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Oracle Perspective

Tech Trends 2018

The symphonic enterprise

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Introduction

THE renowned German conductor Kurt Masur once noted that an orchestra full of stars can be a disaster. Though we have no reason to believe the maestro was speaking metaphorically, his observation does suggest something more universal: Without unity and harmony, discord prevails.

Many companies competing in markets that are being turned upside down by technology innovation are no strangers to discord. Today, digital reality, cognitive, and blockchain—stars of the enterprise technology realm—are redefining IT, business, and society in general. In the past, organizations typically responded to such disruptive opportunities by launching transformation initiatives within technology domains. For example, domain-specific cloud, analytics, and big data projects represented bold, if single-minded, embraces of the future. Likewise, C-suite positions such as "chief digital officer" or "chief analytics officer" reinforced the primacy of domain thinking.

But it didn't take long for companies to realize that treating some systems as independent domains is suboptimal at best. Complex predictive analytics capabilities delivered little value without big data. In turn, big data was costly and inefficient without cloud. Everything required mobile capabilities. After a decade of domain-specific transformation, one question remains unanswered: How can disruptive technologies work together to achieve larger strategic and operational goals?

We are now seeing some forward-thinking organizations approach change more broadly. They are not returning to "sins of the past" by launching separate, domain-specific initiatives. Instead, they are thinking about exploration, use cases, and deployment more holistically, focusing on how disruptive technologies can complement each other to drive greater value. For example, blockchain can serve as a new foundational protocol for trust throughout the enterprise and beyond. Cognitive technologies make automated response possible across all enterprise domains. Digital reality breaks down geographic barriers between people, as well as systemic barriers between humans and data. Together, these technologies can fundamentally reshape how work gets done or set the stage for new products and business models.

The theme of this year's *Oracle Perspective Tech Trends 2018* report is the *symphonic enterprise*, an idea that describes strategy, technology, and operations working together, in harmony, across domains and boundaries. This is the second edition of our report, and in a way, it represents the culmination of our efforts to examine the powerful technology forces that are remaking our world. The trends we discussed in the past, such as digital, cloud, and analytics, are now embraced across industries. Meanwhile, more recent trends, such as autonomic platforms, machine intelligence, and digital reality, continue to gain momentum.

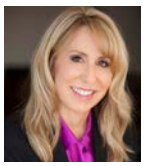
This year, we invite you to look at emerging technology trends from a different angle. When technologies act in unison, we no longer see the enterprise vertically (focused on line of business or isolated industries) or horizontally (focused on business processes or enabling technologies). In the symphonic enterprise, the old lines become blurred, thus creating a diagonal view that illuminates new business opportunities and creative ways of solving problems. Consider this scenario:

IoT sensors on the factory floor generate data that supply chain managers use to optimize shipping and inventory processes. When supply chain operations become more efficient and predictable, finance can perform more accurate forecasting and planning. This, in turn, allows dynamic pricing or adjustments to cash positions based on real-time visibility of operations. Indeed, the two functions begin sharing investments in next-generation Oracle Cloud ERP, the Internet of Things, machine learning, and RPA. Together, finance and supply chain functions shift from projects to platforms, including powerful capabilities in Oracle's PaaS and IaaS service offerings. Meanwhile, business leaders and the C-suite are increasingly interested only in strategy and outcomes, not the individual technologies that drive them. Does the convergence of finance and supply chain really seem so unlikely?

Of course, some domain-specific approaches remain valuable. Core assets still underpin the IT ecosystem. Cyber and risk protocols are as critical as ever. CIO strategies for running "the business of IT" are valuable and timeless. Yet we also recognize a larger trend at work, one that emphasizes the unified "orchestra" over individual advances in technology.

Together with Oracle, Deloitte has been investing in platform-centric thinking and solution offerings, which drive comprehensive solutions and break down siloed implementations.

We hope this latest Oracle Perspective of Tech Trends helps you develop a more in-depth understanding of technology forces at work today. We also hope it can help you begin building a symphonic enterprise of your own. Beautiful music awaits.



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Reengineering technology

Building new IT delivery models from the top down and bottom up

With business strategies linked inseparably to technology, leading organizations are fundamentally rethinking how they envision, deliver, and evolve technology solutions. They are transforming IT departments into engines for driving business growth, with responsibilities that span back-office systems, operations, and even product and platform offerings. From the bottom up, they are modernizing infrastructure and the architecture stack. From the top down, they are organizing, operating, and delivering technology capabilities in new ways. In tandem, these approaches can deliver more than efficiency—they offer the tools, velocity, and empowerment that will define the technology organization of the future.

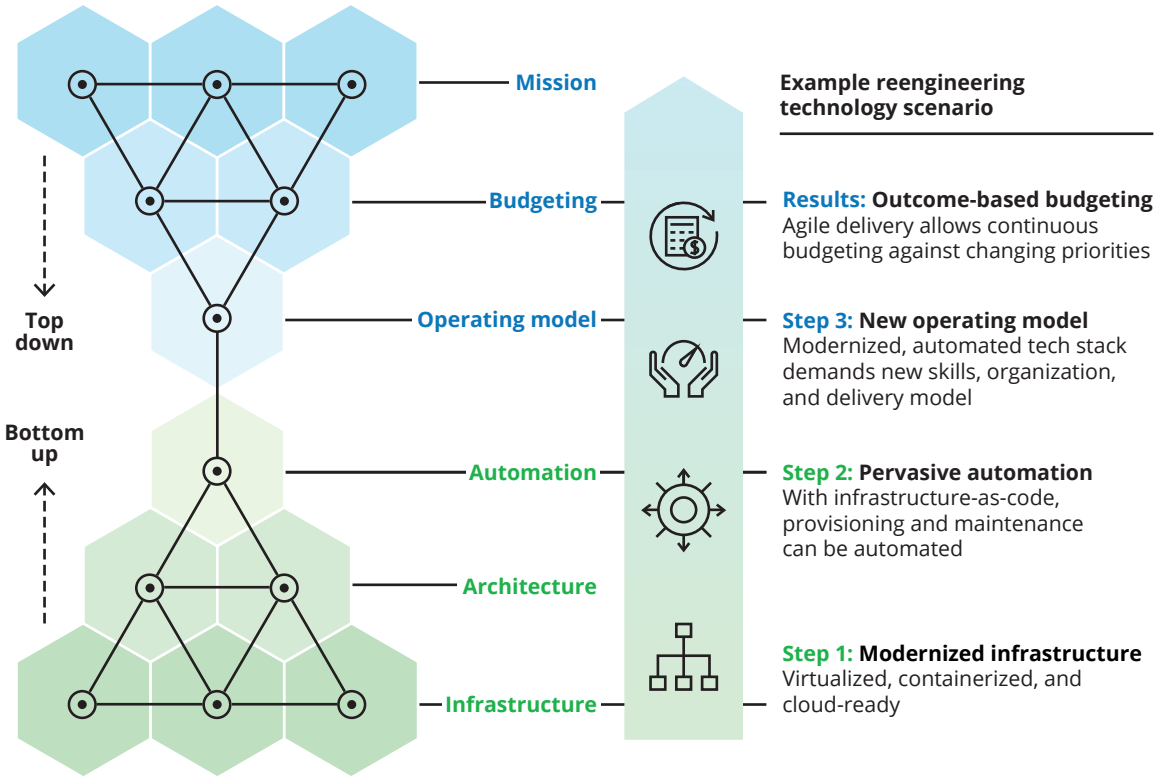
As a growing number of CIOs and enterprise leaders are realizing, adapting incrementally to market shifts and disruptive innovation is no longer enough. At a time when blockchain, cognitive, and digital reality technologies are poised to redefine business models and processes, IT's traditional reactive, siloed ways of working cannot support the rapid-fire change that drives business today. With technology's remit expanding beyond the back office and into the product-management and customer-facing realms, the problem is becoming more pressing.

For years IT has faithfully helped reengineer the business, yet few shops have reengineered themselves with the same vision, discipline, and rigor. That's about to change: Over the next 18 to 24 months, we will likely see CIOs begin reengineering not only their IT shops but, more broadly, their approaches to technology. The goal of these efforts will be to transform their technology ecosystems from collections of working parts into high-performance engines that deliver speed, impact, and value.

Reengineering approaches may vary, but we expect to see many CIOs deploy a two-pronged strategy. From the bottom up, they can focus on creating an IT environment in which environment is scalable and dynamic, and architecture is open and extendable. Importantly, automation (driven by machine learning) will likely be pervasive, which can accelerate the processes of standing up, building on top of, and running the IT stack. These principles are baked into infrastructure and applications, thus becoming elemental to all aspects of the operation. From the top down, CIOs and their teams have an opportunity to transform how the shop budgets, organizes, staffs, and delivers services (see figure 1).

Figure 1. Two-pronged reengineering technology approach

Top-down capabilities are amplified by a revamped bottom-up architecture, and bottom-up efficiency gains become more strategic and impactful when coupled with top-down transformation.



Source: Deloitte analysis.

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The *reengineering technology* trend is not an exercise in retooling. Rather, it is about challenging every assumption, designing for better outcomes, and ultimately, creating an alternate IT delivery model for the future.

Oracle perspective

Moving to the cloud is an enabler of new IT delivery models

Cloud-based enterprise applications are striding ahead to deliver strategic business value, beyond the traditional role of "keeping the lights on." Cloud, in the truest sense, can enable the *reengineering of technology.*

The model as applied to Oracle Cloud:

Reengineering from the bottom up

Step 1: Modernized infrastructure. Cloud offers platforms for enterprise applications that are modern and virtual with a flexible, underlying architecture model. Enterprise-grade infrastructure, including engineered systems, is rapidly available on the cloud and scalable to shrink or grow with demand. In a competitive landscape that is being redrawn continuously by technology disruption, time-to-market can be a competitive differentiator.[1] Using the "cloud-first" approach to infrastructure allows IT to be agile and make better use of its budget through automation, pay-for-what-you-use consumption-based pricing, and a reduction of much of the effort previously expended on maintenance.

Step 2: Pervasive automation. Automation is often a primary goal of companies' reengineering efforts. On paper, adjusting only the IT backbone sounds simple, but it would not derive the most value from a cloud solution. Automation requires core strategic commitment and a new transformation thought process to achieve results. Now is the time to focus on driving automation through the cloud. Cloud currently offers a few automation functionalities, with new capabilities being added via ongoing updates and releases. A cloud-based enterprise application system also has automation opportunities throughout its life cycle including provisioning, testing, deployment, and operation, as well as large-scale autonomic platforms that are self-monitoring and self-learning. Cloud has enabled self-service platforms across all functions of an enterprise including anything that is workflow-driven, repetitive, or policy-based and requires reconciliation. These are the core areas that IT departments need to reevaluate. Previously, IT departments focused on the application and IT architecture itself—specifically how analysts customize the technology to fit business processes, sometimes without challenging why things were always done a certain way. With cloud, IT departments need to shift their focus away from making changes to the ERP, and instead focus on layering on automation. Applying new technologies to automate tasks will help workers handle increasingly complex workloads.[2]

Reengineering from the top down

Step 3: New operating model. Cloud is fundamentally different from legacy on-premises solutions; therefore, it requires a new operating model. Cloud limits customizations, requires the uptake of quarterly releases, and reduces the footprint of boundary applications. From a team structure perspective, going to the cloud is an opportunity to reorganize teams and break down silos. For example, limited customizations lead to a reduction in the need for custom developers, while cloud-hosted infrastructure means fewer database administrators and infrastructure specialists. Moreover, business and IT continually need to break down functional silos, such as product owners and scrum teams collaborating to build prototypes during a digital transformation. The idea that within an organization there are people who understand technology and others who understand business is no longer valid. Technology now lies at the core of the business, which is driving enterprise talent from all operational areas to develop tech fluency.[3] Therefore, it is now critical to fully develop a global process owner (GPO) organization. To take advantage of quarterly cloud releases, for example, a strong GPO can provide process governance, driving continuous innovation and instilling confidence in the changes.

For large, complex, global enterprises, it may be challenging to reinvent your IT shop all at once—why not proof it out during your cloud implementation by using agile approaches and design-thinking principles? From a systems operation perspective, a key approach to reengineering technology is to target the technical debt. Technical debt isn't simply the result of poor code quality or shoddy design. Often, it's the end product of many decisions made over time—actions individually justified by their immediate ROI or the needs of the project. When re-platforming, cloud limits customizations, which, in turn, limits new technical debt. Using intuitive human-centered design principles will also avoid incurring technical debt. Cloud reduces the footprint of boundary applications and provides an opportunity to cut existing technical debt, which can have a positive impact on your bottom line.

Step 4: Outcome-based budgeting. Cloud-based enterprise applications are leaning toward a new budgeting strategy where the focus is not on increasing or reducing the technology budget, but instead on the specific outcome of the project. The new budgeting model follows a 70/20/10 rule: 70 percent of the budget is for fixed project work such as adding supply chain scope to an existing cloud finance baseline; 20 percent of the budget is dedicated to quarterly releases and changes; and 10 percent of the budget is earmarked for innovation in emerging technologies such as robotic process automation. The three key drivers for the new operating model also lead to this new way of budgeting:

- Cloud limits customizations, which renders the old approach obsolete because it leaned heavily on estimating the effort of customizations.
- Cloud has quarterly releases, which drives the need to be agile and flexible with line items in the budget, because the system functionality evolves during the typical yearlong budget cycle.
- Cloud removes boundary applications, which frees up budget to invest in innovation.

Results: Guiding and inspiring. If cloud is done right, IT has the unique opportunity to contribute its view to the bigger picture, as business leaders and strategists prioritize their technology wish list and IT becomes a strategic function rather than an operational one.

Oracle perspective

Use cases

REORGANIZING INTO VALUE STREAMS

A leading global retailer reorganized its IT department based on the principles of reengineering technology. In the past, the organization operated by discipline-based divisions such as infrastructure, application administration, technical support, functional support, and custom development. Deploying a new capability for finance involved negotiating with division leaders for resources and passing approved tasks from team to team. This resulted in delays, miscommunication, and rework.

As the retailer ramped up for its cloud-enabled digital transformation, it reorganized into cross-discipline teams called "value streams." For example, the Finance value stream would handle the full end-to-end delivery of a finance solution. The appropriate resources and the handoffs between those resources would all be managed by the Finance value stream. Team members representing infrastructure, app admin, functional, technical, and support functions are colocated physically, report to the same management team, and work seamlessly together to deploy finance capabilities. The results of breaking down old silos and streamlining IT operations have been staggering in terms of productivity.

In addition, by transitioning the infrastructure to the cloud, this retailer reduced infrastructure and operation roles and the corresponding costs. Fundamentally, there was also a philosophy change from "tech support" to "continuous improvement." This organization reduced the steps in its approval of system change requests (i.e., software customizations) and reinvested the cost into end-to-end process optimization via a global process owner (GPO) organization.

Its budgeting process also followed the principles of reengineering technology. The team no longer focuses on budgeting for discrete tasks but instead sets aside funds to support the GPO; it now evaluates the outcomes based on productivity improvement. For example, $5 million was set aside to achieve $10 million in operating-cost reduction without line-item details of how the budget would be spent. Furthermore, it set aside a small innovation budget with no expectations of short-term ROI; instead this leap of faith will be judged by the new capabilities it establishes for the retailer. While the jury is still out on long-term results, the short-term results have been impressive in terms of cross-discipline productivity gains and morale boost. The focus on business results has also boosted the company's bottom line. In addition, teams are expanding their capabilities and innovation.

Oracle perspective

Use cases

FROM SOLVING TICKETS TO DRIVING INNOVATION

A large-scale, multiregional health care provider has adopted reengineering technology strategies to reorganize the team for IT production support. Previously, teams were organized by function, and tickets were assigned accordingly. While the speed of ticket resolution appeared efficient on paper, this was not an efficient use of the IT production support group. The production support employees are subject-matter experts, with strong skill sets in IT technical capabilities and business-process functionality. This human capital was underutilized.

To address this, leadership empowered the employees by creating diverse teams to tackle a strategic objective. Teams comprise project management, functional, and technical skill sets, all playing an equal and crucial role. Now, production support is working directly in all areas of the organization—treasury, finance, demand planning, procurement, and vendor management, for example. The teams formed within IT collaborate across all areas to increase efficiency and lead agile projects, giving subject-matter experts time and energy to drive innovation.

On the other hand, support desk tickets are still a part of the process. Now, tickets are routed to individuals who have bandwidth, depending on the current workload within their innovation team. Fast-forward one year and the IT department work mix is focused on innovation to enable the strategic goals for the organization, while making less break-fix adjustments to the standard platform.

Bottom line

In many companies, IT's traditional delivery models no longer can keep up with the rapid-fire pace of technology innovation and the disruptive change it fuels. The reengineering technology trend offers CIOs and their teams a road map for fundamentally overhauling IT from the bottom up and the top down. Pursued in concert, these two approaches can help IT address the challenges of today and prepare for the realities of tomorrow.

