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Infosys Live Enterprise – A Continuously Evolving and Learning Organization

Infosys® | Knowledge Institute

Contents

Introduction

"The best way to predict the future is to invent it."

— Alan Kay

Infosys has embarked on a transformational journey to reinvent the way it and its clients do business.

Like our most visionary clients, Infosys' goal is to become a completely knowledge- and data-driven organization, with agility built into its DNA so that it can quickly sense changing business needs and continuously evolve in response.

The holy grail is a strong business core — a seamless network of partners, suppliers and customers who talk to each other in real time, intelligently and at the speed of data.

But we are not there yet, and the road is challenging.

We are envisioning Infosys to be a Live Enterprise powered by the Infosys Digital Platform. The vision with the digital platform is to provide everyone who uses it with a frictionless digital experience wherever they are in the world. Anytime, anywhere access will be achieved. The platform will be completely scalable and secure, and will feature online and offline compatibility in a flawless, employee-centric manner.

According to the chief architects of this transformation, the platform, when fully built to specifications, will enable Infosys to "achieve major-league knowledge sharing, collaboration, process simplification, hyper-productivity, automation, smarter workplace and drive AI-based continuous learning." It will also create a level playing field for every person in the enterprise to access the company's intellectual capital.

Employees will be positioned at the sensing-feeling-responding core of the company, with the ability to seamlessly interact with and continuously learn from the client and partner ecosystem. Each one of these interactions, with the associated intelligence, will be recorded and linked in real time through the Infosys Knowledge Graph to drive a better experience, pan-enterprise visibility and operational efficiency.

The platform will also be multi-tenant (access to multiple or shared users) so that Infosys' global subsidiaries can gain access to the platform — a traditionally disruptive thought indeed.

Perhaps most excitingly, users will benefit from "sentience." Here, the enterprise acts much like a flock of starlings that move together in beautiful synchronicity, each member of the flock matching the speed and direction of the nearest seven or so neighbors to produce stunning murmurations.

To achieve this vision, the internet of things (IoT), automated processes, low latency and straight-through processing of requests will be enabled on the platform. The whole enterprise will behave much like an organism that feels, thinks and acts based on intelligent information at the point of insight. The main benefit of this sentient platform is an unparalleled user experience that keeps getting better as more and more data is fed back into it, in a flywheel effect — where more traffic increases the quality of data coming through, which in turn improves the sentient experience as the platform continuously observes, learns and optimizes what comes before. The enormous potential of the sentient organization will need to be balanced with careful attention to employee, customer and partner privacy.

This paper is a summary of Infosys research and our reality, and describes how organizations can pursue the Live Enterprise to achieve higher levels of agility, insight and value from their information sources. We also hope this report will be a useful guide for business leaders on their own digital transformation journey.

The digital ecosystem

Gartner research defines a digital ecosystem as "an interdependent group of enterprises, people and things that share standardized digital platforms for a mutually beneficial purpose, such as commercial gain, innovation or common interest." [1]

Digital ecosystems enable firms to interact with customers, partners, adjacent industries — even their competition.

The four most valuable public companies in the U.S. — Google, Apple, Facebook and Amazon, collectively known as "GAFA," — are all orchestrators of digital ecosystems [2]. Baidu, Alibaba and Tencent, collectively known as "BAT" and valued at a combined $1 trillion, are the most active digital ecosystems on the planet, fueled by a treasure trove of user data across China [3]. Their power derives from the fact that users can have two-way conversations with the business — with thoughts, concerns and questions answered almost immediately, and products and services adapted accordingly. These ecosystems drill down on what users really value and why they really want to connect with others. By understanding the desires and motivations of its users, the operating model gives customers what they want, when they want it.

Customer expectations around service, engagement, response and support have escalated with the rise in power of these behemoths.

A brand is now measured by the 24/7 service it provides and how this fits with the customer's life.

Can other companies build their own digital ecosystems and walk in the footsteps of GAFA and BAT? Yes, but it requires navigating the high potential but risky seas of digital transformation.

