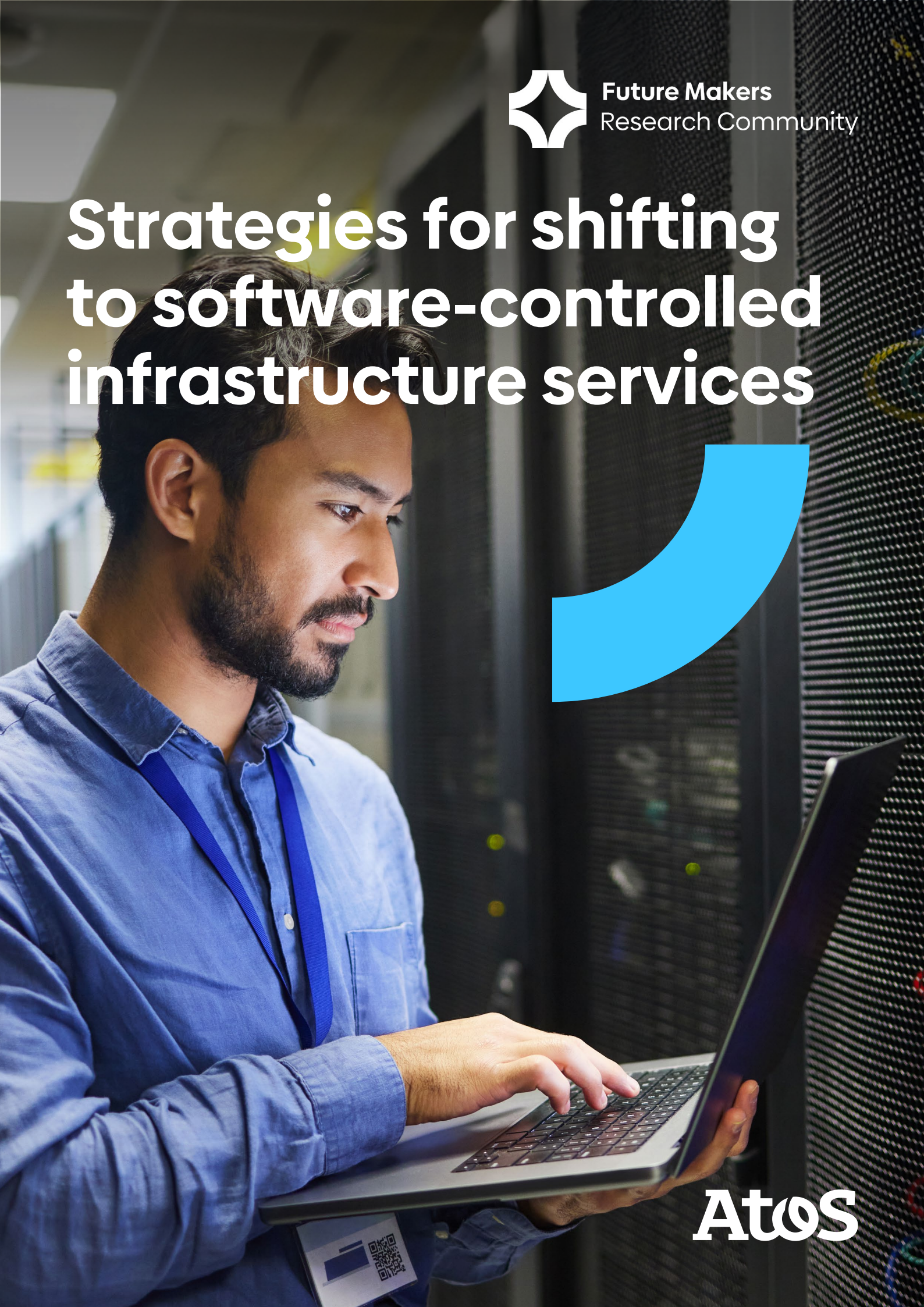
Future Makers
Research Community

Strategies for shifting to software-controlled infrastructure services



Atos

Introduction

In the ever-evolving landscape of business and technology, adaptability is key to survival and success. According to the famous paraphrase of Charles Darwin, "it is not the most intellectual of the species that survives; it is not the strongest that survives; but the species that survives is the one that is able best to adapt and adjust to the changing environment in which it finds itself."

Although the quote itself may not be genuine[1], the underlying idea nonetheless still holds true. In the business world, economic pressures and rapid technological advancements like AI and cloud computing demand higher agility and adaptation — and the penalties for failure can be severe.

