantly because the AI wiring can't dynamically optimize through to execution.

This is the difference between **AI-infused** and **AI-native** processes. Infusion takes what exists today and adds in point-AI solutions. AI-native reinvents the process with what AI makes possible. Figure 4 shows the difference between AI-infusion of as-is and AI-native reinvention for the E2E process for work planning. It shows how the process runs to respond to a change in context, such as a new connection request or updated asset health information.

As-is AI infused:
Highly manual and human orchestrated on top of fragmented data. Infusion of point AI tools e.g., plan optimizer.

Takes weeks due to the number of hand-offs and task durations. Suffers from poor decision quality due to trade-off complexity and optimism bias.

AI-native to-be:
Massive compression and improved decision quality as agents run the E2E on all the structured and unstructured data across domains eliminating hand-offs and silos.

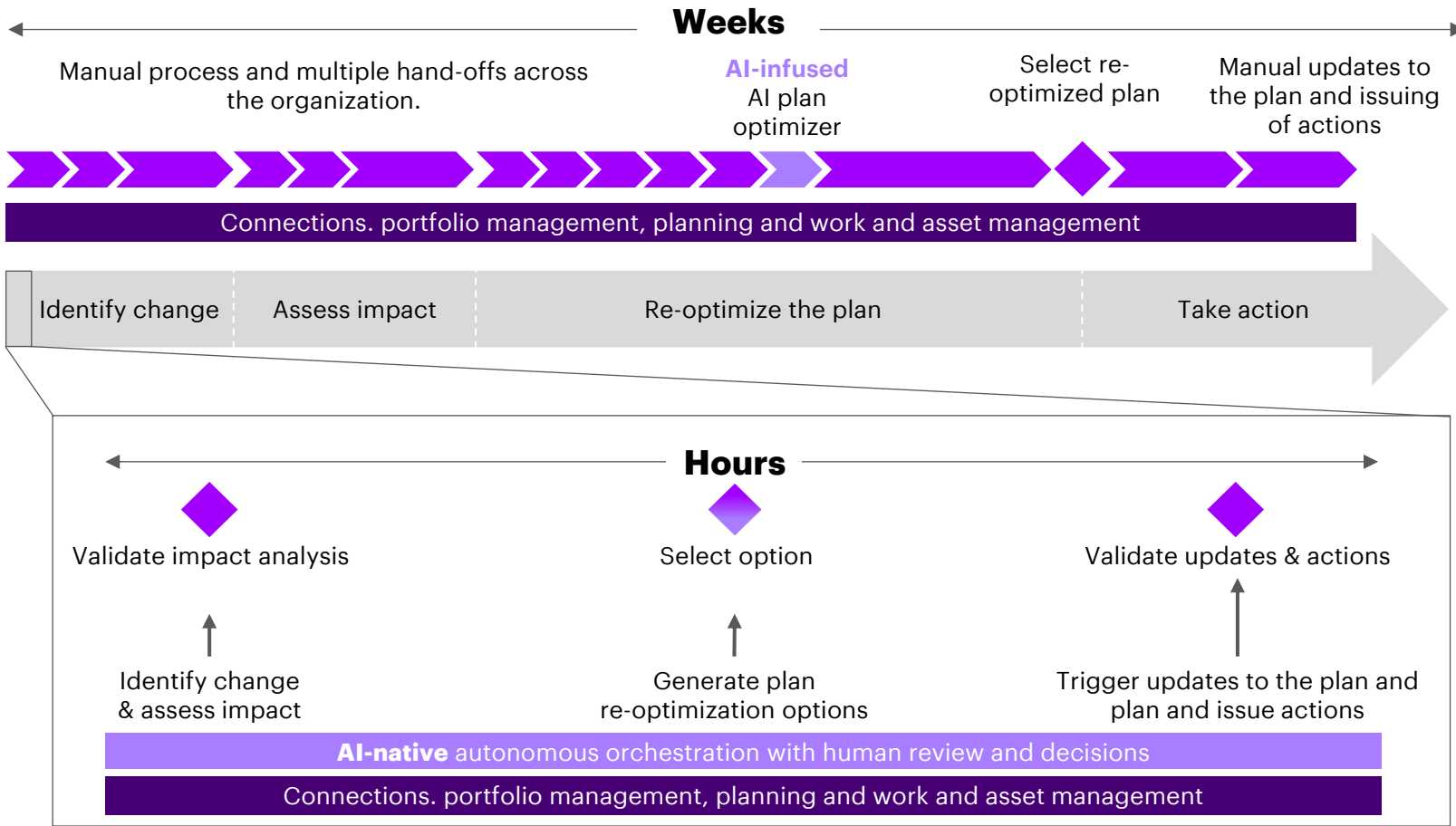


Figure 4
AI-infused vs. AI-native

Humans Agents Platforms

By eliminating human-performed and orchestrated tasks and hand-offs, the AI-native approach reduces cycle times and enables humans to act as accountable and specialized decision-makers supported by machine intelligence.

What will an AI-native future look like?

An AI-native business operates seamlessly across one integrated value stream that converts the drivers for work into system outcomes. The existing organizational construct remains; there are specialized teams with clear accountability for domain performance e.g., Engineering is accountable for design assurance and Ops is accountable for the safe execution of work. Platforms also remain but are now triggered by agents as they run the process.

The big change is in E2E optimization and orchestration, which is performed by agents, steered by humans and underpinned by platforms and data (Figure 5).