Airbus, the multinational aerospace company, has taken the ecosystem route to build out its Skywise digital aviation data platform. The platform launched in March 2018 and aims to be the single platform of reference for all major aviation players, helping them improve operational performance and business results. The digital ecosystem integrates historically siloed types of data and data sources (such as aircraft and fleet configuration, onboard sensor data, and flight schedules) into one secure, cloud-based access platform [4]. Companies like easyJet use the platform to maintain their fleet of 300 aircraft; for example, they can analyze components on their aircraft, enabling predictive maintenance and reducing delays and cancellations.

Because digital ecosystems such as GAFA, BAT and Skywise are built around the customer, they achieve significant benefits in revenue and reputation. For instance, research by the Drucker Institute found that the top six of the top 250 companies it analyzed all built their business models around 360 views of the customer [5].

These orchestrators of digital ecosystems are so successful that it's tempting to believe that all other companies are disadvantaged if they don't get on board in the same manner. But here at Infosys, we believe that you don't have to copy the Facebook or Airbus model to realize significant success. Instead, when the operating model of these giants is deconstructed, some foundational components emerge that are also relevant to businesses that don't share their internal data with clients as fully, at scale. Agility, responsiveness and low latency in processes are primary components, along with the idea of sentient organisms mentioned above.

"While Live Enterprise finds common ground with GAFA and BAT models, there are also significant differences. We place the employees, along with customers, at the center of our digital ecosystem," says Rafee Tarafdar, senior vice president and unit technology officer at Infosys. "In doing this, we are stating that customer-centricity is necessary but not sufficient. By placing the employee at the center, the enterprise can execute its business services with intelligent routines built into business processes, and can adapt at the speed of data. The Infosys business model is still customer-centric, but the operating model — the way in which the business is constructed to derive value — is centered around the employee."

Major challenges

The constantly evolving market demands that ideas and knowledge be shared throughout the workforce much faster than legacy systems allow. Firms must also be agile, creative and responsible with data: the general data protection regulation, enforced in May 2018, has established a high bar for information sharing and security.

Because users are accustomed to recommendation algorithms from companies like Amazon and instant feedback from Uber, people in their day job quickly lose interest with an operating system (or platform) that thinks about yesterday when it should be planning for tomorrow.

Everyone from data scientists to executives want access to the right data at speed, with minimal response times. Over half of global executives surveyed by the Economist Intelligence Unit said that important business data is not captured or shared at their firms [6]; further, Teradata research found that 42% of respondents are battling poor enterprise data quality [7].

Users also want quick solutions to problems by tapping into knowledge reserves from their colleagues. If they don't get it from their laptop in real time, a lengthy process ensues of attaching files, sending emails and waiting for people to give them available time to support their need.

The wider employee base also expects a self-service culture at work when issues arise. Requests must be met in real time, with an attractive user interface; otherwise, users turn off and go elsewhere. Research by Forrester found that 73% of online users consider time their most important customer service priority [8] ; further research by the company shows that 75% of online users prefer to solve customer service issues on their own.

Organizations should provide tools that allow employees to complete actions by themselves with minimal support from IS teams. Security should be built within the flow so that data is extracted from systems with the right governance and controls in place, as required by corporate and regulatory policies.

Employees now expect intelligent routines that assist users in completing actions in real time, as well as digital assistants that use robotic process automation to complete trivial procedures, freeing up the workforce to concentrate on higher-value tasks.

There are numerous bottlenecks to processes within an enterprise. Whether a person is booking a hotel room or planning a budget, issues can emerge at all levels, whether because of experience (what the user actually sees) or the underlying technology architecture (high latency due to archaic data structures). This results in lower operational efficiency, substandard employee experience and lower market differentiation.

These are difficult challenges to overcome, and most organizations haven't taken decisive steps to address the mismatch between user expectations and business proficiency. In our report "Digital Radar 2019: Barriers and Accelerators for Digital Transformation," only 21% of firms surveyed are acting decisively to seize the opportunities offered by digital technologies. Firms that lag in these areas delay the opportunity to transform their culture and business model, and risk competitive disadvantage.