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Oracle perspective

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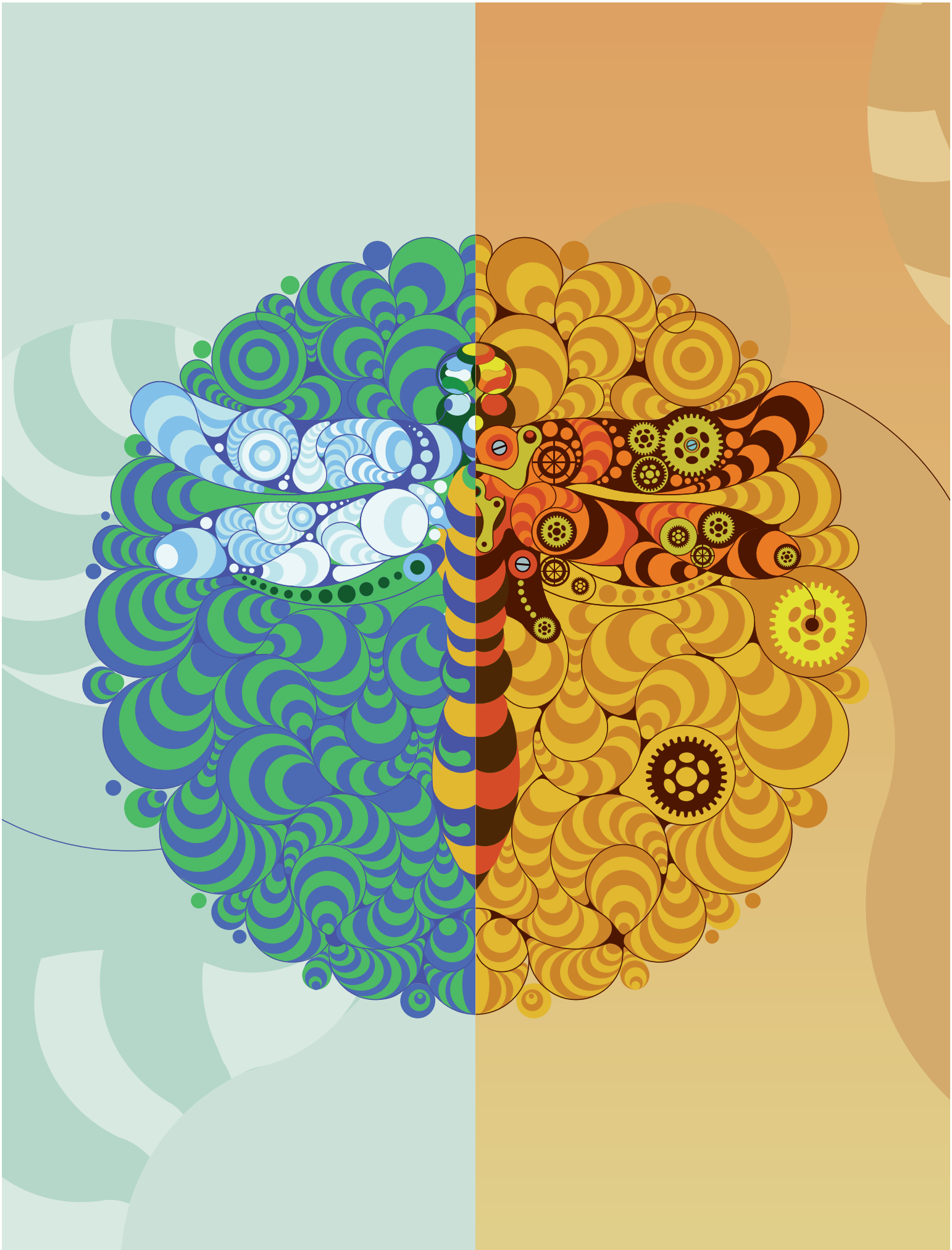


No-collar workforce

Humans and machines in one loop—collaborating in roles and new talent models

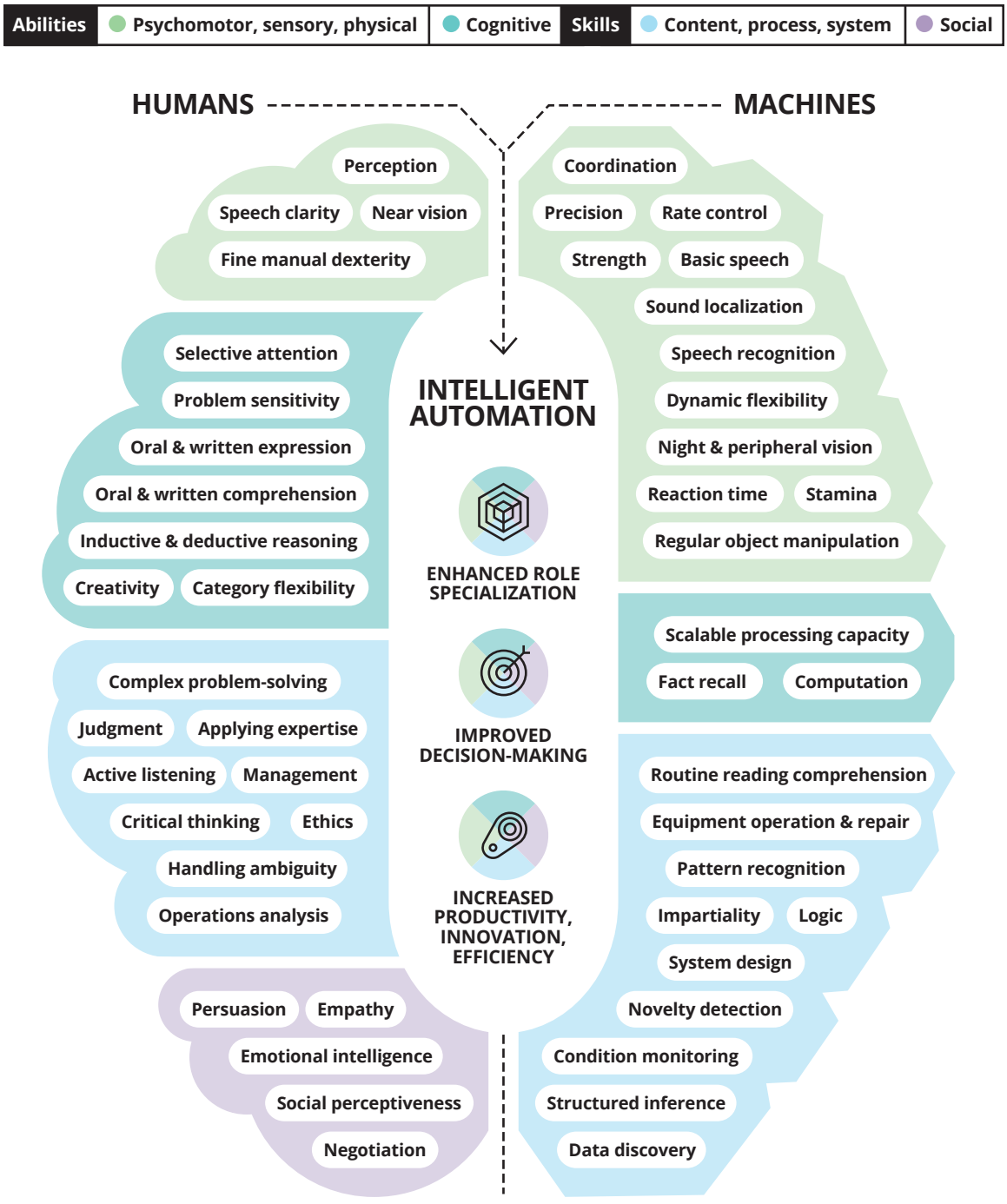
As automation, cognitive technologies, and artificial intelligence gain traction, companies may need to reinvent worker roles, assigning some to humans, others to machines, and still others to a hybrid model in which technology augments human performance. Managing both humans and machines will present new challenges to the human resources organization, including how to simultaneously retrain augmented workers and to pioneer new HR processes for managing virtual workers, cognitive agents, bots, and the other AI-driven capabilities comprising the "no-collar" workforce. By redesigning legacy practices, systems, and talent models around the tenets of autonomics, HR groups can begin transforming themselves into nimble, fast-moving, dynamic organizations better positioned to support the talent—both mechanized and human—of tomorrow.

WITH intelligent automation marching steadily toward broader adoption, media coverage of this historic technology disruption is turning increasingly alarmist. "New study: Artificial intelligence is coming for your jobs, millennials,"[1] announced one business news outlet recently. "US workers face higher risk of being replaced by robots,"[2] declared another.

These dire headlines may deliver impressive click stats, but they don't consider a much more hopeful—and likely—scenario: In the near future, human workers and machines will work together seamlessly, each complementing the other's efforts in a single loop of productivity. And, in turn, HR organizations will begin developing new strategies and tools for recruiting, managing, and training a hybrid human-machine workforce.

Figure 1. A new mind-set for the no-collar workforce

Humans and machines can develop a symbiotic relationship, each with specialized skills and abilities, in a unified workforce that delivers multifaceted benefits to the business.



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Notwithstanding sky-is-falling predictions, robotics, cognitive, and artificial intelligence (AI) will probably not displace most human workers. Yes, these tools offer opportunities to automate some repetitive low-level tasks. Perhaps more importantly, intelligent automation solutions may be able to augment human performance by automating certain parts of a task, thus freeing individuals to focus on more "human" aspects that require empathic problem-solving abilities, social skills, and emotional intelligence. For example, if retail banking transactions were automated, bank tellers would be able to spend more time interacting with and advising customers—and selling products.

Consider this: In a survey conducted for Deloitte's *2017 Global Human Capital Trends* report, more than 10,000 HR and business leaders across 140 countries were asked about the potential impact of automation on the future of work. Only 20 percent said they would reduce the number of jobs at their companies. Most respondents (77 percent) said they will either retrain people to use new technology or will redesign jobs to better take advantage of human skills.[3] Indeed, recent Deloitte UK research suggests that in the future, 30 percent of high-paying new jobs will be social and "essentially human" in nature.[4]

The future that this research foresees has arrived. During the next 18 to 24 months, expect more companies to embrace the emerging *no-collar workforce* trend by redesigning jobs and reimagining how work gets done in a hybrid human-and-machine environment. It will require new ways of thinking about jobs, enterprise culture, technology, and, most importantly, people. Even with these challenges, the no-collar trend introduces opportunities that may be too promising to ignore.

Oracle perspective

Human-machine collaboration changes the way we implement, interact with, and experience enterprise solutions

Impact on enterprise applications & operations

One of the most impacted area of this human-machine collaboration is enterprise applications. Most large organizations have been transitioning from standardized, on-premises, monolithic ERP systems to more nimble and modern cloud-based enterprise applications. The pace of this transition has been growing as most organizations have realized that cloud enterprise applications form the core building blocks of their digital transformation journeys. But interestingly, as AI and bots have become mainstream and part of the digital transformation toolkit, they are not only being used to automate simple, redundant tasks but they are starting to revolutionize how we implement, interact with, and experience cloud-based enterprise applications.

Implementation

Clients no longer want to use scarce team members to do redundant tasks, such as configuring and regression testing of enterprise applications. Humans are now training bots to pick up these essential but low-value-add tasks while they spend time on more critical tasks like solution design and change management.

Interaction

Users now rely on bots to perform certain non-value-add work directly in the systems. A prime example of this is the month-end close process where financial analysts spend time performing reconciliation and rely on their bot co-workers to perform system-specific activities such as opening and closing calendar periods and running month-end close reports.

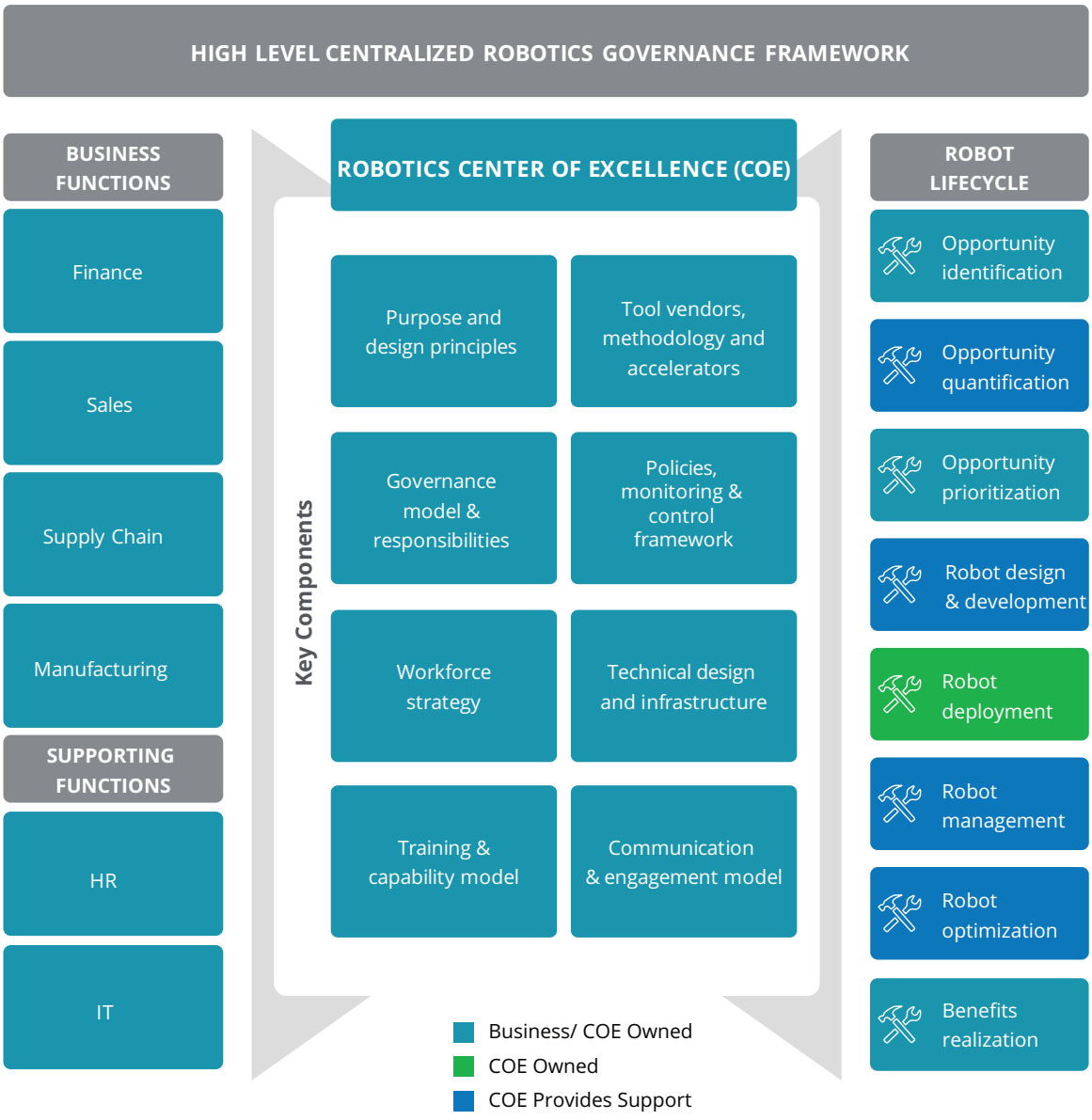
Experience

Virtual assistant bots now allow enterprise applications to be extended beyond a simple user interface of a web or mobile app. A service technician can spend more time servicing equipment while the virtualized assistant provides them a seamless, personalized experience in ordering spares, reporting/escalating, or simply doing paperwork for each job they complete.

The no-collar trend comprises much more than deploying AI and bots; it includes creating new ways of working within a culture of human-machine collaboration. Workers accustomed to providing standard responses within the constraints of rigid processes become liberated by mechanical "co-workers" that not only automate entire processes but also augment human workers as they perform higher-level tasks.

A key component of the changing organizational culture is to evolve the existing processes and governance structures to meet the challenges of supporting human-machine collaboration. Organizations leading the charge with human-machine collaboration have set up centralized or federated Centers of Excellence (CoE). A CoE construct can help ensure that only the most impactful and strategic opportunities are undertaken. It also avoids the disparate proliferation of bots across the organization.

The following diagram shows a high level centralized robotics governance framework.



Oracle perspective

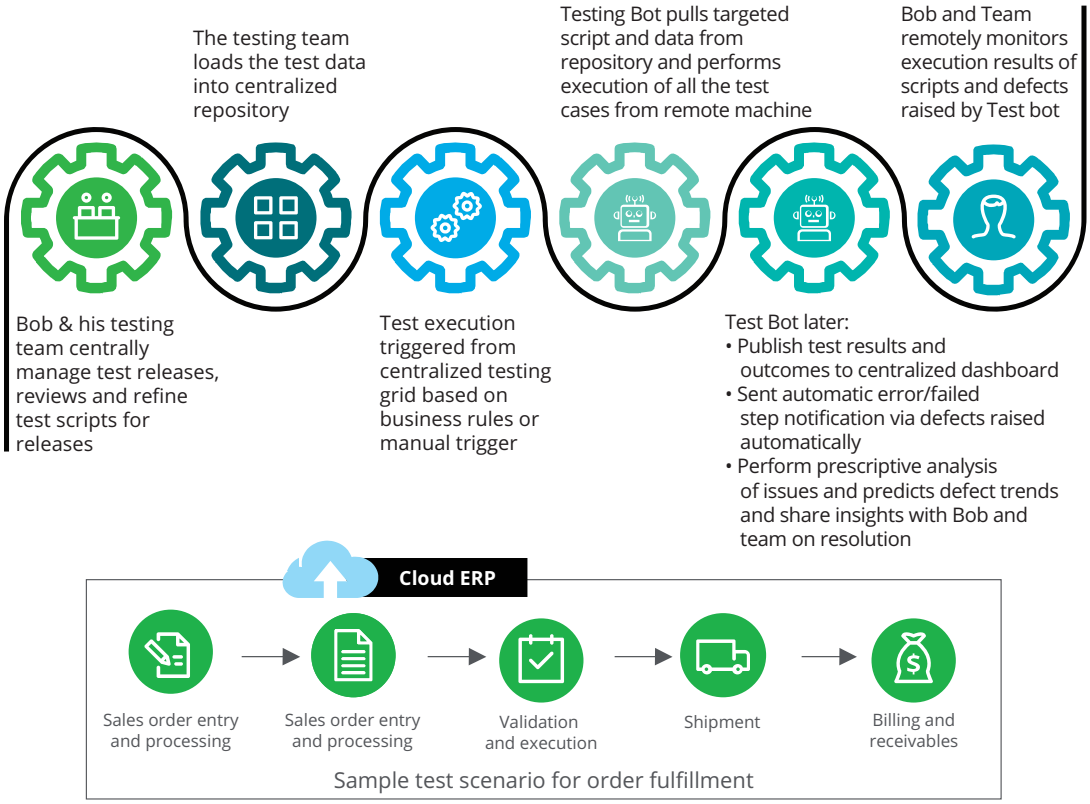
Use cases

CHANGING IMPLEMENTATION—CONFIGURATION, TESTING, AND RELEASE MANAGEMENT

A global consumer and industrial products organization implementing Oracle Cloud Procurement and Financials wanted to shorten its implementation timeline and lower post-implementation release-management costs. An assessment study was performed to explore how robotic process automation (RPA) could automate integration testing and configuration for the organization. The study identified several processes that would benefit significantly from an RPA approach. Multiple bots were built to automate large portions of the integration and regression testing cycles of the Oracle Cloud ERP implementation. The automated bots were able to execute all end-to-end steps traditionally performed by a manual tester, then send run-time notification and log any defects encountered during the test execution.

