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Everything-as-a-service

Modernising the core through a services lens

MANY ORGANISATIONS ARE REORIENTING THEIR BUSINESS CAPABILITIES AND approaching business products, offerings, and processes as a collection of services that can be used both inside and outside organisational boundaries. But doing so means IT may need to revitalise legacy core assets by upgrading to the latest ERP platforms or refactoring aging custom code. Though sometimes-daunting undertakings, these and other legacy remediation efforts can help achieve short-term efficiency gains and cost savings, while laying the foundation for broader strategic shifts.

DURING the last decade, the one-two punch of business imperatives and a rapidly evolving technology landscape has led many CIOs to revitalise their legacy core systems.

On the technical front, after years of customisations, workarounds, and deferred upgrades, many heart-of-the-business systems that run back-, mid-, and front-office processes has become hamstrung by accumulated technical debt and dependencies. For many CIOs, refactoring these assets and building new architectures and platforms around them have been essential steps in making IT systems not only more efficient and effective but fundamentally more reliable.[1]

As for the business imperatives that often drive core revitalisation efforts, the pace of technological innovation continues to accelerate, offering ripe opportunities to rewire the way companies work, engage their customers and business partners, and compete. Globalisation, increased M&A activity, and cyber threats are putting pressure on IT ecosystems and delivery models. New digital products and offerings, along with powerful forces such as analytics, social media, and mobile, are giving rise to business models built around intuitive experiences and grounded in underlying mission-critical data, transactions, and systems.

Among the questions CIOs must answer: Can legacy core systems support these innovations and the strategies they drive? And are core assets sufficiently flexible and scalable to meet business needs going forward? For those CIOs answering "no," core revitalisation has provided a roadmap for approaching the core not as an anchor but as a set of customer-focused, outcome-driven building blocks that can support the business well into the digital age and beyond.

Today, a new business imperative is gaining traction in boardrooms and IT shops alike. Everything-as-a-service (XaaS) is a strategic and operational blueprint that, within the next 18–24 months, will likely begin upending business and operational models, and redefining the fundamental goals of core modernisation.

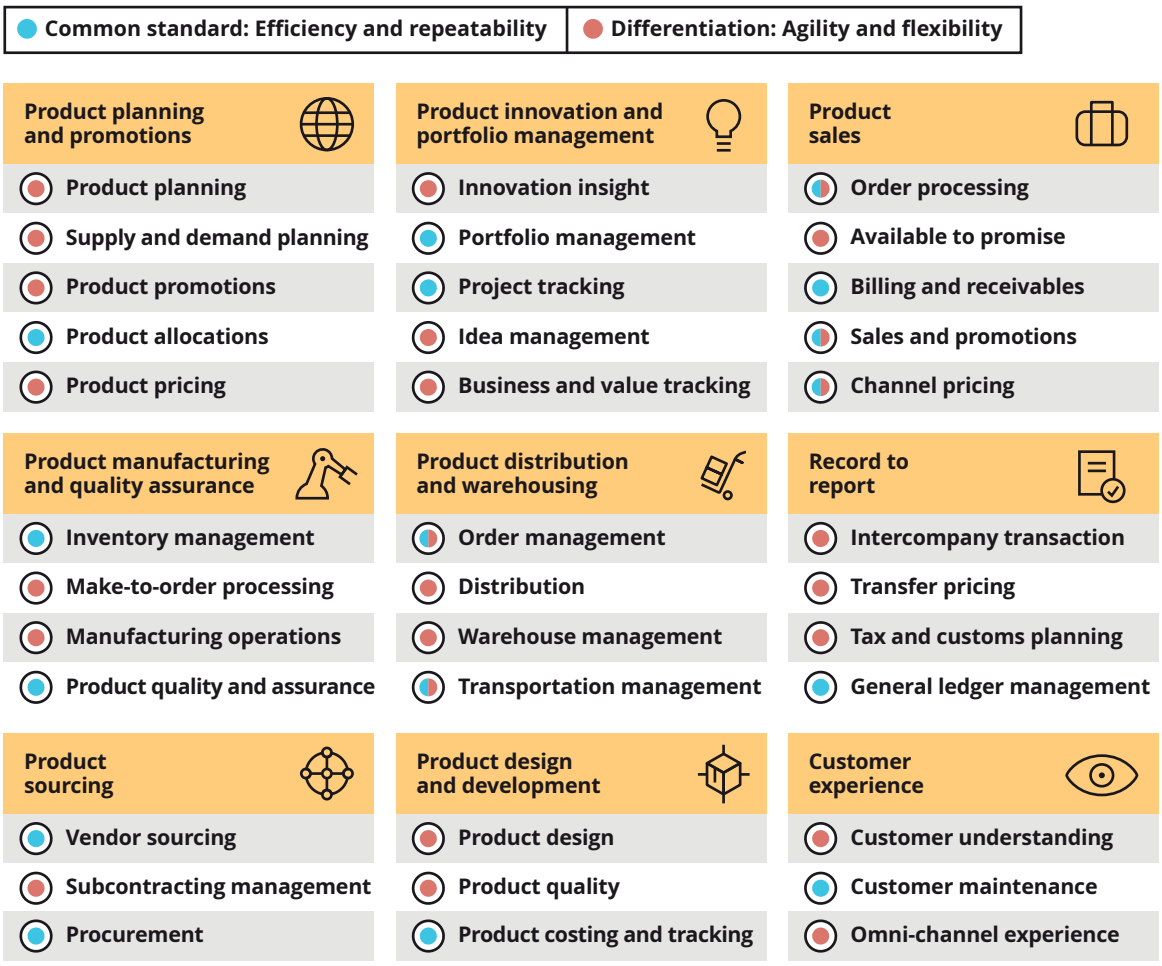
XaaS envisions business capabilities, products, and processes not as discreet vertical offerings operating