Changing core systems is a substantial undertaking, with multiyear programs common. Silo- and batch-based systems need to be overhauled, but for core systems, change is risky and hard. This is illustrated by the Trustee Savings Bank debacle in 2018 that saw 1.9 million customers locked out of their accounts when core systems were migrated from Lloyds' parent firm. And by the time new systems are implemented, completely new experiences and applications may have become the norm.

Even the choice of how to transform can be difficult: internal development, external partners, custom applications, commercial software? How can leaders take on the programmatic aspects of digital transformation to solve these problems while keeping an eye on the external market to stay relevant?

Reimagining work through Live Enterprise

The platform powering the Live Enterprise provides the scaffolding and structure that strengthens an organization's digital capabilities and advances its operating model for the digital era.

The platform ecosystem directly addresses the problems of agility, speed, curation of behavioral data, security, velocity of ideas and responsiveness to market forces across eight dimensions:

Agility and speed
A large organization with the speed and agility of a startup

Responsiveness
Increased velocity of reaction and response to a rapidly changing external environment.

Velocity of ideas
Increased velocity of ideas within the enterprise to leverage its collective ideas, insights, experience and knowledge.

Networked
Collaborative and seamless teamwork to ensure the best of the organization is brought into every interaction with the customer.

Hyper productive
Employees can focus on their customers and teams and can invest in their own learning.

Sentient
Create organizational sentience that makes every interaction value-adding while simultaneously eliminating nonproductive work.

Competitive advantage
Hugely differentiate the enterprise and make this a source of competitive advantage.

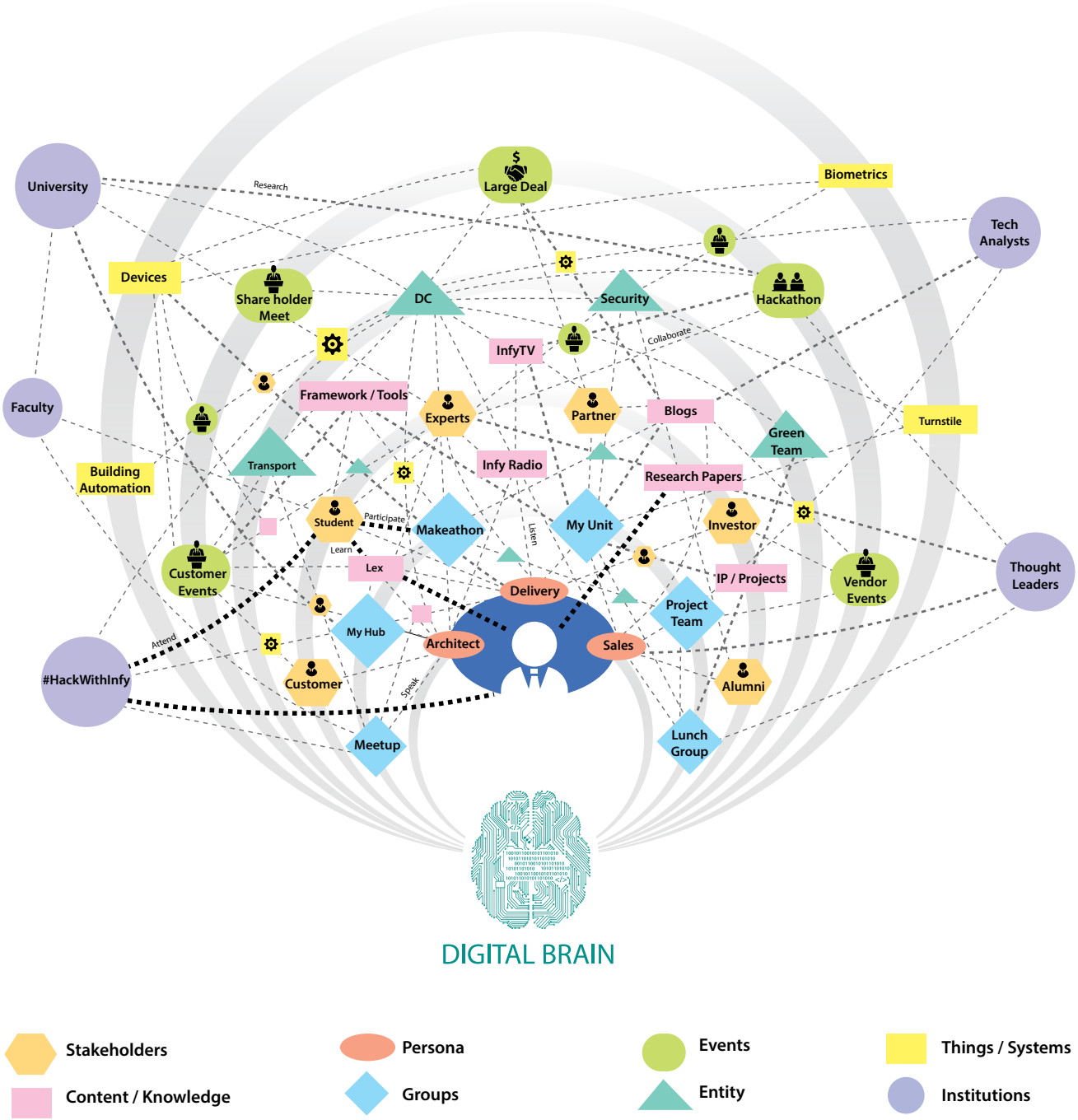
Smart workplace
API-driven smart workplace and polycloud infrastructure that is vendor agnostic and can be managed through new digital interfaces.