In this context, the role of IT has transformed significantly, shifting from centralized departments to becoming an integral part of business operations tasked with driving innovation and differentiation. However, they are often burdened with the legacy of yesterday's innovations. Enterprises now rely on a diverse range of IT environments — with a mix of on-premises, hyperscalers, private clouds, edge computing, IoT and others.

Despite this complexity, businesses must continue to innovate and adapt to stay competitive. Unfortunately, any change to one environment affects the others it touches, potentially triggering an unintended cascade of complexity that reduces stability and increases risk.

Software control of infrastructure can provide a solution to these issues, but it comes with its own set of challenges. Below, we will explore the barriers to adoption of software-controlled IT infrastructure and propose a framework to overcome these challenges, ensuring quality, cost efficiency and speed in IT service management.

[1] Leon C. Megginson wrote this in 1963, see: https://www.darwinproject.ac.uk/people/about-darwin/six-things-darwin-never-said/evolution-misquotation

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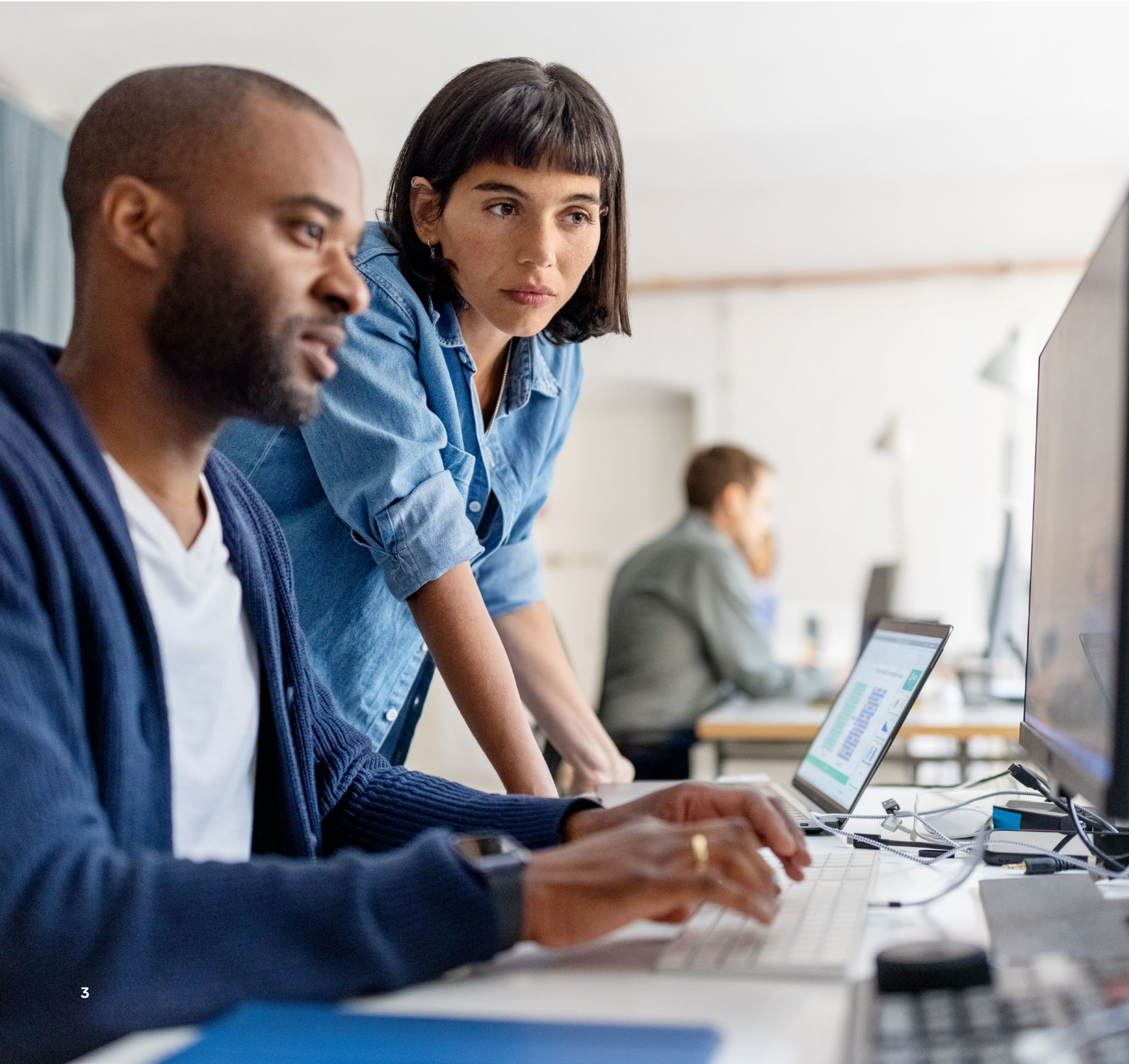