individually in silos but, rather, as a collection of horizontal services that can be accessed and leveraged across organisational boundaries. So with a few technical upgrades and strategically deployed APIs, the customer service module in your ERP system that is used exclusively to support external customers can now be leveraged by other departments as well: by IT for help-desk queries, by HR for internal customers, and by logistics for vendor support, for instance.

XaaS casts core modernisation in an entirely new light. What was primarily a technical process of overhauling legacy systems becomes a broader operational and business effort to create greater efficiencies and to engage customers, employees, and business partners in new ways. This effort also entails building a catalog of assets that embody existing IP and establishing platforms for ecosystem investments that can, in turn, lead to new products or even business models.

Figure 1. Redesigning business processes as services

In the high-value opportunities listed below, services defined as "common standard" represent compartmentalised, commodity business functions where repeatability and efficiency matter most. By treating these as services, organisations can expand sourcing options to include out-of-the-box ERP, legacy systems, BPO, or cloud offerings. Services defined as "differentiated" represent opportunities to drive competitive advantage by improving agility and operational flexibility.



For CIOs, XaaS may also offer a way to help justify essential if decidedly unglamorous investments to the board. In many companies, addressing reliability, security, and scalability challenges in legacy core systems is, from a technical perspective, essential. Unfortunately, those holding the purse strings often view core revitalisation as nothing more than plumbing upgrades that, at best, increase efficiency. However, when viewed through the lens of XaaS, core modernisation lies at the heart of business strategy: It involves shoring up the technical base to deliver efficiencies while rationalising complex redundant footprints, reducing licensing commitments, and most importantly, allowing redeployment of IT operations resources. Ideally, those cost savings would then be used to fund innovation and business growth initiatives.

XaaS and the customer

What's driving XaaS? And why now? In short, customer expectations of ownership, service, and access are evolving rapidly. In what some call the "Uberised economy," individual consumers and companies alike are embracing a new consumption model in which little or no friction exists between desire and the satisfaction of need. For example, ride-sharing services such as Uber and Lyft offer transportation-as-a-service, making it possible for individuals to get from point A to point B quickly, efficiently, and, perhaps most importantly, without the operational expense associated with owning a car. With ride-sharing, secondary and complementary activities are delegated to someone else.[2]

Now, apply this same model to enterprise IT. Like the individual who wants to get to a destination easily, affordably, and without having to buy a car, employees, business partners, vendors, and even customers all want easy, frictionless access to critical services that someone else supports and maintains.