The highly networked, sentient organism is illustrated in Exhibit 1 — a high-level picture that suggests how difficult the challenge of digital transformation really is.

The platform that underpins this vision is comprised of six layers and includes a polycloud infrastructure with intelligence and services at the top. Business processes are reimagined for partner integration, and an innovation foundry is housed in the service layer so that employees can crowdsource and build innovative features.

Employees, customers and partners engage with the platform through the "interact" layer that enables in-the-moment insights and collaboration through software like Yammer and Teams, contextual search where relevant information is shown to users, and seamless experience across channels, both online and off. The digital brain — a center of intelligence that gives the enterprise higher cognition — makes every interaction a value-adding exercise so that employees can focus on creativity and innovation.

Exhibit 1. The digital platform enables the enterprise to be the best workplace and learning environment, with the employee at its heart



"The Live Enterprise is not just innovating incrementally, digitizing existing manual processes or moving the experience to a mobile application," says Tarafdar.

How is Infosys changing its own enterprise to focus on hyper productivity, achieve zero-latency in processes and facilitate continuous learning to instill new patterns of sentient behavior?

What lessons and insights are relevant for other firms?

Creating the future at Infosys

Live Enterprise is not just an idea to solve a hypothetical problem set; it is actually being implemented within Infosys. The intent is to also provide our clients a glimpse of their own possible future – a future where next-generation, cloud-native, internet-scale architecture is engineered using open-source software, commodity hardware and distributed agile delivery.

To understand the intent and potential of the Live Enterprise, it is instructive to contrast the current state and future aspirations, using Infosys as an example, through the eight dimensions listed above.

Table 1. Live Enterprise, an Infosys example

		Current State	Live Enterprise
1.	Agility and speed	Enterprise-centric	Ecosystem-driven
		Traditional bug fixing SLA model	Software reliability engineering model
2.	Responsiveness	Reactive and prescriptive	Proactive, predictive and intelligent
		Disparate tools and interfaces	Standardized tooling and integration patterns
3.	Velocity of ideas	Application-centric	API- and services-centric
		Siloed data	Integrated data
4.	Networked	Proprietary development stack	Open-source stack
		Multiple communication and collaboration channels	Unified communication and collaboration
5.	Hyper productive	Legacy processes	Frictionless and simplified processes
		BPM supported processes	Self-service and automated processes
		Embracing Agile	Agile, DevSecOps and extreme automation
6.	Sentient	Basic search and limited personalization	Integrated search and personalized experience
7.	Competitive advantage	Batch-driven	Streaming, real time and event-driven
		Customization-driven	Configuration- and extension-driven
		Mostly on premises	Cloud native and cloud first
8.	Smart workplace	Desktop and India-centric experience	Anytime, anywhere mobile experience
		Single cloud vendor	Polycloud infrastructure that is vendor agnostic

These high-level platform aspirations can be represented by platform characteristics, a framework, that if followed, will ensure competitive advantage, business processes and sentient routines that match or exceed those of digital natives.