Applying RPA provided immediate relief to the implementation team, which was working against aggressive timelines. Although the program started as an IT effort, the HR organization was brought into the fold as bots were reshaping individuals' roles and productivity, which required realignment of how business functions supported testing. With HR's assistance, the IT organization is rolling out multiple bots to perform regression testing across the process lifecycle (procure to pay, order to cash, etc.). A centralized release management team was established and took over the role of regression testing, from triggering the bots to managing the test data library and resolving defects.

The graphic below represents the day-in-a-life scenario of executing regression testing for the order-to-cash process lifecycle.



Oracle perspective

Use cases

CHANGING INTERACTION—MASTER DATA MANAGEMENT

A global data and telecommunication equipment manufacturer undergoing a digital transformation wanted to improve its master data management (MDM) processes by introducing active data governance and reduce the overall time to create and maintain master data. A human-machine collaboration was recommended to resolve this MDM problem. As part of this approach, a bot took over the repeatable tasks of creating and maintaining product master data in the systems, while the human data stewards started focusing more on collaborating with various functions, such as engineering, supply chain, and sales, to ensure each product was correctly defined and managed throughout its lifecycle. The client has seen significant reduction in master data errors and has reduced the new product setup time significantly. The approach used in product master data is currently being extended to other functions including managing supplier, customer, and other master data.

However, the organization is quickly realizing the human-machine collaboration fundamentally changes the tasks and skills of the data steward role. The data stewards increasingly are looked upon as data lifecycle SMEs rather than data entry clerks. This change is impacting who is hired/promoted to these roles, as well as how the existing resources are trained and retrained to meet these new expectations.

CHANGING EXPERIENCE—FIELD-SERVICE OPERATIONS

A global energy company—one the world's largest offshore operators—wanted to improve the efficiency of its field-service technicians, who were spending more time ordering and waiting on parts than servicing the equipment that was down. To support the field service technicians, a virtual assistant using the IPsoft Amelia platform was developed, which allowed service technicians to speak with a virtual agent that seamlessly accessed the enterprise application in the background, providing a very personalized experience. When the virtual agent was activated, it recognized the specific technician and job, and it knew the schematics of the job site, allowing it to shorten the spare-parts ordering process. Orders entered by the virtual agent were accurate, and as the virtual agent could reference the exact schematic drawing while ordering the part, fewer wrong replacement parts were ordered. Overall the approval time for spare-part orders reduced from four days to a few hours.

As this case is being extended to the wider enterprise, the HR organization is taking the lead in training and redesigning the jobs of field service agents. Since the virtual assistants can be used in multiple other supporting functions, the HR organization is proactively making an effort to understand how the work currently gets done across other business functions and how it will change, so that they can support this new human-machine talent model.

Bottom line

Advances in artificial intelligence, cognitive technologies, and robotics are upending time-honored assumptions about jobs, careers, the role of technology in the workplace, and the way work gets done. The no-collar trend offers companies the opportunity to imagine an entirely new organizational model in which humans and machines become co-workers, complementing and enhancing the other's efforts in a unified digital workforce.

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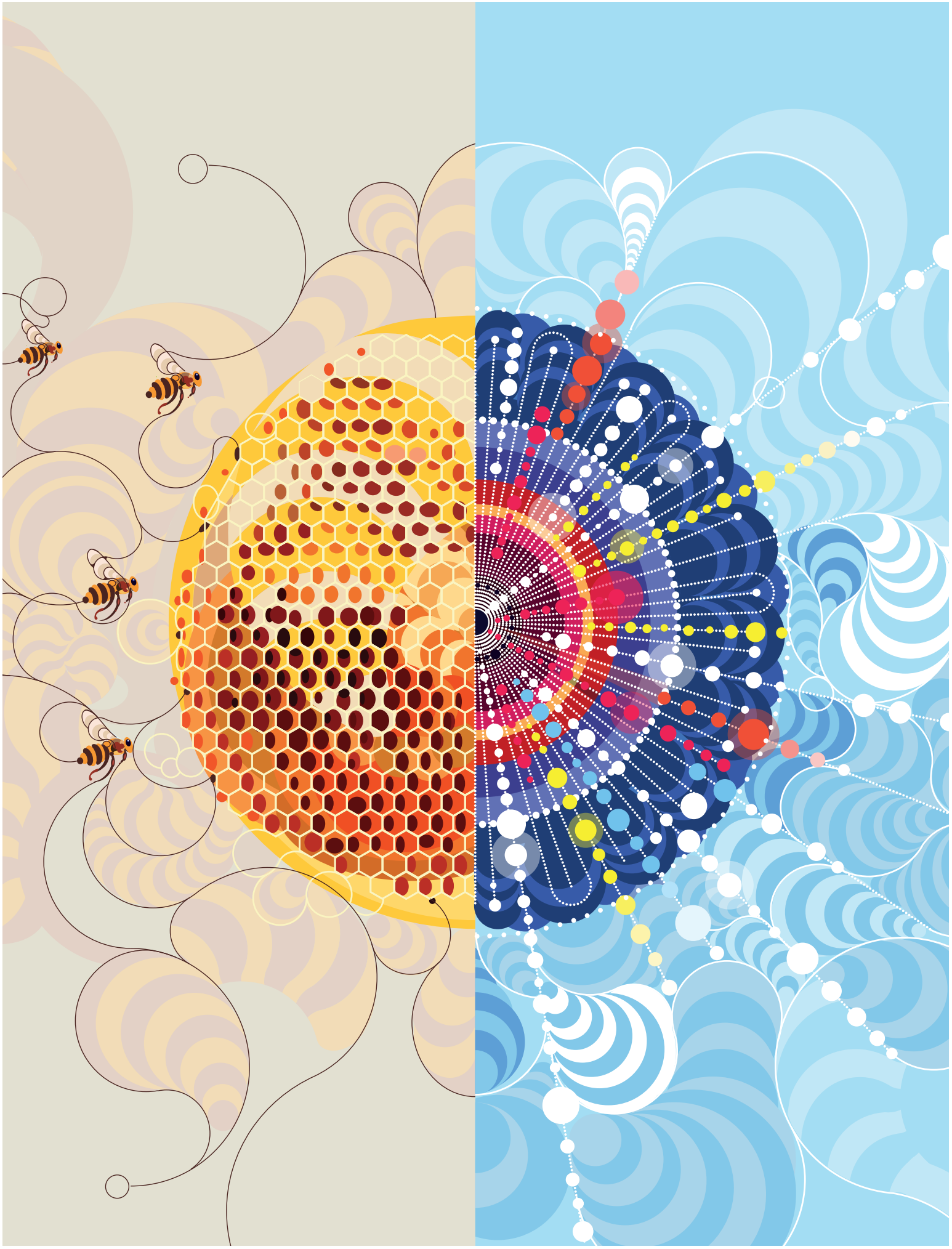


Enterprise data sovereignty

If you love your data, set it free

As every organization recognizes data as a key asset, there is an increasing demand to "free" it—to make information accessible, understandable, and actionable across business units, departments, and geographies. This requires modern approaches to data architecture and data governance that take advantage of machine learning, natural language processing, and automation to dynamically understand relationships, guide storage, and manage rights. Those same capabilities are needed to navigate changing global regulatory and legal requirements around data privacy and protection.

WE have entered a new age of digital enlightenment—one driven by ever-growing volumes of data and the valuable customer, strategic, and operational insights that information contains. In this new age, not only is there more data than ever before, but it is being generated by a wider variety of sources, making it more revealing.

To those already on the path to digital enlightenment, it is becoming increasingly clear that to realize its full potential, data should be free—*free* not in a monetary sense but, rather, in terms of accessibility and ubiquity. At a time when traditional boundaries separating organizational domains are coming down, it becomes more important than ever to expose data widely so that analysts can use it to create value.

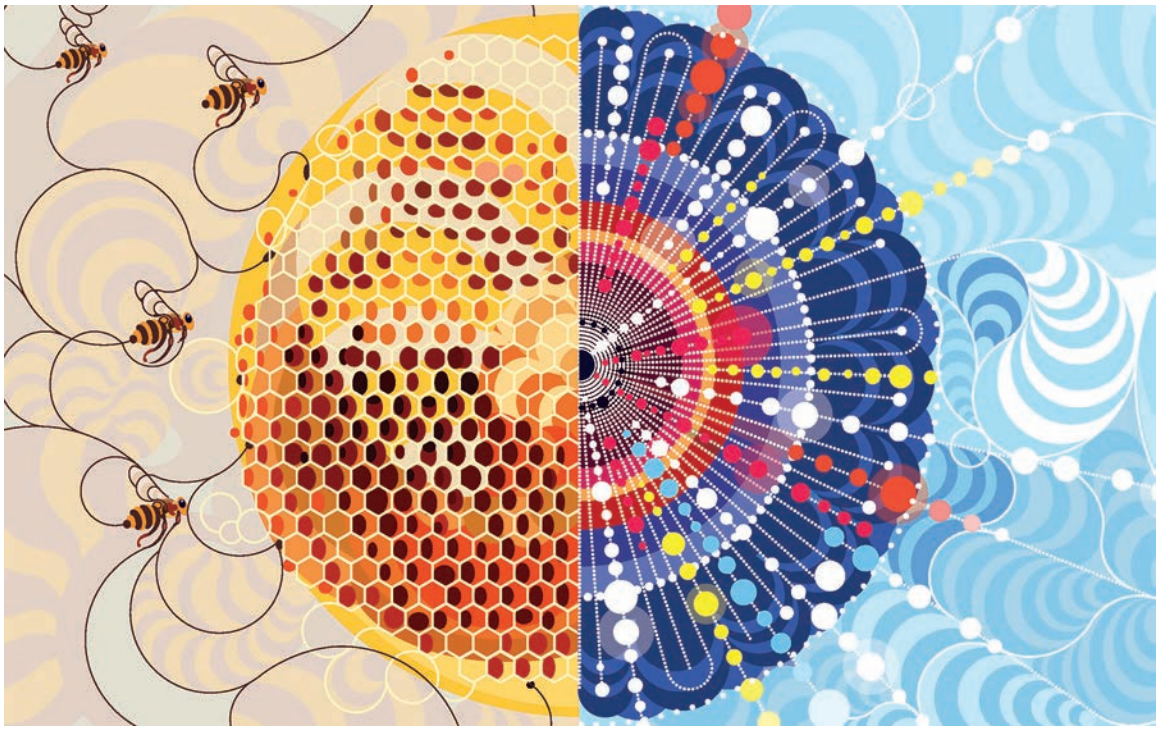
Yet even when data is free, we need to make sense of it. Traditionally, "making sense of data" meant imposing upon it top-down, canonical definitions and hierarchies of access rights and creating layer upon layer of governance protocols. This Dewey Decimal System-esque approach has been, in essence, just a formalized way to try to control chaos using brute force.

We expect that, in the next 18 to 24 months, more companies will begin modernizing their approaches to data management, working to strike the right balance between control and accessibility. As part of the growing trend toward *enterprise data sovereignty*, these companies will develop deliberate techniques for managing, monetizing, and unlocking the value of an increasingly vital enterprise asset.

Their efforts will focus on solving data challenges in three domains: management and architecture, global regulatory compliance, and data ownership. The challenges that many organizations encounter in each of these areas are varied and persistent. For example:

- How can we expose data across organizational boundaries and functional domains while still managing it deliberately and effectively?
- How can we automate laborious and often manual data classification and stewardship tasks?
- How can we, as a global company, comply with regulatory and privacy requirements that differ dramatically by nation?
- Who in the enterprise is ultimately responsible for all this data? Does the CIO own it? The COO? Anybody at all?

The enterprise data sovereignty trend offers a road map that can help companies answer these and other questions as they evolve into insight-driven organizations. Without a doubt, this transition will require long-term investments in data integration, cataloging, security, lineage, augmented stewardship, and other areas. But through these investments, companies can create a dynamic data management construct that is constantly evolving, learning, and growing.



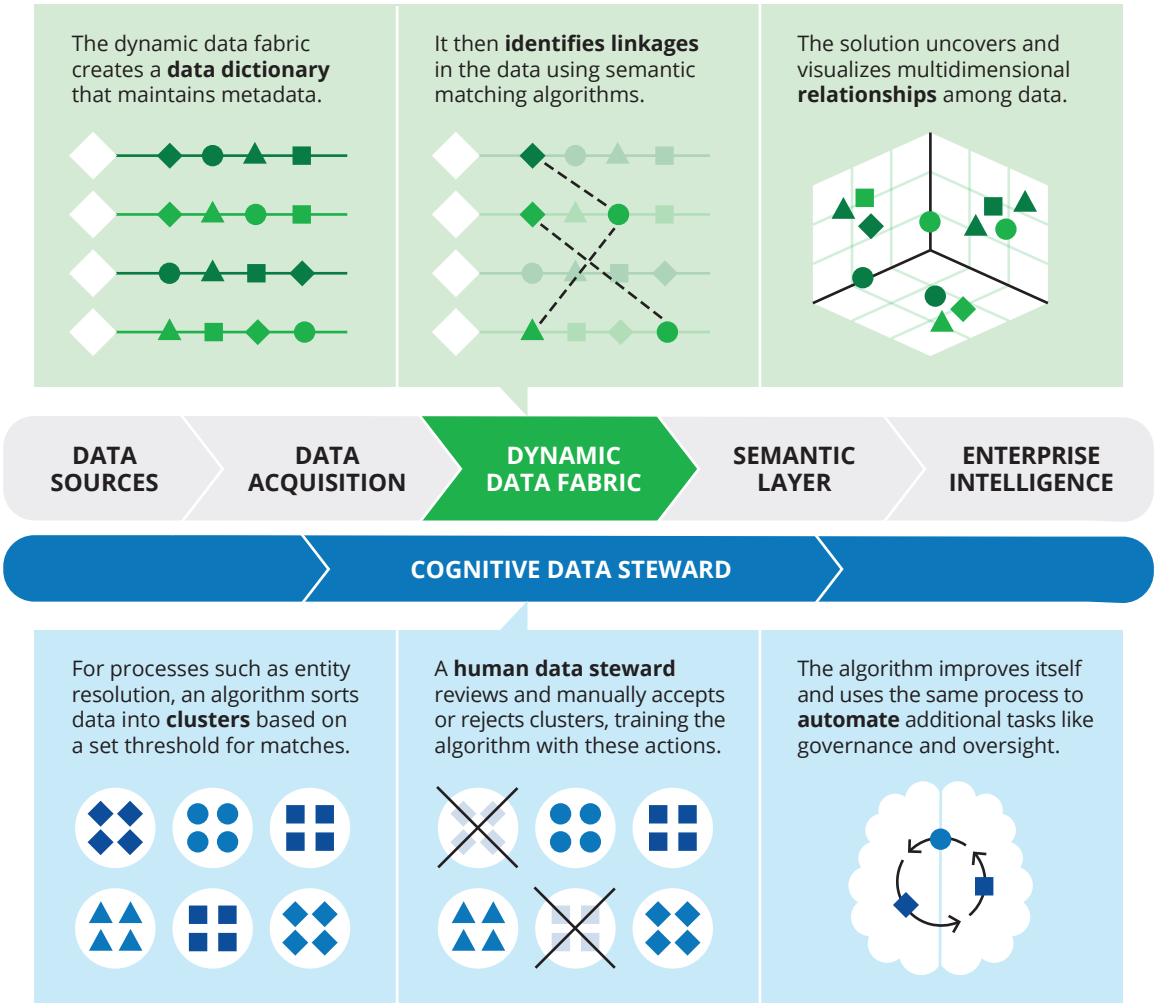
Oracle perspective

Enterprise information needs around big data, real-time reporting, and automation change the way organizations approach data management

Organizations are transitioning from using traditional data warehouses, operational data stores, and ad hoc visualization on structured data to incorporating predictive analytics, AI, natural language processing, and sensor data as part of their core data fabric. Today, data is treated as a strategic business asset, and businesses are taking a modern approach to data management and analytics. Enterprise-wide data management and advanced analytics platforms such as Oracle Analytics Cloud—capable of bridging the chasm between traditional analytics and advanced analytics—are pervasive and catalyzing business time-to-value. Users also are exploring and discovering trends using specialized tools such as Oracle Data Visualization to gain insights. For instance, a marketing manager running an online marketing campaign on social media gets real-time streaming updates on take rates.