For IT, that could mean sourcing some capabilities from cloud services vendors. Notably, it could also mean extending IT services to regional operations or newly acquired assets, or beyond organisational boundaries for use by customers, business partners, and even competitors. We're already seeing XaaS use cases—and success stories—emerge in various industries. Retail giant Amazon, for example, has taken the internal services it was using in its e-commerce operations and extended them to customers outside the Amazon organisation for use in their own businesses. Customer service, financial services, fulfillment, warehouse systems—the company has monetised commonly used business services by making them available, for a fee, for customers, competitors, or other third parties to use.[3] Recently, it was reported that the company is laying the groundwork for its own shipping business that would compete with UPS, FedEx, and the US Postal Service. Not only would this business deliver Amazon's parcels—it could be made available in a B2B model for other retailers to use as well, a strategy that CIOs could potentially use to help offset core revitalisation costs.[4]

Similarly, General Electric, a company synonymous with manufacturing, is pursuing multiple XaaS opportunities by wrapping data, analytics, and digital solutions around traditional offerings and making them available to customers as services. For example, building on its storied history as a lightbulb manufacturer, GE has created a cloud-based energy-as-a-service business that helps customers monitor and optimise their energy consumption using sensors embedded in LED bulbs.[5]

To be sure, these and similar early use cases are pioneering initiatives undertaken by companies with specific needs and well-defined, long-term business and IT strategies. For many companies, however, the process of transitioning to an XaaS model will likely begin around the organisational edges and progress incrementally over the coming years. In this more cautious approach, layering application programming interfaces (APIs) on top of complex legacy systems makes it possible for companies to reuse, share, and monetise core assets and data as they explore XaaS opportunities. Deploying APIs in this strategic way can help extend the reach of existing services and, potentially, enable new revenue streams. Such opportunities are currently driving API use.[6] According to MuleSoft's second annual *Connectivity Benchmark Report*, of 802 IT decision makers surveyed, 56 percent already

had an API strategy for accomplishing goals such as these.[7]

Of course, it's not enough just to build APIs. They introduce an entirely new set of capabilities not typically part of traditional middleware or integration scenarios, and CIOs need to consider deliberate approaches for designing, exposing, contracting, servicing, metering, and billing based on API usage. Fulfilling a function similar to that of OSS and BSS-esque supporting services in middleware scenarios, API management is a critical piece of the burgeoning API economy.[8]

The XaaS road ahead

CIOs and business leaders can begin their XaaS journeys by answering the following questions:

What can everything-as-a-service do for your business? Viewing business models, processes, and strategies through an XaaS lens may illuminate entirely new opportunities to grow revenue and drive efficiency. For Salesforce.com, those opportunities began with hosted CRM. For Amazon, it was subscription-based data storage in the cloud. Bringing these opportunities to fruition may require that you overhaul some legacy systems and reimagine your operations and the way you engage customers. The good news is that there are core modernisation techniques that can help you extract more value from legacy assets while laying the groundwork for a service-oriented future—from replatforming to remediating to revitalising.

How can XaaS transform the way your employees work? Think about how your employees currently do their jobs. What departmental or task-specific systems do they rely upon? What processes do they follow, and how does your operational model help or hinder them as they work? Then, imagine those same systems, processes, and operating models as services that are no longer siloed by task or department. Instead, they are horizontal, extending across organisational boundaries for use by internal and external customers, business partners, and suppliers, among others. What opportunities can you identify?

What new products and service offerings can XaaS enable? XaaS is as much a mind-set as it is a strategic and operational vision. It helped Amazon and GE identify and then pursue bold, new opportunities that lie outside of their traditional business models. Amazon monetised its own internal services by extending them to customers. GE is evolving from a manufacturer of goods to a purveyor of business outcomes. Clearly, the degree to which both of these organisations have transformed their core businesses will not be appropriate for every company. But even on a smaller, more focused scale, what products do you offer that could manifest as services? What operational verticals could take on new life as horizontals?

In the coming months, as more CIOs and business leaders find answers to these questions, they will have opportunities to redraw boundaries that have traditionally informed their strategies and goals. Indeed, through the lens of XaaS, entire marketplaces may begin to look less like crowded, hypercompetitive arenas and more like blank slates upon which imaginative new rules of competition can be written.