The drivers behind software-controlled infrastructure

In nature, being better able to adapt than your rivals is the key to survival. Amidst economic pressures and an environment evolving rapidly due to disruptive technologies like AI and cloud, many of today's enterprises are experiencing an increased need for agility and adaptation.

It's not only the marketplace that is evolving, but the role of IT itself. IT departments are becoming a distributed and integral part of business operations. Rather than simply supporting or enabling the business, IT now has a more strategic role to play, leading the critical effort to digitalize the business.

Many companies that utilize managed IT services have also shifted how they manage and host their IT services. The move has been from primarily on-premises IT to a mix of deployments in multiple hyperscalers in multiple regions, on-premises, private clouds, edge and highly distributed IoT. The evolution of IT service management has been greatly impacted and accelerated by increased utilization of public clouds and the cloud continuum onto IoT and edge.

Enterprises that have engaged managed IT service providers increasingly expect these partners to provide a flexible, elastic, cloud-native-like experience for all the services they offer.

For company leaders, the primary concern is to bring new products and services to market — regardless of how they are developed, managed or delivered. On the IT side, this means continuing to release new business applications and update existing ones while maintaining business continuity and compliance. IT landscapes which require high touch with a high total cost of ownership and low agility are in danger of falling short of business expectations in this digital world.

Quality, cost and speed still remain the key competitive factors, despite the fact that most large enterprises still operate a mix of old and new infrastructure. For instance, a company may deploy front-end applications running on cloud while large data repositories and core finance and accounting systems run on older hardware. This gives rise to complexity that must be abstracted in order to keep it from standing in the way of agility.

Teams in charge of digitalizing business applications are seeking the benefits of hybrid cloud adoption and are sharply focused on moving at a faster speed than the competition. They are increasingly engaged in implementing agile processes for their operations, such as site reliability engineering (SRE) and DevSecOps. Modern application development teams use orchestrated CI/CD toolchains that necessitate integration with easy-to-use consumption of the services from their underlying managed IT services provider.

Hence, the managed IT infrastructure space is largely becoming a world governed by intelligent software automation. However, there are significant barriers that stand in the way of making this new software-driven approach the standard. They include:

- The tendency of hyperscalers to propose a single cloud approach that increases vendor lock-in and doesn't support hybrid cloud solutions.
- The heterogeneity of hybrid cloud setups increases the cognitive load on IT teams.
- Poor data quality can hamper interoperability and decrease the automation potential.
- High total cost of ownership for home-grown solutions.

> *"Automation applied to an efficient operation will magnify the efficiency. Automation applied to an inefficient operation will magnify the inefficiency."*
>
> Bill Gates
> **Co-founder, Microsoft**

These roadblocks go a long way to explaining why an automated, software-driven approach to IT infrastructure management is not yet pervasive in all businesses and service providers. There is a solution, but it will require a new approach along with a shift in mindset.

In order to adapt to new customer needs, IT service management providers must go above and beyond the classic IT competencies and delivery approach that they are accustomed to. It will also require a next-generation, cloud native or cloud-like service management framework that leverages the power of AI to help companies solve their most pressing technology and business challenges.

In short, it's time for enterprises to expect more from their managed IT service partners, and these providers need to evolve if they want to remain relevant.

Designing the future of managed IT services

If you were to set out to design a hybrid cloud management framework from the ground up to support a modern enterprise, we believe its key requirements would include:

A single interface to create and manage infrastructure services across legacy and cloud

The ability to access and manage services through a set of APIs

A SaaS-like consumption model

A catalog of infrastructure building blocks that enforce your policies

Support for multi-cloud environments

Automation by design

Ensuring that services and infrastructure metadata is accurate and up to date

Such a platform would be capable of supporting the business ambitions of simultaneous low cost, high speed and high quality. Let's look at each of these factors in detail, and what it would take to support them.