Many of the master data solutions available over the last 20 years were federated systems with master data sets and separate working sets. The process of reconciling master data sets and working data sets was endless, and data management rules had to be written prior to deployment. Organizations are moving away from federated models and manual processes to leveraging advanced data management toolkits that include natural language processing, dynamic data discovery, and ontologies, plus advanced machine learning and cognitive capabilities. This system requires less up-front rule making and can teach itself to manage complexity and maintain regulatory compliance across both internal and external ecosystems.

Figure 1. Advanced data management framework



Source: Deloitte analysis

Oracle perspective

Use cases

ENHANCING REAL-TIME AND BATCH REPORTING CAPABILITIES

A large, nationwide power-generation company wanted to enhance its business intelligence capabilities to meet regulatory reporting requirements. Additionally, it sought to analyze historic profile changes and transactional data to best determine the rate of risk for each of the accounts, customers, counterparties, and legal entities. There was a need for a unified architecture, strong authentication, authorization, and auditing of data, and full data encryption capabilities to make it easier to meet regulatory compliance requirements.

Previously, the volume and variety of data meant that it could not be used to its fullest extent due to constraints in processing power and cost of storage. The company implemented Oracle Big Data Appliance to solve for its big data needs. The native Hadoop-based architecture combined with big data connectors provided the following feature functionalities to enable seamless integration of structured and unstructured data:

- Ability to combine data from Oracle Database, Hadoop, and NoSQL in a single SQL query
- Ability to extend security and access policies from Oracle Database to data in Hadoop and NoSQL
- Address a mix of real-time and batch reporting needs thru a single enterprise platform
- A significant increase in transaction processing volume to enable calculation of continuous risk profiles

The platform's simple, unified architecture freed up the IT team from activities involving expensive and time-consuming upgrade cycles and maintenance. The big data appliance implementation resulted in a projected savings of 45 percent when compared to building the architecture from the ground up.

IMPLEMENTING ANALYTICS SANDBOXES

A multinational power-management company set up a process to provision sandboxes where data scientists and power users could explore data on an ad hoc basis across a wide variety of data sources. Sandboxes served as data labs for experimentation prior to making datasets formally available to the larger enterprise. This provided the organization a view into identifying crucial insights to gain operational efficiencies and the ability to prioritize data management initiatives.

The following were features of the analytics sandboxes:

- Provided a place where data scientists or power users could explore data on an ad hoc basis with a wide variety of data sources
- Provided governances and tools that enable rapid analytics experiments and data investigation
- Reduced the number of new formal and informal data bases, ETL programs, and complex reports being created on a one-off basis
- Enabled rapid ingestion of multiple forms of data for analysis
- Allowed scientists to use data-wrangling tools to identify transformation rules

In addition to supporting business functions in answering questions that previously would have required new extracts and data loads, analytics sandboxes could be deployed simultaneously across various business functions in an agile fashion without having to integrate datasets into centralized repositories through formal IT processes.

Oracle perspective

Use cases

SOLVING FOR HISTORICAL DATA ANALYSIS

A large, global investment banking firm was using multiple technologies to store finance data off site. When it came time to access that information, it faced challenges due to data being distributed across disparate platforms and technical limitations when performing analysis across the entire dataset. As a result, the value provided by the off-site storage solution was suboptimal.

To address these challenges, a decision was made to deploy a platform with the following characteristics:

- A reliable governance mechanism to store and recover data for seven years or more
- The ability to access all the information when needed using a standard analytical tool set
- Online access to this information to generate additional business value

A data-lake architecture was chosen to address these challenges and was deployed to consolidate information from multiple relational technologies onto a single platform. By taking advantage of the scalability of the platform to accommodate large datasets, a common data model was developed and users were provided a single access point to sandboxes and an enterprise analytics platform.

Bottom line

As data grows exponentially in both volume and strategic importance, enterprise data sovereignty may require long-term investments in data integration, cataloging, security, lineage, and other areas. But with focus and careful planning, such investments can generate ongoing ROI in the form of a dynamic data management construct that is constantly evolving, learning, and growing.

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Oracle perspective

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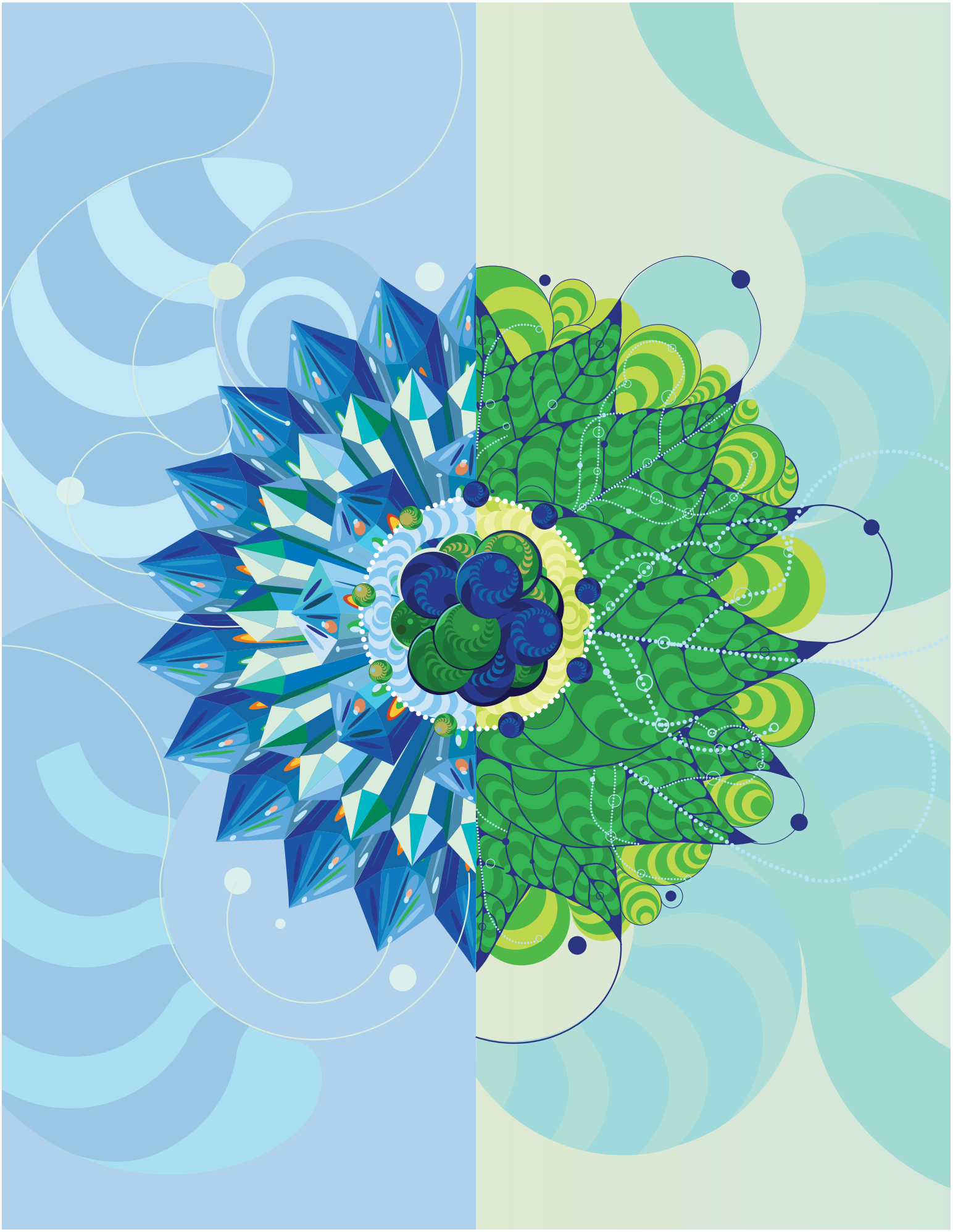


The new core

Unleashing the digital potential in "heart of the business" operations

Much of the attention paid to cloud, cognitive, and other digital disruptors today centers on the way they manifest in the marketplace: Individually and collectively, these technologies support new customer experiences, product innovation, and rewired industry ecosystems. Often overlooked, however, is their disruptive potential in core back- and mid-office systems and in operations, where digital technologies are poised to fundamentally change the way work gets done. This transformation is beginning with finance and supply chain, two corporate and agency pillars ready to embrace all things digital. From there, next-generation transaction and financial systems, blockchain, machine intelligence, automation, and the Internet of Things (IoT) are redefining what is possible in these mission-critical functions.

FOR many in the business and tech worlds, the word digital conjures up thoughts of marketing, e-commerce, and omnichannel experiences that increasingly capture business mindshare (and investment). This is hardly surprising given that improving digital engagement with customers, patients, citizens, and business partners is now a defining mandate across industries and sectors.

Though savvy organizations are approaching the digital mandate from a number of angles, one issue remains consistently important: the interconnectedness of front- and back-office systems. CIOs recognize that any effort to transform the front office won't get far unless new digital systems have deep hooks into the core. These critical hooks make pricing, product availability, logistics, quality, financials, and other "heart of the business" information residing in the core available to sales and customer service operations.

Creating connective tissue between enterprise functions and the core represents progress, but in terms of opportunity, it only scratches the surface. Here in the midst of the digital revolution, the core's full potential remains largely untapped. Why? Because thus far, few organizations have extended the digital mandate beyond customer-facing functions to the middle and back offices.

Expect this to change over the course of the next 18 to 24 months as CIOs, CFOs, and supply chain

leaders begin developing new digital capabilities in their core systems. We're not talking about deploying point solutions or shiny digital add-ons. Rather, this is about constructing a new core in which automation, analytics, real-time analysis and reporting, and interconnections are baked into systems and processes, fundamentally changing how work gets done. In many ways, the new core trend mirrors digitization efforts already under way in other enterprise functions, such as HR, sales, and marketing. Though their tactics and milestones certainly differ, all of these groups share a vision of enterprise functions as symbiotic building blocks in a larger ecosystem, working in concert to reshape business.

Digital déjà vu. Efforts to digitize core business processes are hardly new. Over the last two decades, companies have invested in ERP implementations, large-scale custom systems, business process outsourcing, and other ghosts of innovations past. Some of these investments delivered tangible benefits—for example, standardized workflows and automated tasks. However, others created unintended side effects: unintuitive employee user experiences, rigid and overly prescriptive operating procedures, limited data visibility, and in some cases, stagnation because needed changes were too costly or difficult to implement.[1]

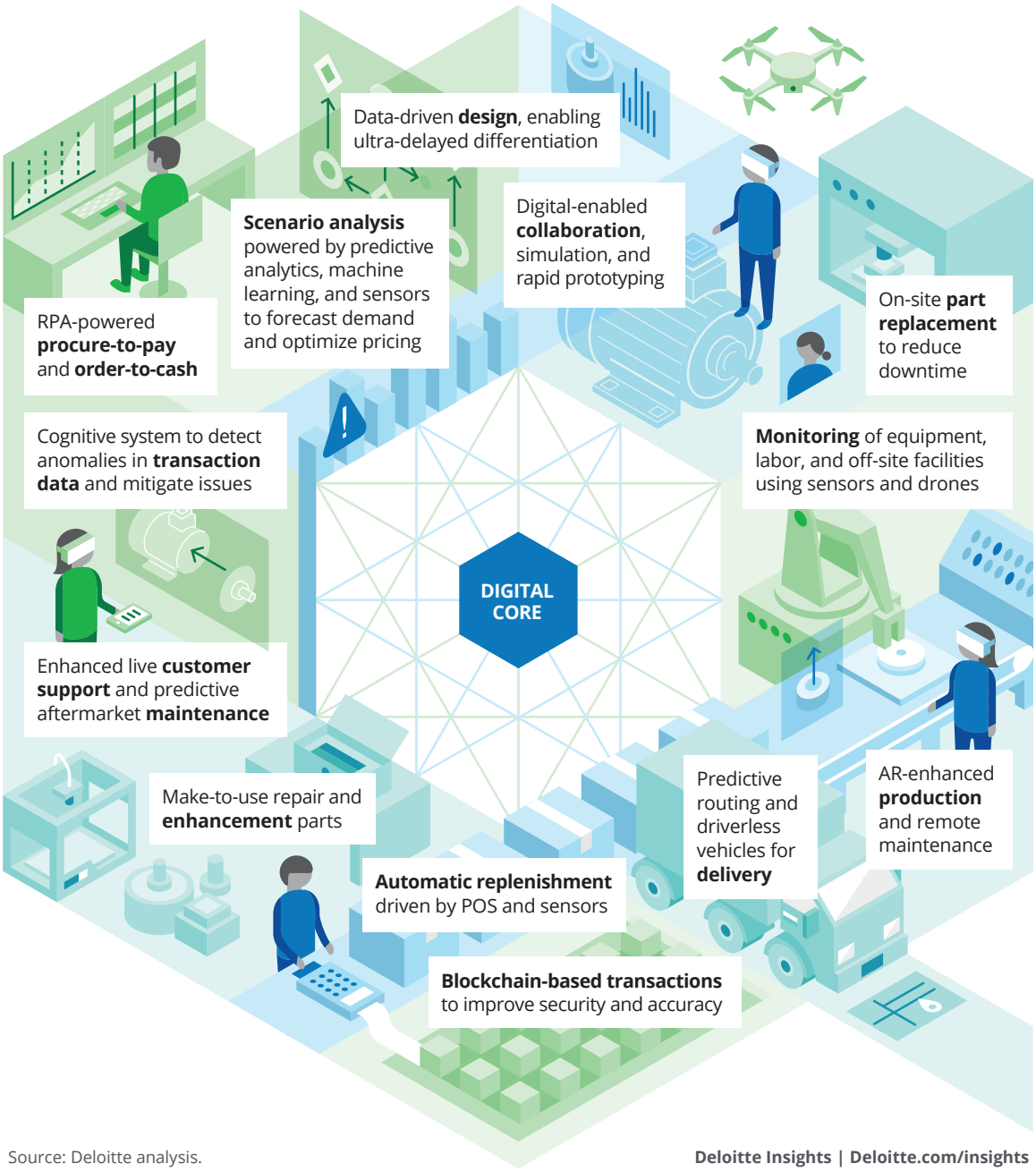
After completing a few of these initiatives and the occasional one-off deployment of the latest digital tool, some companies began to feel core system fatigue, a situation exacerbated by the compounding complexity that eventually appears in aging mission-critical solutions.

Meanwhile, CXOs and line-of-business leaders struggled to reconcile two seemingly contradictory realities: They recognized the shadow that technology's rapid advancement was casting over their operations. At the same time, they were becoming ever more skeptical about one-off technology deployments.

The new core flips these dimensions on their heads. As this trend gains momentum in the coming months, expect to see CXOs target core business areas such as finance and supply networks for meaningful change. Rather than focusing on discrete tasks or individual tools, they will be broadly exploring how digital technologies can support global ecosystems, platform economies, complex operational networks, and new ways of working in the future.

That's not to say the individual technologies are unimportant. They can be essential enablers for achieving an end vision. For example, blockchain's distributed ledger offers a means for exchanging assets in an open, secure protocol, which has interesting implications for trade finance, supply chain validation processes, and other areas. Yet blockchain alone is only one component in a dynamic, interconnected new core stack. As companies begin their new core journeys, it will be critical to understand how digital innovations can work in concert with existing capabilities to drive business value.

Figure 1. The new digital core: Finance and supply chain in action



Source: Deloitte analysis.

Oracle perspective

Modern enterprise applications form a new core

As leading ERP software providers like Oracle mature to adopt/offer disruptive technologies like blockchain, IoT integration, social media integration, robotic process automation (RPA), cognitive, and more, CIO and business stakeholders gain a wider canvas to paint and reimagine their mid- and back-office connections. Cloud can amplify the value these technologies deliver through the ERP systems by offering greater agility, opportunities for automation, and more flexibility.

Organizations that are establishing a modern ERP platform as the foundation for the new core (and leveraging it for blockchain, cognitive, RPA, and other digital transformation enablers) are becoming more effective and competitive as compared to those that are "waiting for technology to mature." There are more digital transformation opportunities available in modern Oracle ERP Cloud applications now than most organizations can adopt as part of an initial deployment, and the rate of innovation is increasing, not stabilizing. Organizations that are sitting back are losing the digital core race, which will impact both marketplace competitiveness and workforce attraction/retention. By placing additional investment and effort into outdated core systems and processes, the cost to catch up will only increase.

Many CIOs hesitate to start the digital transformation of their mid-office and back office operations because they feel it must begin with replacing their existing enterprise system stack. For organizations that have been on modern enterprise application systems for many years, quick wins may be achieved by automating and modernizing legacy applications written in COBOL and building a better user interface on top of it.