Reaching for the clouds

Global semiconductor company Broadcom Ltd. is transforming its core infrastructure by providing business offerings and processes as a collection of services to employees and, more recently, to customers.

During the last two decades, the Broadcom organisational structure and IT environment have grown and morphed due to a series of mergers and acquisitions. In response, vice president and chief information officer Andy Nallappan began exploring ways not only to mesh and optimise legacy systems, but to make the systems more efficient, user-friendly, and attuned to business needs. "I wanted to liberate the IT organisation from the mundane tasks that don't add much value so they can focus instead on projects that drive growth and profitability and make our company unique in the marketplace."

With these goals established, Broadcom—then called Avago Technologies—began its XaaS journey in 2009 by transitioning from a legacy on-premises email platform with limited storage capacity to a cloud-based productivity, collaboration, and storage solution. At that time, the solution vendor was only beginning to make its mark in the enterprise space. Consequently, as an early adopter, Broadcom enjoyed an unusual degree of access to the vendor's product roadmap and architectural plans for the tools being implemented. Likewise, Nallappan and his team were able to collaborate closely with the vendor's senior developers, project managers, and other product leaders during implementation. The end results were encouraging: Data storage capacity improved while overall management costs, in terms of budget and time, declined.

Since its initial XaaS foray, Broadcom has deployed:

- A single sign-on that crosses Broadcom's hybrid landscape—from on-premises ERP to its suite of cloud services
- A cloud-based security suite to ensure all employee devices are secure no matter where they are being used
- A cash management service that makes it possible for the CFO to view a complete picture of the company's transactions, revenue, and cash flow from a tablet device
- A cloud-based HR suite that consolidates HR services such as staffing, learning, and benefits and extends them, uniformly, across the enterprise
- An internal IT service desk platform that has recently been deployed as an external customer-facing service as well

These new systems and service-based approaches allow Broadcom to scale up quickly as the organisation grows. They also help the company

realise acquisition-related cost synergies more quickly, which supports overall acquisition goals.

Nallappan says he looks forward to a day when he won't need to operate any on-premises systems at all and can source everything externally. This day, he acknowledges, may not arrive in the near term. "I don't go to the cloud just because it's cool; it has to make financial sense," he notes. "Not all the pieces we need are available in the cloud yet, but when that time comes, we'll move."[9]

Java-based services transform IT architecture at the IRS

With its development and deployment of a new services-based data processing solution, the Internal Revenue Service is making early progress on its everything-as-a-service journey—one that is already delivering cost savings and operational efficiencies.

Processing an estimated 3 billion tax forms each year is no small task—one made more challenging by the sheer variety of forms the IRS uses. Traditionally, if the agency created a new family of forms, IT would develop and deploy a new solution to process them. "This was an inefficient way to enhance our processing capabilities," says IRS manager Irene Soter, who leads a team of Java developers and contractors currently working to modernise the agency's information return processing systems. "Very little was reusable."

With new forms being introduced as part of the Patient Protection and Affordable Care Act (ACA), agency IT leaders decided to take a different approach. From a data perspective, the ACA forms would be more complex than many existing IRS forms such as the 1099 or the W-2, with more questions to answer and fields to fill in. It became clear that to process ACA data, the IRS would need to create new scanning and data analysis capabilities that could determine: whether a submitted form had been filled out completely; if there was any evidence of fraud; or if the submitted information was ambiguous, and if so, what the submitter's intent actually had been.

IT leadership recognised that the capabilities needed for ACA form processing would be useful in other development projects and with future forms and decided to take a services-based approach to the ACA form design and development. The team charged with building what would become known as the Information Returns Processing system faced a hard deadline of January 2016 to stand up these new service capabilities. Using agile techniques, the team began developing reusable Java-based data processing services that would deliver validated data to a modernised information return database, which was also being developed.

The first release was slated to include three services but instead delivered nine, on time and within budget. These reusable services also started to accelerate other deliveries: "As we began making progress, other IT and business partners began reaching out and asking how they could access these services," Soter says.