A single interface to create and manage infrastructure services

- The single interface addresses two key concerns: **reducing cognitive load** on the application team and **eliminating the vendor lock-in** associated with single cloud solutions. By definition, it is an abstraction layer that simplifies the consumption model to simple asset lifecycle management requests in a consistent fashion. It works across all environments — from public cloud to on-premises environments.
- However, it can be challenging to implement because it requires striking a very fine balance between using abstraction tools that hide the details and not falling into the trap of the lowest common denominator feature set.

Accessing and managing services through APIs, consumed as a SaaS based product

- Controlling an on-prem or hybrid cloud landscape with a minimum of human actions and speed requires an easy integration with any services through a **software-driven, API-based control plane that abstracts the complexity** of such an environment.
- Because each business' IT ecosystem is different, the ease of integrating with a software control plane API is essential to transforming traditional IT infrastructure services into a software-controlled object and all the advantages that it brings. Speed, large volumetry and consistent orchestration by the upper layers in the stack are no longer problems.
- The API control plane and event bus asynchronous communication layers are the main interface mechanisms that any IT ecosystem requires to leverage software-controlled infrastructure.
- The control plane's capabilities should be pre-configured and ready to be consumed without any lengthy or costly setup process. Ideally, the control plane would be packaged as a SaaS platform, ready to be tested and used, with a costing model based on operation as opposed to capital expenditure. In this way, the business will benefit from higher elasticity and agility to react to potential turmoil or quick growth.

A catalog of infrastructure building blocks and support for multi-cloud environments

- Each business has its own best practices or individual policies for security or consumptions patterns. They want the **flexibility** for their team **to build and compose whatever IT asset they need to be agile**.

Basically, they want to build and dictate what their own curated cloud assets should be, a kind of "bring your own hybrid cloud" facility without being locked-in to one cloud environment. Customer curated assets should be made of any asset from any environment, from public cloud to on-prem assets without restrictions. They should be seen as one simple "construction" from a consumption model perspective.

- In addition, they also want to enforce their preferred policies. For instance, they may not want an object storage bucket asset to be created with direct internet facing capability. The service control plane must enable the enterprise to compose its own building blocks — even on top of other building blocks in an infinitely nested ladder of abstractions. At the same time, they need the ability to embed their corporate and security rules into each of these compositions to ensure they are followed by their IT teams.

Automation by design

- Being fully software driven means automating the complete infrastructure lifecycle, from onboarding to day-to-day consumption of services, composition and deployment of new hybrid cloud assets day 1 to decommissioning. **Zero human touch** is critical to ensure agility, low cost and 100% predictable quality of execution.
- Because humans are excluded from the execution of the actions, you can fully trust the quality of the data logging these actions, the assets being managed and their states.
- As AI increasingly becomes a more intrinsic part of the delivery tooling, enabling AI to interact with the IT ecosystem through the use of API is a prerequisite for leveraging the full value of AI.

Ensuring that metadata is accurate and up to date

This is a prerequisite for truly enabling real hyper-automation by design. All managed environments need to be tracked and accurately represented by a digital twin in your data repository. The **digital twin** represents your IT estate data, is always accurate and truly represents the current state of the world — not the desired state requested by a user of the infrastructure control plane. The heart of automation is in having a completely autonomous environment that works without human intervention to compare the desired state with the actual state and automatically perform the resolution actions to match both visions.

Benefits

- **Reduced cognitive load**
  Your team will be able to work with a simple, consistent consumption model across any environment, reducing the pressure and cognitive load imposed on them. Choose a service provider that offers a software-driven control plane with the mechanisms to integrate almost any of your existing IT ecosystems. This will enable you to hide the underlying complexity, enable quick adjustment and evolution of your own IT ecosystem and supercharge it with new capabilities. These include simplified interfacing with heterogeneous cloud environments and automatically maintaining a high-quality digital twin that accurately reflects the current state of your managed assets.
- **Empower citizen developers**
  When users are able to define their own asset templates to consume through the control plane, you gain the ability to integrate your preferred policies and security requirements into these blueprints. The result is greater flexibility and true citizen developers that can enjoy a simple-to-use, abstracted yet powerful, multi-cloud management tool to support your business applications.
- **Flexible costing model**
  Because software-controlled infrastructure is offered in a fully automated fashion with a SaaS like experience, you get an OPEX based costing model that is very elastic and agile and thanks to automation by design. By guaranteeing zero human intervention, it eliminates the human factor that is so often the source of errors and mistakes. All this at the absolute minimum cost and high predictability — which equates to quality.