A simple framework that maps investments to business criticality can help define a road map. It can be helpful to start by organizing digital technologies into four categories that act as milestones in the road map:

- ***Enablers*** are the start of the "new core" journey, providing immediate value without requiring significant alteration of the process or technology landscape. An example is automating repetitive, time-consuming back-office processes through RPA.
- ***Kick-starters*** are the building blocks of the future enterprise, as they drive disruption in multiple areas of the business and require significant investments. If any of your enterprise systems has fallen behind in an upgrade cycle or has become too heavily customized to change, a cloud replacement might be a good option for this category.
- ***Performance drivers*** utilize the new core to drive business efficiency and exponential growth by enabling newer ways of doing business. For example, you might consider using predictive analytics to increase network agility and improve customer service if you are in a consumer product business.
- ***Future stars*** are industry disruptors and change your core business. For example, if you are thinking of building a new manufacturing facility, the focus should be to develop a smart factory enabled by a self-learning, production-feasibility tool that leverages data from sensors to optimize production scheduling.

Digital disruptors are providing innovative ways to solve challenges across capabilities within an enterprise. New technologies often are associated with risks, and companies tread with caution. However, those risks can pay off handsomely when they unlock new efficiencies or grow revenue. The matrix below provides a view of digital disrupters' impact today.

Oracle perspective

Digital Disruptor	Sample Challenges	Oracle Cloud + Digital Disruptor Solution	Client Impact
Process Robotics	How can we lower finance's operating cost for providing transactional services?	**Bots built** on Oracle Cloud ERP across **RTR, PTP, and QTC** process areas	Decrease the **FP&A and CC&R time by up to 30%**
Cognitive Computing	How can I get real-time financial data with timely and crisp insights without information overload? How can we provide real time insights and adjustments to demand and supply planning?	Developed **"CFO's Personal Assistant,"** powered by **Alexa and Amelia**, which can extract **real-time information and insights** from Oracle Cloud Concurrent and cognitive planning to integrate demand, supply, inventory, and financial intelligence	**Better insights** and real-time information access for **improved decision-making**
Blockchain	How can I improve my cash position by efficiently managing payments/ receipts? How can I enable exchange of business transactions and master data across the supply chain?	Built **Oracle Cloud B2B Payments BaaS solution** that enables **near-real-time, more-secure** B2B payment remittances at a much **lower cost**	Decrease **cost per invoice by up to 28 percent** from best in class ($1.80 versus $2.50)
Visualization	How can I achieve insight by visualizing my global sales and profitability in an interactive tool?	Enable **dynamic visualization** through Oracle Cloud, allowing for **interactive mobile** dashboards	**Real-time, on-the go** information access for better decision-making
Advanced Analytics	How can we better predict our revenue, costs, and overall business performance?	Out-of-the-box Oracle Cloud capability for predictive analytics combined with **internal and external data** to establish a rolling, **driver-based** forecast model to **accurately predict** a rolling multi-year forecast	Decrease **FP&A time by 30 percent with a 50-percent improvement in forecast accuracy**
Workplace Collaboration	How can we improve daily finance operations using increased collaboration to provide more context and keep a record?	Oracle Cloud has built-in context-based **online collaboratio**n capability, which allows discussions that were previously offline and "lost" to be **performed in real time and automatically preserved**	Better **auditabilty** and **real-time information** access for improved decision-making

Oracle perspective

Use cases

HARNESS THE POWER OF DIGITAL TECHNOLOGIES BY MOVING TO CLOUD

A leading transportation and logistics company needed a cutting-edge technology platform to support its global acquisition strategy and provide a foundation for digital innovation and continuous improvement. After completing multiple large integrations over previous years, the client recognized the need to replace its current aging on-premises ERP solution with a more nimble, scalable, standardized Oracle ERP Cloud foundation.

The client realized the business value of Oracle Cloud when it replaced its existing, aging enterprise application (and the high-cost upgrade cycles that went along with it), which simplified and standardized global business processes. In addition, Oracle Cloud provides the opportunity to easily harness the power of breakthrough digital technologies such as RPA, blockchain, and advanced analytics, all of which could improve the company's operating efficiency and financial performance.

The client initiated a multiyear global transformation initiative focused on realizing the benefits offered by Oracle Cloud across the enterprise's global network. By implementing Oracle Cloud in its finance and supply chain operations, the company can effectively integrate new acquisitions into its global distribution network. Also, the platform's cloud-based model provides timely access to the latest features and innovations, helping to enable a faster rate of continuous improvement than was possible with its previous on-premises ERP and long upgrade cycles.

Moving to cloud also facilitated digital transformation, kick-started by a few quick wins:

- Applying advanced analytics to real-time data from the cloud enabled the company to make faster, real-time decisions about delivery commitments and staffing levels during peak delivery periods.
- Deploying blockchain to enable business-to-business payments, the company eliminated costly intermediaries and reduced payment processing time from several days to just a few minutes.
- Using RPA to automate system testing, the company introduced a DevOps model of continuous software upgrades, enhancements, and new feature uptake that enables rapid and continuous improvement across its global operations.

The result was cross-border payment savings, increased throughput, and a standard global footprint.

Figure 2. Blockchain-based proof-of-origin solution

Oracle Perspective

Use cases

ENABLING AN END-TO-END COLLABORATIVE SUPPLY CHAIN THROUGH BLOCKCHAIN

Increased competition is pushing life sciences companies across the globe to reduce lead times in new drug development. The process is complicated further by the numerous stakeholders involved in the drug life cycle. Across these stakeholders, there are logistical issues as well as potential fraud and abuse to address. These issues drive up the already significant costs of adhering to strict quality standards mandated by industry best practices while keeping manufacturers focused on their core competency. Finally, there is a lack of accessibility to product, intermediary, and ingredient information for all stakeholders.

Blockchain can provide the ability for collaboration across interested stakeholders by storing drug life cycle information while providing a comprehensive, single view of all information. The blockchain offers a cost-efficient, trustworthy platform, devoid of a single controlling entity, that can store immutable information.

When specific and standardized manufacturing and logistics data is stored on the blockchain, it becomes immediately transparent to all parties that have permission to access the chain. This eliminates the need for disparate and multiple reconciliation processes, resulting in enhanced traceability throughout the life cycle and increased collaborative trust across supply chain partners and the end consumer.

Adoption of a blockchain solution for storing drug life cycle data provides regulatory and quality certification partners unprecedented access to information for a more in-depth inspection of the final product. It can also prevent counterfeit drugs from entering the supply chain. The industry benefits as it moves toward greater transparency, higher quality, and last-mile compliance across the supply chain.

Bottom line

Most boardrooms lack the appetite to fund (or the patience to weather) expansive transformation agendas. This is especially true when the agendas in question focus on back-office institutional processes. Be that as it may, digital's disruptive march across the enterprise continues apace. Fueled by digital innovation, the new core trend presents a host of potentially valuable opportunities to redefine heart-of-the-business work and establish a better foundation for customer-facing innovation and growth initiatives.

The mantra for success: Think big, start small, and scale fast.

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ENDNOTES

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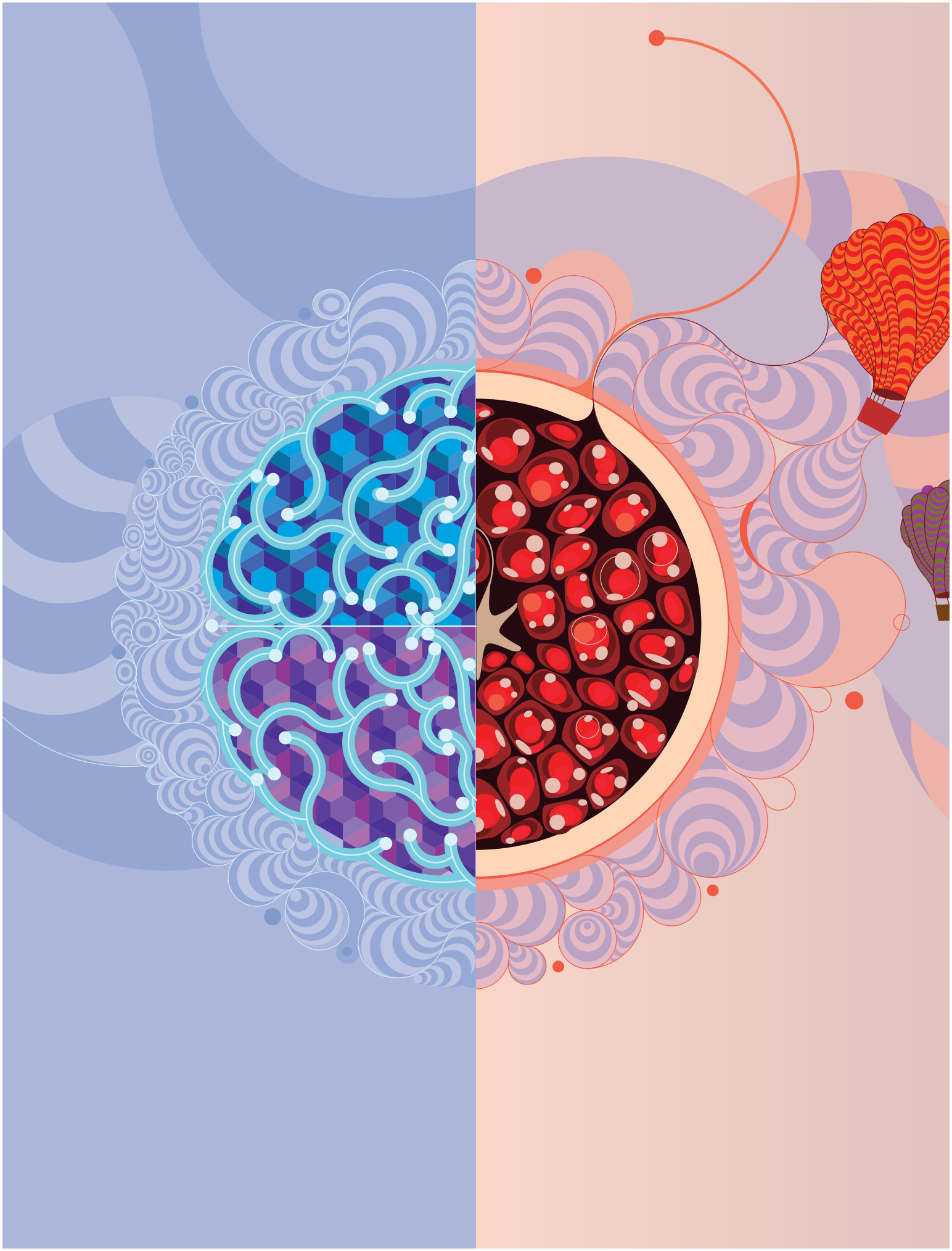


Digital reality

The focus shifts from technology to opportunity

The augmented reality and virtual reality revolution has reached a tipping point. Driven by a historic transformation in the way we interact with technology and data, market leaders are shifting their focus from proofs of concept and niche offerings to strategies anchored in innovative use cases and prototypes designed for industrialization. They are laying the groundwork for broader deployment by tackling issues such as integration experiences with the core, cloud deployment, connectivity, cognitive, analytics, and access. Some have even begun developing new design patterns and nurturing nontraditional skill sets, heralding a new era of engagement. These early adopters recognize a shift in the AR/VR winds: The time to embrace digital reality is now.

OVER the next decade, advances in digital reality—an amalgamation of augmented reality (AR), virtual reality (VR), mixed reality (MR), 360°, and immersive technologies—will lead to more natural and intuitive ways for technology to better our lives. Indeed, our means of interfacing with digital information will likely no longer be screens and hardware but gestures, emotions, and gazes.

This represents a leap forward comparable to historic transitions from client-server to the Web, and Web to mobile. And it may already be under way. International Data Corporation (IDC) projects that total spending on AR/VR products and services will soar from $9.1 billion in 2017 to nearly $160 billion in 2021, representing a compound annual growth rate of 113.2 percent.[1]

What accounts for such explosive growth? Increasingly, companies are shifting their focus from experimenting with "shiny object" AR and VR devices to building mission-critical applications in the enterprise. Consumer-oriented investments in gaming and entertainment continue, but increasingly the real action is happening in the workplace. IDC estimates that industry AR/VR use cases that will attract the largest investments in 2017 are on-site assembly and safety ($339 million), retail showcasing ($250 million), and process manufacturing training ($248 million).[2]

During the next 18 to 24 months, the digital reality trend will likely gain momentum as more companies pilot use cases and accelerate into production. Some early adopters are now in their second or third iteration of product or service design. Others have taken use cases all the way to industrialization.

This trend may accelerate as three promising design breakthroughs are integrated into digital reality systems:

- **Transparent interfaces:** A blend of voice, body, and object positioning capabilities will make it possible for users to interact with data, software applications, and their surrounding environments. Though such functionality will develop further in the coming years, it can already make interfaces seem much more natural.
- **Ubiquitous access:** Much like we enjoy with mobile devices today, in the near future AR/VR will likely provide an "always on" connection to the Internet or to enterprise networks. But unlike having to reach into our pockets for our phones, we may soon wear AR/VR gear for hours at a stretch. Advances in design and the underlying technology are giving rise to a new generation of comfortable, self-contained digital devices free of tethering wires or bulky battery packs.
- **Adaptive levels of engagement:** You are attending a virtual meeting with colleagues and a loud 3D advertisement launches in your field of vision, disrupting your concentration and interrupting the meeting. For the same practical reasons that we must be able to mute the ringers on our smartphones and block pop-ups when surfing the Internet, with AR/VR having the ability to control data feeds appearing in our virtual environments will be crucial. In the near future, contextual "traffic cop" capabilities may be able to tailor data feeds to user preferences, location, or activities.

Development of these game-changing capabilities may not happen overnight. Designing user experiences for immersive environments is a fundamentally different process than creating experiences for flat screens. Indeed, it utilizes entirely new languages and patterns. Some design techniques will have to be invented by a new generation of programmers whose skills fit more naturally in Hollywood than in a traditional IT department. Already, we are seeing CIOs enlist film and videogame design veterans with computer-generated image (CGI) expertise to help design VR experiences.[3] Meanwhile, the major Hollywood studios are ramping up their own VR content development programs.[4]

As with any development initiative, there are real IT ecosystem issues to consider, including core integration, cloud deployment, connectivity, and access. What's more, digital reality's component parts are still evolving, as are standards and governance strategies. Yet even with these headwinds, digital reality initiatives march steadily forward.

Five big digital reality opportunities

In previous editions of Tech Trends, we examined AR/VR technologies and early use cases through a future-perfect lens, recognizing that broader adoption and commercialization would not happen overnight.[5] Well, the future has arrived. The digital reality trend shifts the focus away from technology and firmly toward development and deployment. As you explore digital reality's potential for your organization, consider the following opportunity areas:

- **Connect:** "Cooperation without colocation." Digital reality already makes it possible for workers to engage with, share information with, and support colleagues in other locations. Some may think of this as glorified video telephony, but it is much more than that. For example, engineers sitting in a regional office will be able to see what field workers see as they repair and maintain remote equipment, helping to guide their actions. Scientists separated by oceans will convene in a "virtual sandbox" where they can perform collaborative research. Videoconferencing and live chats—often frustrating experiences hobbled by broken connections and unflattering camera angles—become immersive interactions that serve up replicated facial expressions, gesticulations, and holograms in real time. Teams will be able to work together on shared digital assets such as virtual whiteboards or digital models that can be manipulated in real time.

- **Know:** Digital reality can offer knowledge workers—a broad term that basically applies to anyone using a computer—access to the specific information at the exact moment they need it to do their jobs. This is more than a souped-up document-sharing tool—it can actually present information in a visual context. For example, wearing DR glasses, construction engineers can see a detailed description of a project's electrical and plumbing parts and also how the individual parts will fit into a wall. Imagine leveraging this same flexibility in any initial conceptualization phase, such as architecture and interior design, consumer product R&D, or supply chain and logistics mapping. Immersive analytics can further enhance virtual collaboration by helping users explore data in multiple axes and dimensions. For example, by applying immersive analytics to historical data on urban cellphone tower placement, engineers immersed in a virtual environment might be able to move cellphone towers around a map to gauge the potential impact that each placement could have on nearby residents' quality of life.
- **Learn:** Some pioneering companies are using digital reality to immerse trainees in lifelike situations that would be too expensive or logistically impossible to recreate on the ground. For example, UPS now provides VR driving tests that allow new drivers to prove themselves in a virtual environment before taking the wheel of a five-ton delivery van.[6] In its training simulation, KFC places employees in a virtual "escape room" where they must successfully complete a five-step chicken preparation process before they are released.[7]
- **Explore:** Consumer-focused use cases are proliferating across the retail, travel-hospitality-leisure, and real estate sectors as vendors use digital reality to bring potential customers closer to the products, services, and experiences on offer. For example, Estée Lauder has launched an AR virtual makeup mirror on its website and mobile site that adjusts for light, skin texture, and shine so that users can virtually try on product shades using their photo or live video.[8] Meanwhile, guided virtual visits are poised to transform the real estate industry and the way agents work on a daily basis; they may never have to show up for an open house again.[9]
- **Play:** Play: Use cases and full deployments of DR technologies in gaming, storytelling, and live events are varied and numerous—and will likely become more so in the coming years. IDC projects that the investment in AR/VR gaming use cases alone will reach $9.5 billion by 2021.[10]

What does this mean for IT?