Moving forward, the IRS will work to expand its service offerings and transform its IT architecture to be more flexible and services-based. This also includes an expanded focus on continuous service improvement: for instance, fine-tuning the Information Returns Processing platform as data volumes increase and more services are deployed. "Tuning to volume is always the issue when you are dealing with this much data," Soter says. "Managing the larger scale and providing visibility into individual service performance will be the trick. We will be relying on our team of highly talented developers with experience in how to handle the volume, how to tweak it, and how to step it up."[10]

Out with the old

Several years before changes in capabilities, products, and processes began coalescing into what is now recognised as the everything-as-a-service trend, Cisco Systems sensed a change in the operational winds and took action. The global technology products and services provider launched a multifaceted architectural and operational initiative to break down silos, deploy and leverage technology more effectively, and align IT services with both customers and the business.

"This is an ongoing transformation effort," says Will Tan, Cisco's senior director of operations. "We have 30 years of mind-set to overcome, but today, what we provide are services, and we need to create an organisational construct to support that."

Cisco's move to the as-a-service model began by examining the company's operations through a product and positioning lens, especially in the area of cloud offerings. "We realised that we needed to rethink the way we were working, how we thought about value streams, and the way we organised ourselves," Tan says. "Likewise, we began reviewing the relevance of our architecture to determine what kind of connectivity we need to meet our [XaaS] goals."

So, roughly six years ago, Cisco took a first—and fundamental—step in its transformation journey by creating a single, uniform taxonomy that would clearly define the company's services, the architectural components that support them, and, importantly, how these components fit together. Dubbed BOST (the business operations systems and technology stack), this working taxonomy has helped break down functional silos by ensuring that all groups approach services and services architecture consistently.

Following this initial step, Cisco identified two major goals that would drive its transformation efforts going forward:

Business alignment of IT capabilities: Cisco has worked aggressively to align IT with the business units' missions and operations—reorienting all IT operations so they "lead with a business view." IT now organises its priorities by the business's strategic and operational priorities, measuring success not just by isolated performance of IT disciplines but by business outcomes.

Anchor IT with a services mind-set: IT capabilities began to be defined by the value they were creating, decoupling the underlying technical skills, activities, and solutions from the overarching business services driving growth and demanding flexibility and agility. This meant the IT operating model and organisation had to evolve, along with the underlying technical architecture up, down, and across the stack.

Some companies view XaaS exclusively as a means for controlling costs and creating efficiencies. Cisco sees an equally compelling opportunity to rethink the way it engages and understands customers—and to shift its mind-set to how its ecosystem of supply chain and channel partners think about their customer outcomes.

Though Cisco's XaaS journey is ongoing, the company's efforts are delivering tangible benefits, with IT costs coming down and processes becoming more streamlined. And Tan cites other welcome outcomes. "A couple of years ago, we transformed our ERP system into a global platform that consolidated core financials and supply chain. IT has built services that have become global standards, which have helped us scale for the future," he says. "As we have expanded into China and India, we have leveraged this platform not just for cost containment but to accelerate our time to market and to offer *business* services more effectively."[11]

MY TAKE

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The Department of Industry, Innovation and Science's XaaS program has been focused on reducing legacy systems and transforming our digital services to better support both internal users and Australian small and medium sized businesses.

Today, the Department delivers a number of significant XaaS platforms, including a large CRM system, one of two whole of government grants management platforms, the business.gov.au website and a range of associated internal and external web services.

To deliver the transformation, we firstly worked on reducing our legacy debt to free up resource capacity. We gained support to simplify services back to a smaller future-proofed product set, supported by a range of tools to meet business outcomes. We then adopted a collaborative position with our internal clients to define the problem and develop solutions based on that rationalised product set.

> "ACCELERATION OF THE USE OF CLOUD IS EXPECTED IN LINE WITH GREATER UNDERSTANDING, TRUST AND PUBLIC ACCEPTANCE"

This allowed us to focus on building deeper expertise across the smaller set of highly flexible and supportable products, instead of being drawn across a broader range of products at much more shallow expertise level.

Central to the approach was the need to simplify core services and leverage advances in cloud technology. As we operate in a classified information environment, we focused on a hybrid cloud implementation model. The first candidates were outward-facing services to Australian businesses. We implemented a competitive partner model for a large quantity of projects that retained our delivery partners. We also worked with our partners to adopt agile delivery methods and used their teams to augment our internal resources as we built in-house capabilities.