> *"There's a lot of automation that can happen that isn't a replacement of humans, but of mind-numbing behavior."*
>
> Stewart Butterfield
> **CEO, Slack**

In business as in life, an inability to adapt and evolve to changing environments will invariably result in extinction. Adapting quickly requires agility, so how is it possible to be agile and generate the high-quality outcomes that we need, without blowing up the cost side of the equation? At Atos, we have been working to solve this problem, and below we will share our blueprint for success.

The Atos approach

Atos is working to deliver on our vision to expose infrastructure services through a **software-driven, API-first control plane** that enables multi-cloud asset orchestration and easy integration with any IT ecosystem using APIs and asynchronous event communications.

Our approach eliminates vendor lock-in, enables lifecycle management of multiple clouds and largely leverages open-source technologies to ensure sovereignty, portability and a path to long-term evolution.

Under the hood, human intervention is mostly removed, enabling very fast turnaround time, competitive cost and highly predictable results.

Atos enhanced programmable infrastructure service (EPIS) is exactly what its name describes: a framework of many services that makes your infrastructure service fully programmable. Users can take control and automation to a new level by managing software objects with a software-driven approach, opening the door to even greater potential by integrating AI and Generative AI as potential automation drivers.

The **Atos managed services control center (MSCC)** is the key application running inside EPIS, which is easily extensible and enables you to create your own hybrid cloud assets according to your requirements and policies.

These new offers are currently still in the Beta phase, but we are open to demonstrating their capabilities. We are excited to partner with forward-thinking enterprises willing to participate in the maturation of this exciting new world of managed services.

Conclusion

Businesses face many challenges driven by rapid technological evolution, including:

- **Adapting to disruptions:** Businesses must adapt to economic pressures and disruptive technologies like AI and cloud to remain competitive, requiring increased agility and flexibility.
- **Changing roles:** The role of IT has shifted from a centralized department to an integral part of business operations, focusing on agile digitalization efforts.
- **Changing expectations:** Businesses expect the IT function to provide new services and functionality with a flexible, cloud-like experience — no matter the underlying difficulty in delivering.
- **Increasing complexity:** Enterprise IT departments now operate a diverse range of environments, including on-premises, multiple hyperscalers and IoT, complicating IT service management.
- **Barriers to adoption:** Barriers to widespread adoption of new technologies include vendor lock-in, cognitive load of managing hybrid environments, data quality issues, and high total cost of ownership for home-grown solutions.

Ultimately, the role of IT should be to alleviate pressure on the business, not add to it. In order to make this a reality, IT must evolve to provide support through increased agility and automation.

We believe that a software-driven, hybrid environment, API-first approach to managing the IT ecosystem can overcome these challenges. This software control plane can effectively orchestrate multi-cloud deployments, reduce vendor lock-in and provide a flexible experience that maintains business continuity and compliance.

By virtually eliminating human intervention, it increases data quality and predictability, and paves the way for hyperautomation. It also delivers greater visibility and control, with a single interface for managing infrastructure, API access, SaaS consumption models, multi-cloud support and automation.

If you are interested in more, please contact us at atos.net/epis

About Atos

Atos Group is a global leader in digital transformation with c. 72,000 employees and annual revenue of c. € 10 billion, operating in 68 countries under two brands — Atos for services and Eviden for products. European number one in cybersecurity, cloud and high-performance computing, Atos Group is committed to a secure and decarbonized future and provides tailored AI-powered, end-to-end solutions for all industries. Atos is a SE (Societas Europaea) and listed on Euronext Paris.

The purpose of Atos is to help design the future of the information space. Its expertise and services support the development of knowledge, education and research in a multicultural approach and contribute to the development of scientific and technological excellence. Across the world, the Group enables its customers and employees, and members of societies at large to live, work and develop sustainably, in a safe and secure information space.

Find out more about us
atos.net
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Let's start discussion together

About the Future Makers Research Community (FMRC)

The Future Makers Research Community is a global network of our Future Makers - exponential thinkers and forward-looking technology thought leaders - across Atos.

Our Future Makers are united by profound curiosity, a strong growth mindset and a passion for shaping the future through exponential technologies applied in a deep industry context. We collaborate on thought leadership, (co)-innovation and R&D across all innovation horizons, and our ambition is to elevate organizations and drive lasting impact.

In close co-creation with our clients and partners, we deliver bold ideas and industry use cases, by anticipating trends and market needs that will reshape businesses and society.

Together, we're not just imagining the future — we're building it.

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