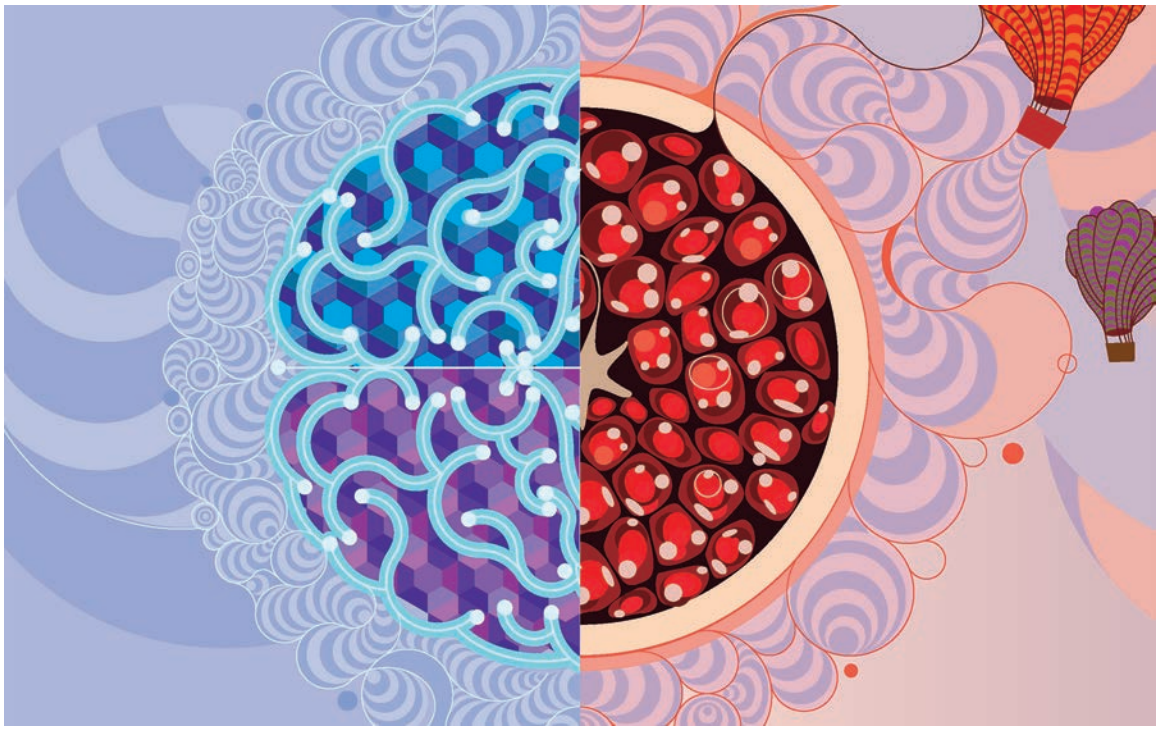
Many questions about the impact that digital reality technologies could have on IT ecosystems remain unanswered. However, we are far enough along in the immersive journey to know that CIOs should start thinking now about their company's DR strategies and the computing power required to support them fully.

- **Storage.** The amount of data required to render DR experiences is staggeringly large—and will grow even larger as technologies evolve and new functionality emerges. Consider this: Providing 360° views in VR requires storing each video viewpoint so that users can turn their heads while the video continues to run behind them. Translated, this means that designers need 10 to 20 times the storage capacity that they would need to play a standard HD video file.[11] Cloud can likely meet increased storage requirements in a cost-efficient way, but it is not the only option. Perhaps digital reality could also be a forcing function to modernize your approach to data management, governance, and architecture (see Tech Trends 2018: Enterprise data sovereignty for more details).

- **Core integration.** Headgear manufacturers are designing APIs that tie core technologies and business processes into DR experiences. Imagine, for instance, being able to present customer, facility, or product content in a virtual environment. Likewise, imagine being able to use this content in transactions initiated in

digital reality. In the near future, deep hooks into ERP/CRM/CMS systems will be a critical component of DR system design.

- **Analytics.** What is the intent behind a gaze? It is currently possible to track the gaze of an individual wearing an augmented reality headset and then, to discern user intent, analyze the data this tracking generates. Eventually it may be possible to use tracking analysis to drive advertising. For example, when an individual gazes at the refrigerator, a pop-up with a discount to a neighborhood restaurant could appear in that person's field of vision. But what if it were possible to track an individual's gaze for 12 hours at a time? The amount of storage needed to support tracking on this scale would be immense. What's more, analyzing this volume of data in real time would require immersive analytics capabilities far more powerful than those many companies currently deploy.
- **Bandwidth and networking.** At present, few network operators can deliver the bandwidth speeds that AR/VR streaming and 360° experiences require. For example, the kind of low-resolution experience available with many VR displays requires at least 25Mbit/s for streaming; for HD resolutions, the requirement jumps to roughly 80Mbit/s.[12] Recent research finds that only 7.1 percent of global connect speeds are above 25Mbit/s.[13] Though nascent efforts to develop the intelligent traffic management solutions, compression algorithms, and low-latency/high-throughput capabilities needed for AR/VR are under way, in the short term, bandwidth and networking could slow progress in digital reality initiatives.



Oracle perspective

Enterprise applications can enable digital reality capabilities for superior experiences

Business models are rapidly changing to flexible consumption models, where customers can try first and buy later, opt in to specific options that they need, and choose proper support levels as they deem necessary. Due to the transformative nature of their user experiences, organizations can find applications of digital reality technologies in these newer business models, for both internal and external customer-facing processes. Digital reality can help consumers to:

- Virtually try and experience the products in an immersive environment before purchase
- Understand the product better with augmented help/training in the real world after purchase
- Receive lifelike virtual support during use

Providing immersive experiences to customers can improve and speed the sales process by providing firsthand virtual experiences. Interestingly, all of these improved sales and support experiences add strain to the internal business processes and, therefore, compel organizations to enhance and enable modern workspaces internal to the organization. Organizations can transform their current enterprise application landscape to enable newer platforms that are necessary and can enhance the overall experience.

Many organizations have already begun this journey as they transition from on-premises ERP applications to modern cloud-based applications. Oracle, for example, is not a device or IoT sensors manufacturer; rather, it has an applicable set of applications, tools, and designs that can aid in implementing enterprise use cases that can serve as building blocks for digital reality. These applications provide features and capabilities that can help organizations to think ahead and lay out plans to overcome a few of the current inhibitors of digital reality.

What can traditional organizations do to immerse themselves in digital reality?

Adopting digital reality into an organization requires a structured approach with clearly stated digital goals. Organizations need to develop a road map to enable adoption of digital reality technologies in their current system landscapes and be future-ready by developing architectures, digital assets, and integrations that are scalable and deployable across process areas. This can be achieved by focusing on:

- **Building a business case.** Establish and showcase the value of enabling digital reality across process areas, and connect business strategy with execution and business value.
- **Identifying process areas.** Among varied business process areas, identify where the application can span across product design, engineering, sales, quotes, supply chain, services, and other functions.
- **Developing scalable architecture.** Establish solution development standards for interoperability, content production, and frameworks to ensure reusability and accelerated deployments.
- **Building digital assets.** Design rich digital assets that can be used across application use cases and can act as digital twins to physical-world objects.
- **Enabling enterprise integrations.** Develop integrations with traditional back-office ERP systems, modern cloud applications, and IoT data collection applications.

How can modern enterprise applications help?

Modern enterprise tools and applications provide features and capabilities that can help CIOs adopt digital reality strategies and enable the computing power required to support them fully. Each of these strategies can independently drive adoption and collectively drive enablement of a modern experience in the organization.

- **Storage.** Oracle's database (on-premises/cloud) provides features to enable trends like the no-collar workforce and digital reality. With cloud tools providing better controls, personnel can manage increasing storage requirements on demand. Organizations can adapt modern database features to prepare for the future.
- **Core integration.** Oracle Cloud platforms and applications (SaaS, PaaS, IaaS, etc.) provide integration capabilities that can help organizations to be ready and open with integrations at one end of the hook while the other end is being enhanced by headgear or other digital reality device manufacturers.
- **Analytics.** Integration and storage capabilities can make it easier for organizations to use modern analytic cloud platforms if they haven't begun the transformation journey yet.
- **Bandwidth and networking.** Organizations can design applications that can rely solely on in-device storage, integrations with applications for transactional data, and signals from managed PaaS solutions that do not need higher bandwidth network signals. Once enabled, it is possible to enhance these applications to utilize the full capabilities of modern 5G networks.

Oracle perspective

Use cases

COLLABORATIVE ENGINEERING AND IMMERSIVE SALES EXPERIENCE

A telecommunications equipment manufacturer wanted to drive tighter collaboration and efficiency in the design, development, and sales of its communications equipment and infrastructure-planning services. Designing such complex and secure products involves multiple personnel, located across the globe. The engineering team designs the products and infrastructure-equipment layout while the sales team works in tandem on proposal development. A tremendous amount of design and proposal material is generated, which can be confusing across the teams.

This company implemented a digital reality solution that enabled engineering to share complex product information with sales, which improved the integration and sharing of information between the two teams and simplified the sales process. It used Oracle Cloud and Oracle Installed Base to deliver integration to pricing for new equipment and infrastructures, as well as to install base equipment.

RFP responses are now similar in nature, with some variations depending on the layout of the space or area. A reusable digital reality application provides capabilities to create a network layout on geological maps or floorplans that delivers a concise view to executives and details to engineers. This application can enable a smart workspace for engineers and the sales team to connect and collaborate during build, presale, and sales processes while delivering a compelling story. Additionally, information is now a virtual overlay on design materials, thus providing a superior sales experience.

A number of digital assets were created, including:

- Geological maps/layouts for engineers to collaborate and design the layout
- Digital equipment to enable engineering to layouts on maps and floorplans
- Digital twins for infrastructure equipment

The result has been a well-designed digital reality solution that has improved the integration and linkages through the design, sales, and support process.

Bottom line

As more DR use cases accelerate into full production, the idea that immersive technologies could become the "next big platform" seems less like science fiction and more like a reasonable vision of the future. To be sure, challenges remain along digital reality's path to full commercialization. But these challenges do little to diminish its long-term disruptive potential. Digital reality is poised to transform the way we interact with data and experience the world around us. Are you ready?

AUTHORS

Oracle perspective

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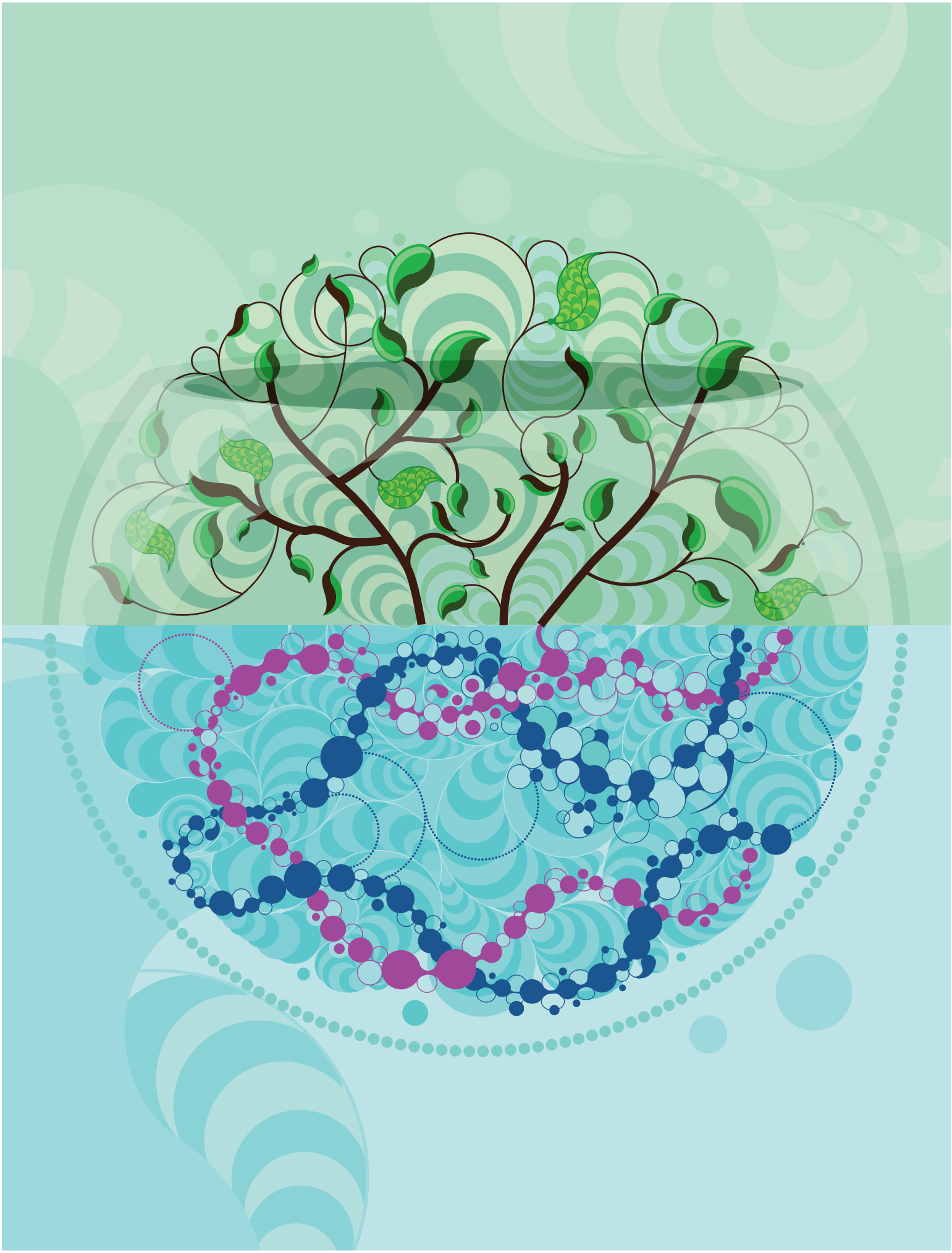


Blockchain to blockchains

Broad adoption and integration enter the realm of the possible

Blockchain technologies are on a clear path toward broad adoption, with proofs of concept shifting toward production and leading organizations exploring multiple concurrent use cases of increasing scope, scale, and complexity. Moreover, initial coin offerings and smart contracts are finding more applications and creating more diversity throughout the blockchain ecosystem. Now is the time for organizations to begin standardization on the technology, talent, and platforms that will drive future blockchain initiatives, as well as to begin to identify business consortia to join. Beyond these immediate steps, they should also look to the horizon for the next big blockchain opportunity: coordinating, integrating, and orchestrating multiple blockchains working together across a value chain.

Amid the media frenzy surrounding bitcoin a few years back, prescient technologists and business leaders recognized that the real story was not the scandals swirling around Silk Road or Mt. Gox but rather bitcoin's technology endoskeleton, blockchain. They saw tremendous disruptive potential in this open, shared ledger platform. For example, public and private sector organizations might use it to share information selectively and securely with others, exchange assets, and proffer digital contracts.[1] Individuals could use blockchain to manage their financial, medical, and legal records—a scenario in which blockchain might eventually replace banks, credit agencies, and other traditional intermediaries as the gatekeeper of trust and reputation.[2]

Though, at the time, few use cases for such opportunities were ready for prime time, the notion that blockchain had significant potential not just for business but in society as a whole began to gain traction. Today, blockchain is garnering headlines once again, this time for the vast ecosystem of cross-industry use cases emerging around it. Blockchain is now finding applications in every region and sector. For example:

- Europe's largest shipping port, Rotterdam, has launched a research lab to explore the technology's application in logistics.[3]
- Utilities in North America and Europe are using blockchain to trade energy futures and manage billing at electric vehicle charging stations.[4]
- Blockchain is disrupting social media by giving users an opportunity to own and control their images and content.[5]
- Blockchain consortia—including the Enterprise Ethereum Alliance, Hyperledger Project, R3,

and B3i—are developing an array of enterprise blockchain solutions.

This list is growing steadily as adopters take use cases and proof-of-concepts (PoCs) closer to production and industry segments experiment with different approaches for increasing blockchain's scalability and scope. Yet there are several issues that warrant attention. With the proliferation of platforms and protocols in the marketplace today, no single solution has emerged as the clear winner; consequently, no technical or process standards are yet in place. Likewise, operational silos keep some companies from either developing clear business plans around blockchain or collaborating with ecosystem partners for mass adoption.

As the latest blockchain trend unfolds over the coming months, expect to see more enterprises push beyond these obstacles and turn their initial use cases and PoCs into fully deployed production solutions. Many people assume that enterprise blockchain adoption is further along than it actually is; in reality, it will take time and dedication to get to large-scale adoption. But when it does arrive, it will be anchored in the strategies, unique skill sets, and pioneering use cases currently emerging in areas such as trade, finance, cross-border payments, and reinsurance.

As these sectors lead in the coming months, blockchain's future will follow.