The scale of the reform has been significant. Business Registration Services is one of the Department's largest products, enabling a fast, seamless business registration from multiple agencies. VANguard, the Government's digital authentication service broker, manages over 140 million transactions a year and authenticates transactions between 65 unique entities with 70 other online services. The Department's reform of business-facing services to deliver an omni-channel, agile series of products and services has been the catalyst for changes across both business areas and IT.

Balancing challenges with benefits

Perhaps the biggest change has been the central consolidation of the Department's 'IT shop'. Our team is now faster to market, can test and deploy new services faster, can remove reliance on some of the traditional upgrade roadblocks more effectively and is more closely aligned with business outcomes.

A key advantage has been that by using XaaS or software-as-a-service, it enables an upgrade path where you are paying for upgrades as you go. Our philosophy has also now changed from: "Why should it go to cloud?" to "Why shouldn't it go to cloud?"

A hybrid environment of in-house and cloud services is required because of the need to manage classified information, though this does create challenges with in-house technology keeping pace with the cloud upgrade paths. The transformation has also increased the in-house skills required, so an investment in skills has been pursued.

We have proven that we can integrate a seamless offering from multiple vendors. Our experience in is being shared with other departments, and so benefits from scale will continue to develop as the market matures.

Considerations for Government CIOs

In providing digital services to government, efficiency and speed-to-market remain important but we also need to observe the regulatory environment requirements. We often need to grapple with jurisdictional boundaries and have the additional factors of the Protective Security Policy Framework, data sovereignty and mandatory privacy controls to respond to.

We are accountable to citizens and Parliament which means that all spending is under scrutiny. As a result, government departments need to be more cautious than the private sector, and this can make adoption slower. Change is not impossible though: for example, we expect to see acceleration in the use of cloud as public acceptance grows and we build on our early successes. The 'start small, prove the technology and then grow' model has worked well and is allowing scaling up to be done at a lower risk profile than previously.

Primary ownership of some projects are owned by states and territories or local government, so my team plays a connecting and facilitative role to help drive more competitive businesses in Australia. We are now taking an 'API centric' approach, where the Department publishes APIs and lets them be consumed by agencies and the public. This is forming the basis of the first wave of government trying to simplify the business landscape.

One measure of our success is the number of enquiries we are getting from other departments about our transformation journey. Our end-user focus means we have programs that offer agile delivery and can work with multi-disciplinary teams to help them.

Government CIOs embarking on a XaaS journey must have a clear understanding of how the plan ties to business value and the customer outcomes, and on talent management and how to leverage external vendors. They also should not be afraid to challenge the status quo.

The feedback has been very positive: we are now operating in an environment based on greater trust, understanding, honesty and willingness to collaborate.

The end product is selling itself, which is extremely rewarding.

As companies begin evolving their traditional products, processes, and business capabilities into services that can be used both inside and outside organisational boundaries, it is important that the services they will be consuming or exposing have sufficient trust and security capabilities embedded, that application programming interfaces are secure, and that data verification and storage capabilities are trustworthy.

XaaS initiatives offer CIOs the opportunity to build new trust, risk management, and security capabilities into systems and processes during the earliest stages of development. But the XaaS model itself, in which discrete products and processes can be transformed into horizontal services that span the enterprise and beyond, may also offer an opportunity for CIOs to reimagine their basic approaches to risk and security. For example, would it be possible to approach risk as a collection of uniform services? Moreover, could some of these uniform services—for example, threat intelligence or identity management—be sourced externally?

Think about the potential efficiencies to be gained by deploying standardised "authentication-as-a-service" or "data validation-as-a-service" capabilities both internally and externally. Not only could this reduce redundant processes that have a long history of irritating users ("please enter your password again and again and again . . .")—it could create a single risk or security service that could simplify maintenance and speed development.

> "ARE THERE AREAS OF WEAKNESS WITH HIGH DEPENDENCIES THAT PUT EITHER YOUR ORGANISATION OR ITS PROJECTS AT RISK?"