Agents also require an “organization,” as they, like their human counterparts, are specialized e.g., solve specific hard problems. The agent organization exists across three layers:

- 1. **Orchestrator agents** that act as the human interface layer and manage across the underlying super agents to execute against intent.
- 2. **Super agents** that are managed by the orchestrator agents and themselves work across utility agents to complete tasks.
- 3. **Utility agents** are highly specialized, and task-focused and managed by the super agents.

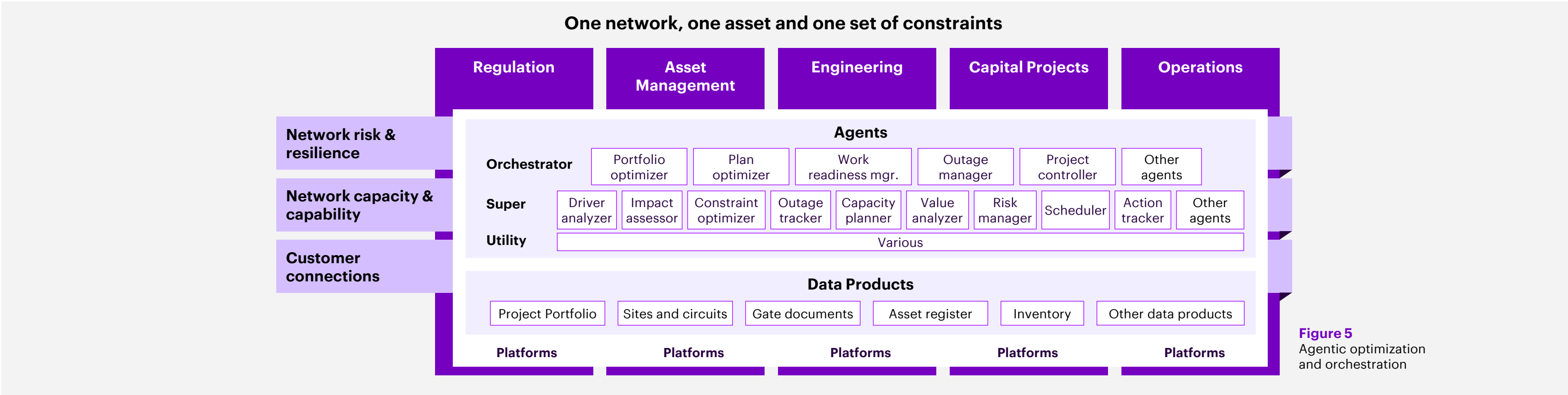


Figure 5
Agentic optimization and orchestration



The agent organization operates in a radically different way. It can coordinate, collaborate and integrate instantaneously and with no loss of information fidelity and quality at the interface and access to all the information with close to zero latency. This is what enables vast acceleration in clock speed, integration and dynamic optimization that collective human intelligence cannot replicate.

Agents also bring built-in discipline—aligned to policy and standards—while retaining sufficient adaptability to problem solve. Machines provide effective points of control, e.g., checks against standardized designs and work readiness reviews and increased rigour and discipline in tracking actions to completion.

With the agents and data products in place, the constraints of human-run processes are removed, creating the ability to continuously solve hard problems, dynamically optimize and rigorously execute to outcome.





What to do next

The need for change is compelling, and an AI-native approach is uniquely able to meet the challenge. The level of change is significant but justifiable given the value at stake. Now is the time to act, with process reinvention across the value stream that goes from the drivers of work to delivered system outcomes.

The change is underpinned by fixing the data layer, creating a set of data products upon which AI agents and humans can operate and then deploying an agent organization piece by piece with people and platform change driven in parallel.

The rapid development of AI over the last 12–18 months has made the need for change more pressing and created the means to act. This is an industry defining moment and a huge opportunity.



About Accenture

Accenture is a leading global professional services company that helps the world’s leading businesses, governments and other organisations build their digital core, optimize their operations, accelerate revenue growth and enhance citizen services—creating tangible value at speed and scale. We are a talent- and innovation-led company with approximately 791,000 people serving clients in more than 120 countries. Technology is at the core of change today, and we are one of the world’s leaders in helping drive that change, with strong ecosystem relationships. We combine our strength in technology and leadership in cloud, data and AI with unmatched industry experience, functional expertise and global delivery capability. Our broad range of services, solutions and assets across Strategy & Consulting, Technology, Operations, Industry X and Song, together with our culture of shared success and commitment to creating 360° value, enable us to help our clients reinvent and build trusted, lasting relationships. We measure our success by the 360° value we create for our clients, each other, our shareholders, partners and communities.

Visit us at www.accenture.com.

The material in this document reflects information available at the point in time at which this document was prepared as indicated by the date provided on the front page, however the global situation is rapidly evolving and the position may change. This content is provided for general information purposes only, does not take into account the reader’s specific circumstances and is not intended to be used in place of consultation with our professional advisors. Accenture disclaims, to the fullest extent permitted by applicable law, any and all liability for the accuracy and completeness of the information in this document and for any acts or omissions made based on such information. Accenture does not provide legal, regulatory, audit or tax advice. Readers are responsible for obtaining such advice from their own legal counsel or other licensed professionals. This document refers to marks owned by third parties. All such third-party marks are the property of their respective owners. No sponsorship, endorsement or approval of this content by the owners of such marks is intended, expressed or implied.

Some images included in this document have been generated using artificial intelligence technology.

Copyright © 2026 Accenture. All rights reserved. Accenture and its logo are registered trademarks of Accenture.