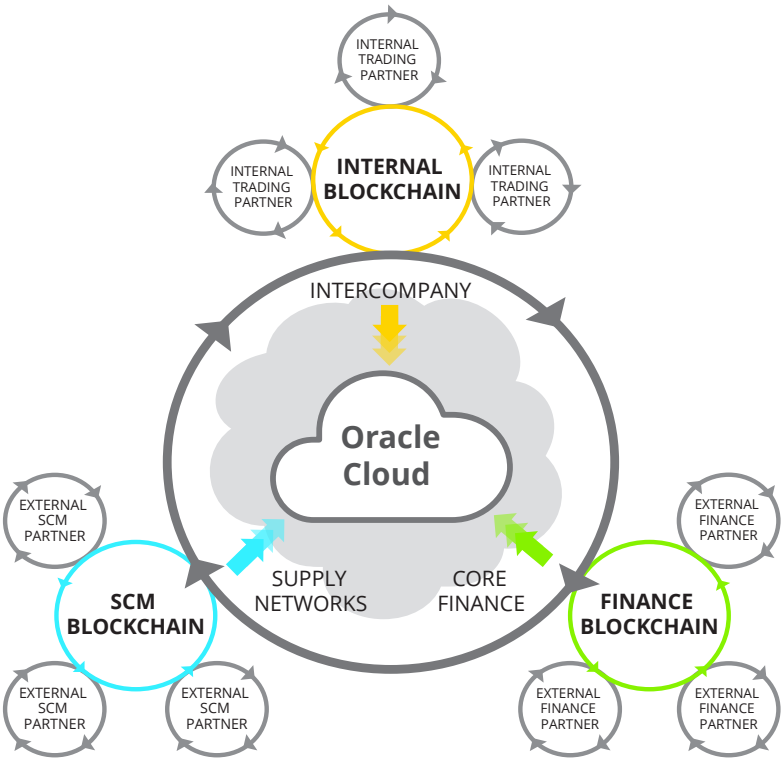
Oracle perspective

Blockchain solutions change the way businesses interact with each other, and even with their own enterprise architecture

Impact on enterprise applications and operations

Organizational use cases for blockchain can be categorized broadly into three major process areas within an enterprise. The first is blockchain's original domain—financial transactions. This includes, but is not limited to, cross-border payments, supplier and customer invoicing cycles, and automated payments originating from smart contracts. The second process area is supply chain management. This includes proof of origin (both for physical goods and "right of ownership"–type goods), in-transit goods tracking, and compensation for damaged goods based on smart contracts. The third process area is internal processes. While external-facing use cases are more commonly discussed, there are numerous use cases for blockchains within an organization on a fragmented enterprise applications structure, such as intercompany reconciliation, intercompany settlements, and intercompany transfer of value. These internal-process use cases are also a great way for risk-averse organizations to test the waters of blockchain; they help demonstrate the value blockchain creates within the enterprise to make the case for scaling up the solution to involve their trading partners for broader-scale adoption and impact.

Figure 1. Oracle Cloud: Blockchain platforms act as extended arms of ERP application



Oracle perspective

The various transactions resulting from these business processes occur across the multiple blockchains to which the organization may subscribe. As enterprises conduct their daily operations, these transactions are generated, processed, and in turn submitted to the next blockchain. Enterprise solutions need to be architected in a manner that enables multiple touch points with the disparate blockchain solutions an organization utilizes. This position allows Oracle Cloud ERP to be the central point for an organization's transaction status, while allowing each independent blockchain platform to act as an extended arm of the ERP application (see figure 1). In addition, this easily allows the enterprise to continuously enhance the use cases their applications address.

Oracle perspective

Use cases

Blockchain technologies will continue to find strong and compelling business-process use cases for the enterprise across the core process areas. To this end, there are three sample use cases to examine, one aligning to each of the three major business process areas previously described:

CORE FINANCE – BUSINESS-TO-BUSINESS PAYMENTS

Organizations' payment cycles today face many inherent inefficiencies as part of the overall business process of submitting, processing, and receiving payments between businesses. Payment cycles today are slow, averaging four to five business days, or potentially longer if transacting parties are in different countries. Payment requests can also have high overhead costs, as banks may charge per transaction, and organizations may need to lock cash in foreign currency bank accounts to expedite payments to foreign suppliers. Organizations also rely on intermediary "trust" parties such as clearing houses to process payments with their business partners.

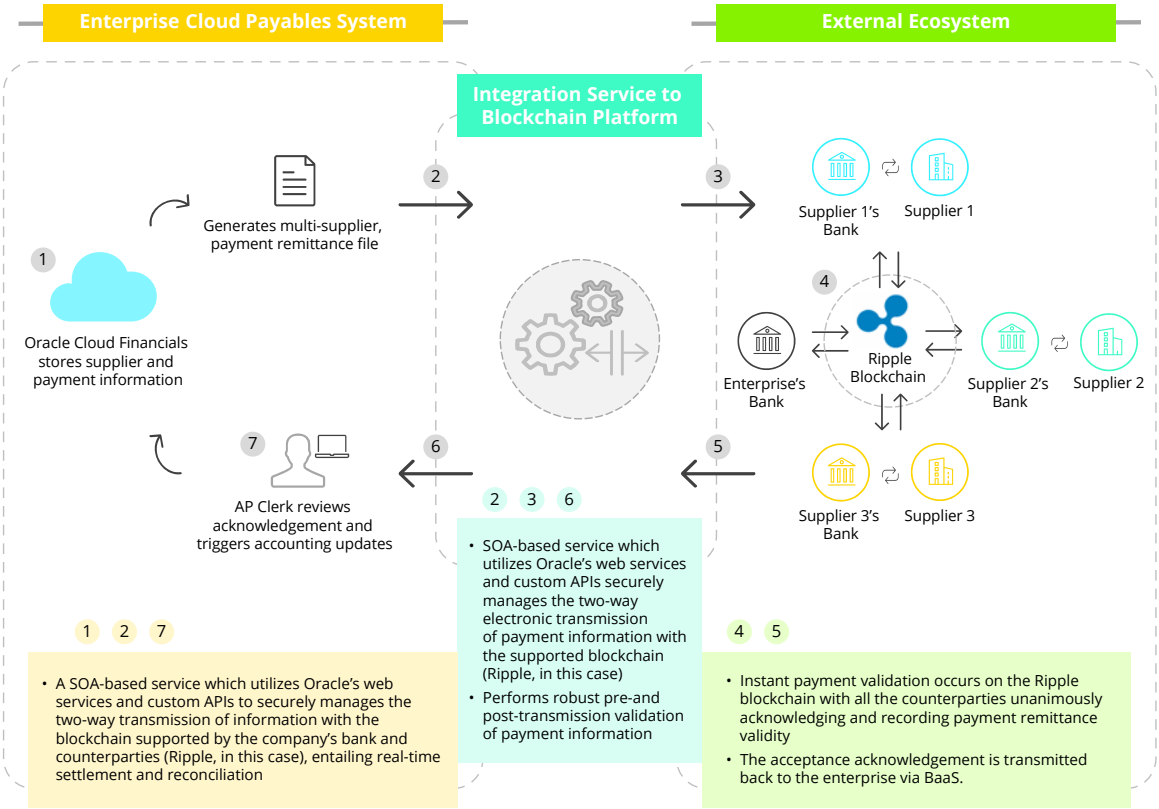
A blockchain-based business-to-business payment solution (see figure 2) addresses the core issues of payment processing, while utilizing Oracle Cloud as the foundation:

- Payment cycles can be drastically shortened by the inherent near-real-time nature of blockchain transactions. Instead of the sequential process required today for payment processing, all involved organizations interact as soon as the payment request is made. Transactional data is validated and the payment is approved between the transacting parties almost instantly, reducing multi-day processing times to minutes.
- Overhead costs can be reduced by eliminating intermediary clearing houses and their associated fees. For cross-border payments, blockchain transactional fees (such as Ripple) are significantly lower than the fees banks levy on similar payments.
- Working capital can be improved and exposure to foreign exchange risks can be reduced due to the shorter payment cycles (with potential to negotiate better payment terms, i.e., "32 days" instead of "30 + 4 days") as well as avoiding the need to lock working capital in foreign currencies for payments.

Oracle perspective

Use cases

Figure 2. Blockchain-based business-to-business payment solution



SUPPLY CHAIN – PROOF-OF-ORIGIN TRACKING

The movement of a product from supplier to customer requires the interaction of a complex system of human and mechanical inputs, all of which need to be tracked and traced from origin to final delivery. Each touch point in the process demands logging of the status, inspection results, risk assessment, and more, with each stakeholder maintaining the details in their respective transaction recording systems, which differ widely in architectural complexity. This leads to organizations being left with limited visibility of the originating point of a product, having to rely on the supplier, the supplier's suppliers, or third parties and partners for goods authentication. The inability to capture and validate all transactional data within a product's value chain can leave an organization's supply network prone to fraud and regulatory non-compliance due to lack of end-to-end visibility of a product's path.

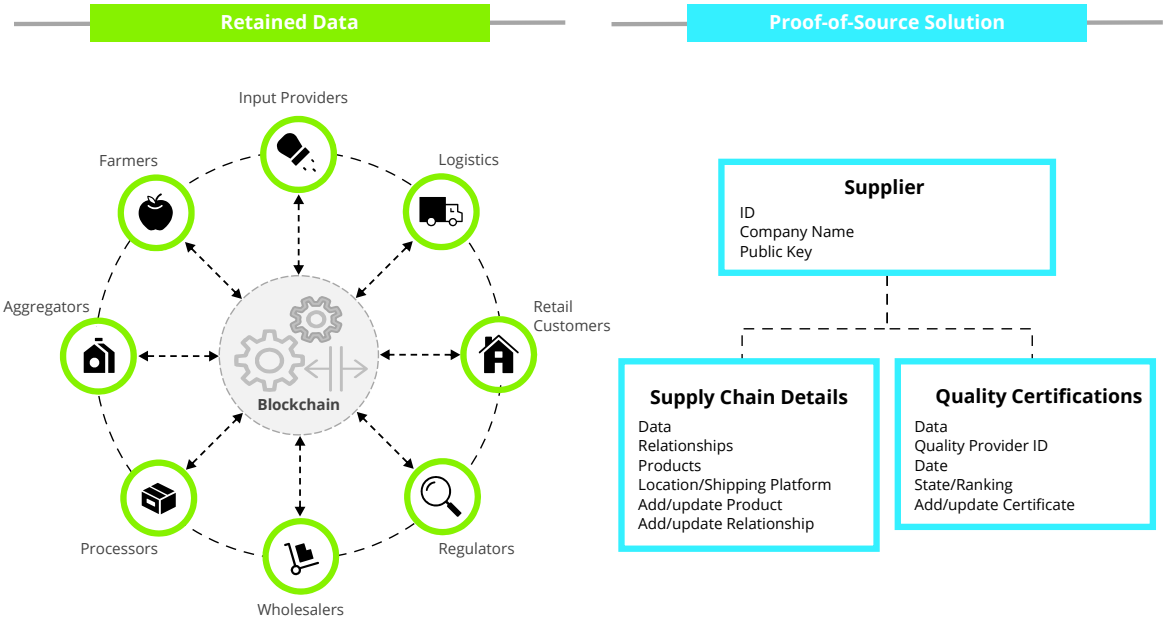
Oracle perspective

Use cases

A blockchain-based proof-of-origin solution (see figure 3) addresses the core issues in tracking a product's status in real time, all while utilizing Oracle Cloud as the foundation:

- The use of validation protocols stored on the blockchain and associated with product SKU numbers enable the receiving organization to instantly verify attributes associated with the goods such as manufacturing origin, country of origin, and vendor.
- All related transactions and their metadata are stored locally by each participant, improving overall transparency across transacting parties. All members of the blockchain constantly revalidate these immutable records with one another, reducing the potential for fraud.

Figure 3. Blockchain-based proof-of-origin solution



This use case creates a single source of truth throughout the supply chain. All members have a local instance of the blockchain and a consensus protocol updates the shared ledger so that all parties gain visibility into each party's shared inputs.

Oracle perspective

Use cases

KEEPING IT INTERNAL – INTERCOMPANY RECONCILIATION

For organizations operating on multiple enterprise applications, intercompany processing can be a challenge. Each system (and the transactions it generates) must be reconciled against the transactions or accounting generated from all other interacting systems. In addition, intercompany settlement processes can involve costly cross-border payments between an organization's various legal entities, which can take days to clear and may only occur monthly as part of period-close procedures. For finance and accounting executives, it is difficult to know the current state of intercompany accounting.

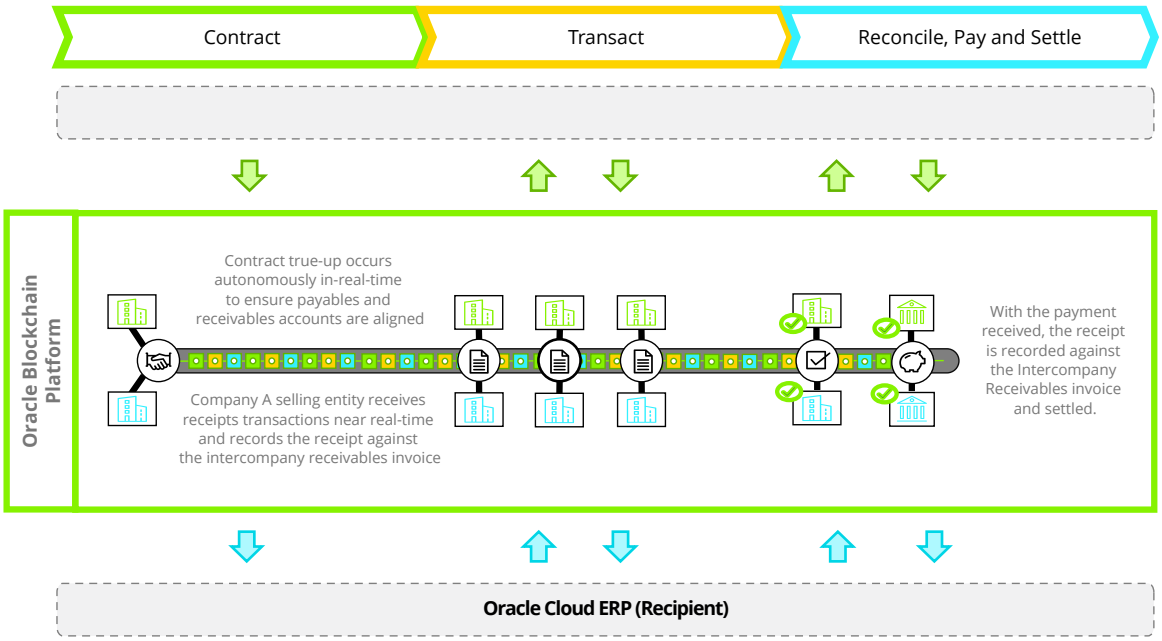
An intercompany blockchain solution addresses the core issues in multiple ways (see figure 4), while utilizing Oracle Cloud as the foundation:

- Intercompany transactions are pushed to the intermediate blockchain by all transacting enterprise systems. This can include internal requisitions (IRs), internal sales orders (ISOs), intercompany AR and AP invoices, and intercompany AR and AP account balances. All transactions are verified upon submission to the blockchain.
- Processed transactions can create open accounting balances immediately upon validation, instead of relying on a feedback confirmation from boundary systems that data has been received and verified.
- Completed transactions can initiate intercompany payments in real time, instead of relying on month-end netting and payments. Settlements can be done either in true fiat currency or in a company-specific token utilized explicitly for intercompany value transfers.

Oracle perspective

Use cases

Figure 4. Blockchain-based intercompany processing solution



Bottom line

With the initial hype surrounding blockchain beginning to wane, more companies are developing solid use cases and exploring opportunities for blockchain commercialization. Indeed, a few early adopters are even pushing PoCs into full production. Though a lack of standardization in technology and skills may present short-term challenges, expect broader adoption of blockchain to advance steadily in the coming years as companies push beyond these obstacles and work toward integrating and coordinating multiple blockchains within a single value chain.

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Oracle perspective

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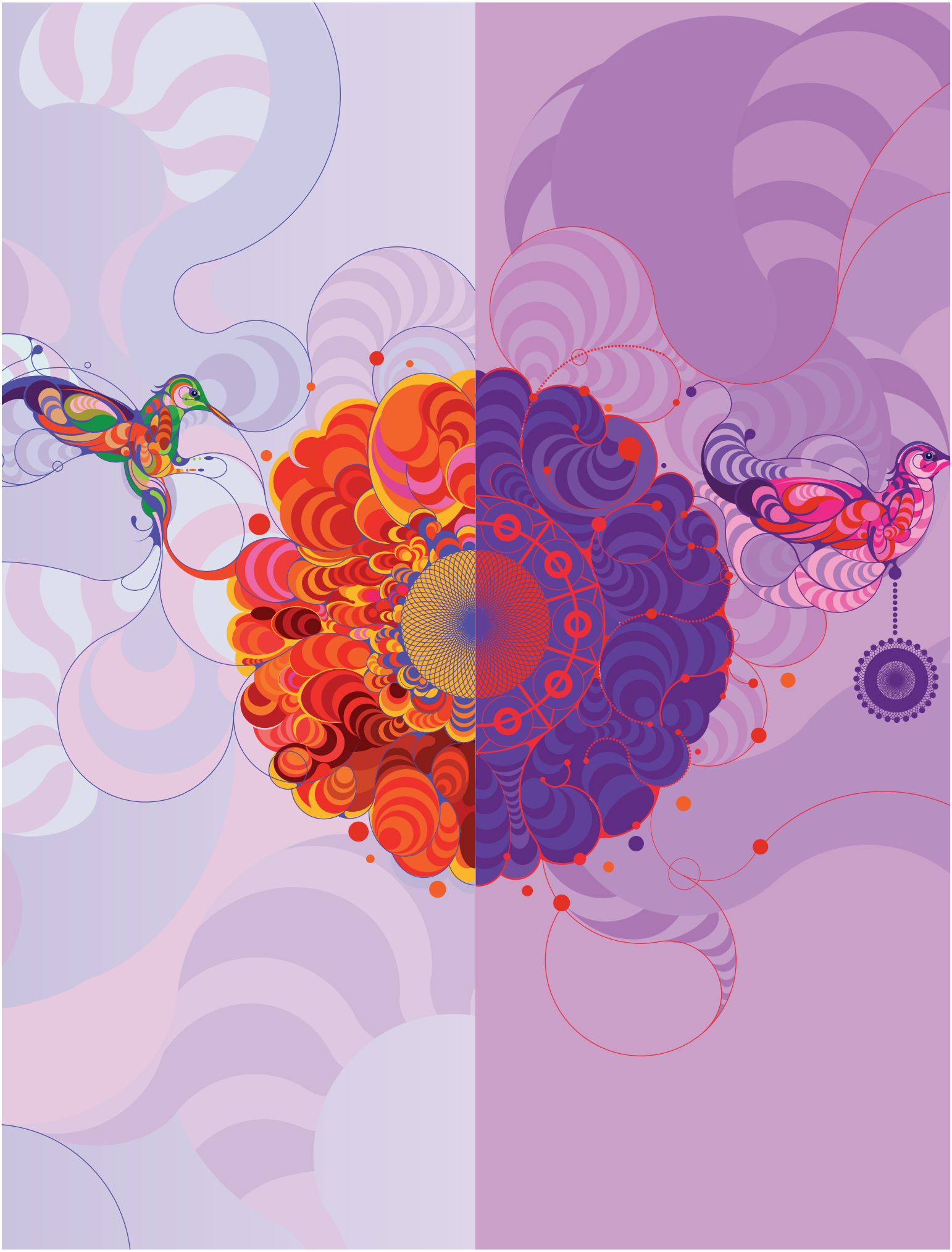


API imperative

From IT concern to business mandate

For many years, application program interfaces (APIs) have made it possible for solutions and systems to talk to each other. But increasingly, companies value these often-overlooked technologies for another capability: They expose technology assets for reuse across and beyond the enterprise. Not only can reuse drive greater ROI in IT investments, but also it can offer API consumers a set of building blocks for using existing data, transactions, and products in creative ways. As part of the growing API imperative trend, organizations have begun exploring new ways to expose, manage, and control APIs. As this trend gathers momentum in the coming months, expect further innovative approaches to emerge for contracting, pricing, servicing, and even marketing a venerable technology that has become a critical pillar of many digital ambitions.