In another example, are there areas of weakness with high dependencies that put either your organisation or its projects at risk? Perhaps a chronic shortage of skillsets in a specific area consistently slows down development initiatives or delivers subpar outcomes? Assessing this challenge through the XaaS lens, you may be able to identify nontraditional approaches to deploying talent resources—think engineering skillsets-as-a-service—that can simultaneously lower project and operational risk while utilising IT talent assets more efficiently.

Finally, in a loosely coupled environment that blends legacy systems and externally sourced capabilities, risk, trust, and security capabilities and processes will likely be more effective when they can be managed holistically. Particularly in the critical areas of data exchange and storage, the ability to take a unified, consistent approach to risk and security becomes critical to maintaining data integrity.

Where do you start?

The next step in reimagining core legacy systems involves reorienting from systems to services. No matter the size of your organisation, transitioning from end-to-end processes to a sequence of discrete services can be a complex undertaking. To get started—and to make the effort more manageable—consider the following approaches:

- **Reimagine current offerings as services:** Review your current systems and product offerings, and imagine how recreating them as services could expand or accelerate your business model. Opportunities may include carving out pricing, inventory, or logistics transactions that are deeply embedded in legacy systems and allowing other lines of business, digital experiences, or even external players to tap these core capabilities. Customer-related services that help users access account details, transaction history, and customer preferences also make promising candidates. Likewise, don't overlook internally focused services such as user authentication, access, and entitlement checking—all core functions that are too often replicated across systems and solutions. The most exciting opportunities might be services that could form the backbone of new products, services, or offerings. For example, exposing and potentially monetising IP such as data feeds, analytics models, or even business processes could have commercial value outside of your organisation's walls.
- **Start on the edges:** When moving to a services-based platform, start by taking small bites around the edges—an inventory tracking system or a customer help desk, for example—rather than tackling an ERP system right out of the gate. By transforming your front office or cash management system, you can methodically deploy each new service in a more manageable pilot program. From there, you can build upon each to link services throughout the enterprise and eventually offer them to the market. Remember this rule of thumb: Migrate first, then modernise. Starting with baseline services may provide the foundation you'll need to create more new services.
- **The five Rs:** The first step in reimagining core systems involves anchoring the technical journey in business imperatives. When thinking through the actual implementation path, there are several techniques that can help transform your legacy system, whether through an incremental upgrade or a radical modernisation:
  - **Replatform:** Enhance platforms through technical upgrades, software updates, or migration to modern operating environments.
  - **Revitalise:** Layer on new capabilities to enhance underlying core processes and data, focusing on improving usability for both customer and employee engagement.
  - **Remediate:** Address internal complexities of existing core implementation with "instance consolidation," master data reconciliation, integration, and/or rationalising custom extensions to packages to drive digital solutions.
  - **Replace:** Introduce new solutions for parts of the core, which may mean adopting new products from existing vendor partners or revisiting "build" versus "buy" decisions.
  - **Retrench:** Once you weigh the risks and understand the repercussions, doing nothing may be the strategic choice that allows you to focus on higher-impact priorities.
- **Acquire different skillsets:** IT will likely need new skillsets as it moves from traditional systems and processes to the new world of API management and cloud-based services. While you may be able to retrain some of your legacy talent, consider adding team members with a few battle scars from having worked in an XaaS environment. Everything-as-a-service actually represents a cultural and mind-set change more than a technical shift. Experienced engineers, designers, and other IT talent who have thrived in an XaaS culture can often serve as stem cells

for change in more traditional IT organisations. You can also maximise the effectiveness of new talent by deploying autonomic platforms[12] to speed development of new services and automate low-level tasks. This, in turn, can free your team to focus on higher-priority goals.

- **Shore up your foundation:** Once you've identified services to build and deploy, determine whether any are foundational systems you'll need to overhaul as part of the transition. A change to one element of an IT ecosystem can affect workflow, security, and integration across the enterprise, so it is critical to understand how a new service fits into the overall architecture.

Bottom line

Transforming existing business products, processes, and legacy systems into a collection of services that can be used both inside and outside the organisation can help streamline IT operations and, potentially, generate new revenue streams. Pursued incrementally, an everything-as-a-service strategy can also cast core modernisation in a new light: What was primarily a technical process of overhauling legacy systems becomes a broader operational and business effort to create greater efficiencies and to engage customers, employees, business partners—and maybe even your market—in new ways.

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