LOOKING back across successive industrial revolutions, interoperability and modularity have consistently delivered competitive advantage. Eli Whitney's interchangeable rifle parts gave way to Henry Ford's assembly lines, which ushered in the era of mass production. Sabre transformed the airline industry by standardizing booking and ticketing processes—which in turn drove unprecedented collaboration. Payment networks simplified global banking, with SWIFT and FIX becoming the backbone of financial exchanges, which in turn made possible dramatic growth in trade and commerce.

The same concept manifests in the digital era as "platforms"—solutions whose value lies not only in their ability to solve immediate business problems but in their effectiveness as launching pads for future growth. Look no further than the core offerings of global digital giants, including Alibaba, Alphabet, Apple, Amazon, Facebook, Microsoft, Tencent, and Baidu. These companies have become dominant, in part, by offering platforms that their customers can use to extend services to entire ecosystems of end users, third parties, and others—platforms designed around the principles of interoperability and modularity.

In the world of information technology, application programming interfaces (APIs) are one of the key building blocks supporting interoperability and design modularity. APIs, an architectural technique as old as computer science, can help improve the way systems and solutions exchange information, invoke business logic, and execute transactions. Increasingly, APIs are becoming a strategic mandate. In previous editions

of *Tech Trends*, we have tracked the growth of API deployment and the increasingly critical role that APIs are playing in systems architecture, innovation, modernization, and the burgeoning "API economy."[1] As of early 2017, the number of public APIs available across multiple vendors surpassed 18,000, representing an increase of roughly 2,000 new APIs over the previous year.[2] Across large enterprises globally, private APIs likely number in the millions.

APIs can deliver a variety of operational and strategic benefits. Revitalizing a legacy system with modern APIs encapsulates intellectual property and data contained within that system, making this information reusable. Likewise, building APIs onto monument systems makes it possible to extract more value from IT assets, while at the same time using valuable existing data to drive new innovations. Finally, incorporating APIs into new applications allows for easier consumption and reuse across new web, mobile, and IoT experiences, along with the option for exposing those APIs externally to enable new business models and partner ecosystems.

The basic API logical architecture provides a blueprint for executing an API strategy, designing and deploying APIs to deliver the greatest value (see figure 1). To avoid the common trap of over-engineering API architecture, consider basing the design on existing enterprise domains—for example, sales and marketing, finance, or HR—and then mapping APIs to the services that each domain potentially can expose.

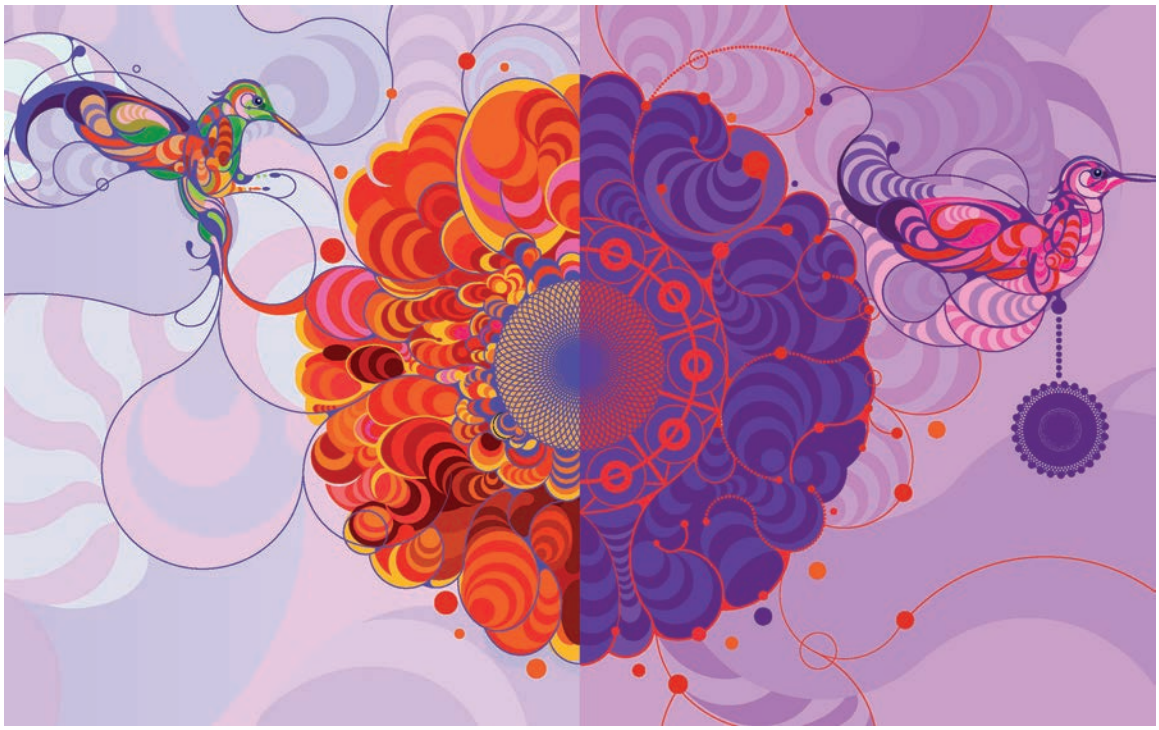
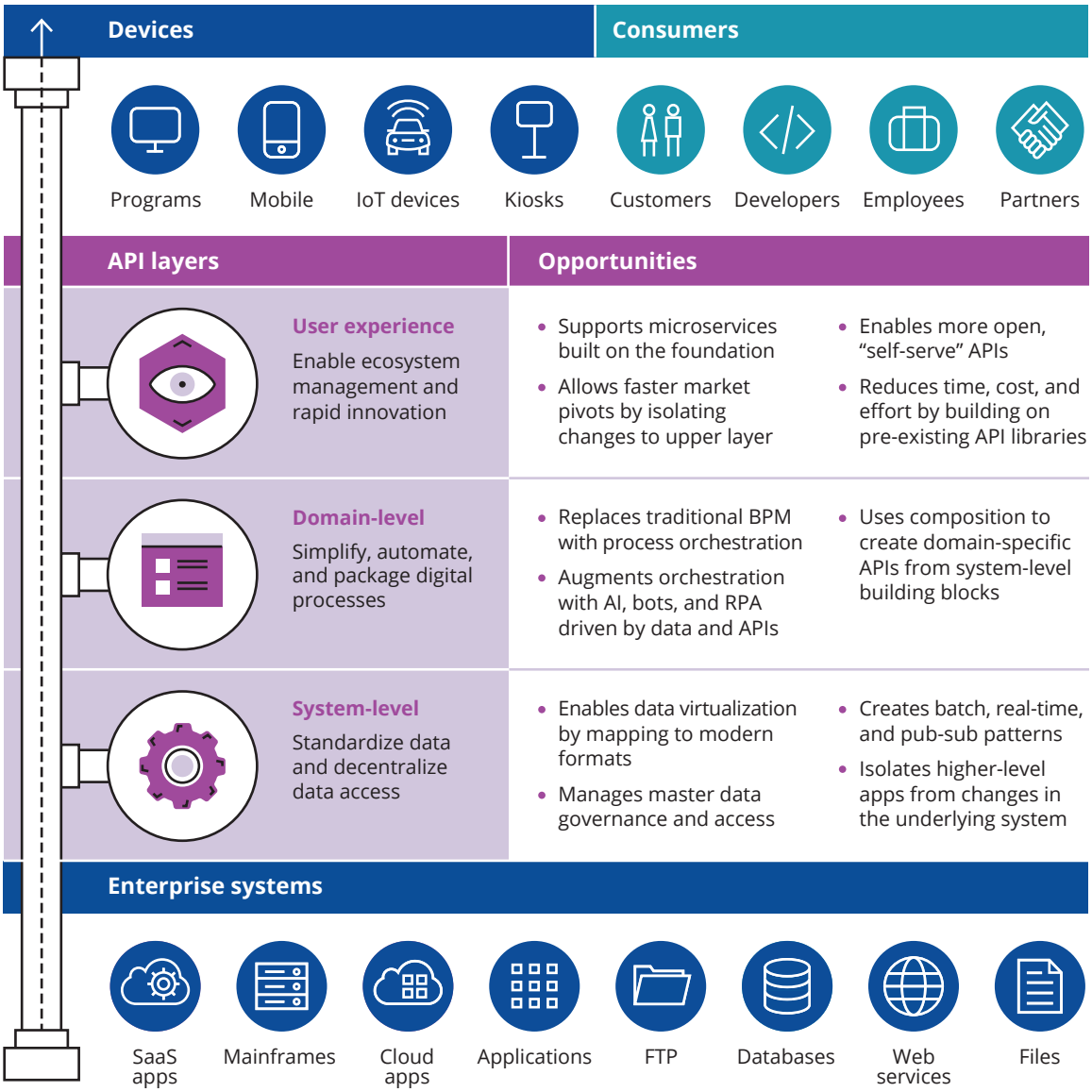


Figure 1. API logical architecture



Source: Deloitte analysis.

If every company is a technology company, then the idea that technology assets should be built for reuse seems intuitive. Reuse requires new capabilities to manage the exchange of what is essentially an encapsulation of intellectual property. These new capabilities also make it possible to support the flow of information and operations across organizational boundaries, and to manage the discovery, usage, and servicing of API assets. Collectively, the strategic intent of APIs and this underlying enabling response represent the API imperative trend—the strategic deployment of application programming interfaces to facilitate self-service publishing and consumption of services within and beyond the enterprise.

Oracle perspective

API imperative enhances the way we implement, interact with, and experience enterprise solutions

Hybrid IT infrastructure

A hybrid infrastructure is composed of a combination of on-premises data centers, private clouds, and/or public clouds. For most organizations with on-premises technology investments, operating in a hybrid architecture is a necessary part of cloud adoption. It is very rare for businesses, particularly ones that have operated for several years, to exist entirely on premises or entirely in the cloud. Traditional IT organizations have existing data centers that need continued support while cloud technologies are being adopted. This balancing act of cost, flexibility, control, risk, and security is pushing many organizations to adopt hybrid IT strategies. Organizations increasingly will live in a hybrid world, with some applications in the public cloud and others in data centers. Enterprise systems and applications are deployed on any of these environments, depending on the strategic business needs, the tactical requirements, and the required outcome. Today's enterprises must have an integration strategy that seamlessly unites applications and systems deployed anywhere: on premises, in a public cloud, a hybrid cloud infrastructure, or in a private cloud. And, APIs are a key enabler for the integration of these infrastructure platforms.

Operations transformation

The emergence of APIs is transforming businesses from day-to-day IT operations to the way we interact with our customers. Businesses are increasingly realizing the organization and cost efficiencies that digital transformation can provide. IT departments are able to leverage their talent in innovative ways by repurposing resources previously tied up in administrative and maintenance activities, since APIs are able to autonomously perform these tasks. With decision science and machine learning embedded directly into business processes, business leaders can focus on managing their business outcomes rather than managing new technology. Customer engagements are simplified while simultaneously providing them with instant, valuable data insights into their business. Ultimately, APIs are igniting a cultural shift within many organizations by enabling the integration of diverse IT systems, building more collaborative and self-service IT environments, and deriving revenues from existing IT assets.

Autonomic platforms

The constant demand for automation can be satisfied by autonomic platforms with their scalability, self-monitoring, self-learning, and self-healing. With more and more of IT becoming expressible as code—from underlying infrastructure to IT department tasks—organizations now have a chance to apply new architecture patterns and disciplines. Taking advantage of this opportunity may remove dependencies between business outcomes and underlying solutions while redeploying IT talent from routine low-value work to higher-order capabilities. Making the move to autonomous APIs will enable IT to provision data warehouses within seconds to minutes, populate data catalogs with intelligent data profiling, and provide automated analysis of key findings with visualization and narration. Businesses will need to prioritize integration of machine learning and crowdsourced APIs into their IT as they become more prevalent. This never-seen-before brand of freedom and automation on the cloud will affect the way users approach their everyday lives.

Microservices and application integration

Large enterprises often deploy thousands of applications to support and enable business. Increasingly, organizations are deploying a microservices approach to break down systems and rebuild them as self-contained embodiments of business rules. The emergence of microservices and the success of core revitalization initiatives have given rise to a fundamentally different approach to software design in which core components are no longer interdependent and monolithic but, rather, "loosely coupled." Microservices look to break larger applications into small, modular, independently deployable services that communicate over APIs. This approach creates a modernized application architecture, further powering the API economy. The API and microservices platform delivers a true DevOps experience that supports velocity and scalability by enabling an automated continuous integration/delivery pipeline.

API-driven digital transformation

Velocity is a key factor for organizations undergoing transformation. In many cases, an organization's individual digital assets alone are not sufficient but require leveraging and combining with those of others in interesting and novel ways. This leads to creation of platforms through a network effect that is made possible by APIs. APIs are driving digital transformation across industries and markets. Organizations are leveraging APIs to extend their business capabilities through partners, customers, and other ecosystem engagement channels. This is true of both B2B and B2C initiatives. Web APIs are paving the way for expanding the market reach and acquiring new customers through multiple channels, primarily social and mobile applications. Many cloud service providers are shifting their focus from monetizing in traditional ways to exposing their key capabilities for digital businesses. Particularly with big data platforms and the Internet of Things bringing digitization to myriad products and services, the influence of APIs is growing far beyond technology firms.

Oracle perspective

Use cases

IMPROVING CUSTOMER EXPERIENCE USING A MICROSERVICES ARCHITECTURE

A company that focuses on a personalized shopping service struggled to establish a cohesive strategy between the digital and physical experience of its customers. The development team needed to rethink its approach to enable an enriching customer experience.

The firm's tech strategy revolves around a design-first approach where front-end and back-end developers collaborate to create the customer experience through APIs. Oracle's Apiary enabled customer teams to effectively design and document their APIs. The tool serves as a medium for developers and non-developers to review app designs through the use of a shared blueprint. The process emphasizes what the endpoint will do before any code is written, permitting stress-free feedback for the APIs. To take it further, the back-end platform is built on a microservices architecture where each data element acts as its own service delivering data. The real beauty of the process is found in the API that consolidates all of these data elements into one package for the user to experience through the front-end app. This solution effectively tackles both the user experience and the behind-the-scenes headaches.

The use of an API-oriented microservices architecture and leveraging API design and documentation tools resulted in expedited development and efficient collaboration. These improvements enabled the data science and back-end teams to work in parallel, allowing more innovation while maintaining the reliability of the APIs to align disparate elements.

ENHANCING VR COMMERCE THROUGH APIS AND MACHINE LEARNING ALGORITHMS

A global payment processing company launched a virtual reality (VR) commerce app to help merchants manage purchases made on digital shopping platforms worldwide. VR commerce is drastically more complex than traditional commerce platforms. Payments are validated by head movement, eye scans, and vocal cues in the midst of the customer's 360-degree immersive experience.

Machine learning algorithms and APIs have enabled the analysis needed to assist merchants in determining the precise moment when they should promote their products in response to shopper behaviors. The customers aren't the only focus of the company, though; it also sees an opportunity to address the needs of its merchants by accelerating payment processing time. APIs within Oracle Financials Cloud enable direct connectivity to banks and credit card networks using all types of transaction platforms. In addition, they can build API scripts to automatically pull transactional data in real time. From an operational perspective, the cloud APIs allow the firm to scale and increase ROI without adding headcount.

The resulting process lets the organization compress transaction flows from consumer purchases to merchant payment receipts within minutes, bypassing the traditional manual process with payment specialists.

Bottom line

As pioneering organizations leading the API imperative trend have discovered, companies can make more money by sharing technology assets than by controlling them. Embracing this trend fully will require rethinking long-held approaches to development, integration, and governance; but clinging to the old ways is no longer an option. The transition from independent systems to API platforms is already well under way. Don't be the last to learn the virtues of sharing.

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Oracle perspective

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ENDNOTES

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