Exhibit 2. To enable this new vision and promote interaction between users, the platform will support these 25 characteristics

All 25 characteristics are important for the success of Live Enterprise, and taken together, solve many of the problems that our clients face. A quick explanation of some of the highly essential characteristics follows. These characteristics (highlighted in Exhibit 2 in the left column) form much of the discussion that follows in the concluding sections, with an eye towards the sentient experience and routines that make Live Enterprise so disruptive and potentially rewarding.

Co-creation

Encourage co-creation of content through collaboration, communication, learning and sharing. Onboarding is made easy to support diverse co-creator needs. Sharing of knowledge through blogs, content search and showcasing of innovations. Message boards, forums and recommendation engines.

Fluidity

Seamless movement from one app to another, while retaining context. Business and information services available as externalizable interfaces to provide contextual and personalized experience. Consistent experience and user journey across devices.

Proximity

Platform will enable faster decision-making with minimal steps in flow. Decision-making process will involve fewer layers and presentation of relevant data at point of use for decision-making for all persona of the user.

Zero latency

Minimal iterations, faster information and action in the flow. Process and business capability key performance indicators should enable zero latency in each of the key processes. Enable straight-through processing wherever possible.

Micro feedback

For every user interaction and transaction, gather feedback and use it to improve the platform. All data is digitally collected and verified.

Simulation

Platform will enable users to run what-if scenarios in the flow. Platform will help evaluate distinctly different alternatives instantly in the flow.

Guided practice

Users have accessibility to knowledge and expertise to make the right decision in the flow. Platform guides users to perform activity in minimal steps and hides complexity of underlying processes. Process should enable sentient routines so users can be nudged to perform activities that bring about positive change.

Layered

All applications will follow a layered architecture, made up of interact, process, serve, intelligence, systems of record, shared.

More characteristics may be added over time, but the ones listed above have the potential to significantly increase capabilities to compete and operate efficiently.

True disruption

These characteristics are critical to architect and design a digital platform that can power a Live Enterprise.

"In our research to date, we have simply not seen many other examples of large enterprises that apply this level of automation, knowledge sharing and sentience at such scale and rigor."

– Jeff Kavanaugh
Global head – Infosys Knowledge Institute

With these characteristics, the platform will empower employees with the following features:

Intuitive experience
Employees will enjoy a personalized experience using in-house mobile apps: InfyMe, focused on enhancing personal productivity; Infy Work, focused on enhancing work and program productivity; and Learn & Career, for continuous learning. All onboarding will be done through Launchpad.

Intelligent
The employee will enjoy optimized processes, improved user journeys and personalized experiences.

Knowledge-driven
The creation, curation and sharing of knowledge is made effortless on the platform. Employees become "navigators" for their clients, using the "innovation foundry" — a hub to crowdsource and build innovative features.

Ecosystem-driven
A revocable virtual ID will be given to every employee so that they can integrate with the partner ecosystem and consume products and services.

Digital assistants
Employees will have easy access to the right information, processes, tools, expertise, case studies and IP solutions. This will inevitably increase productivity.

Smarter workplace
There will be a fast movement of intelligence through IoT products and technologies like vision analytics.

Collaborative
There will be an interplay among subject matter experts, teams, customers and partners through audio, video, chat and co-working mediums.

Polycloud infrastructure
The employees and our clients will be able to access and provision infrastructure on the cloud and edge through self-service tools and will be agnostic to the underlying cloud, making it truly cloud neutral.

With these high-level features in place, the business model of Infosys is still customer-centric, but the operating model — the way in which the business is constructed to derive value — is centered around the employee, giving Infosys the feel of a startup, able to respond to market changes and giving rise to new opportunities to innovate.

Infosys Live Enterprise architecture

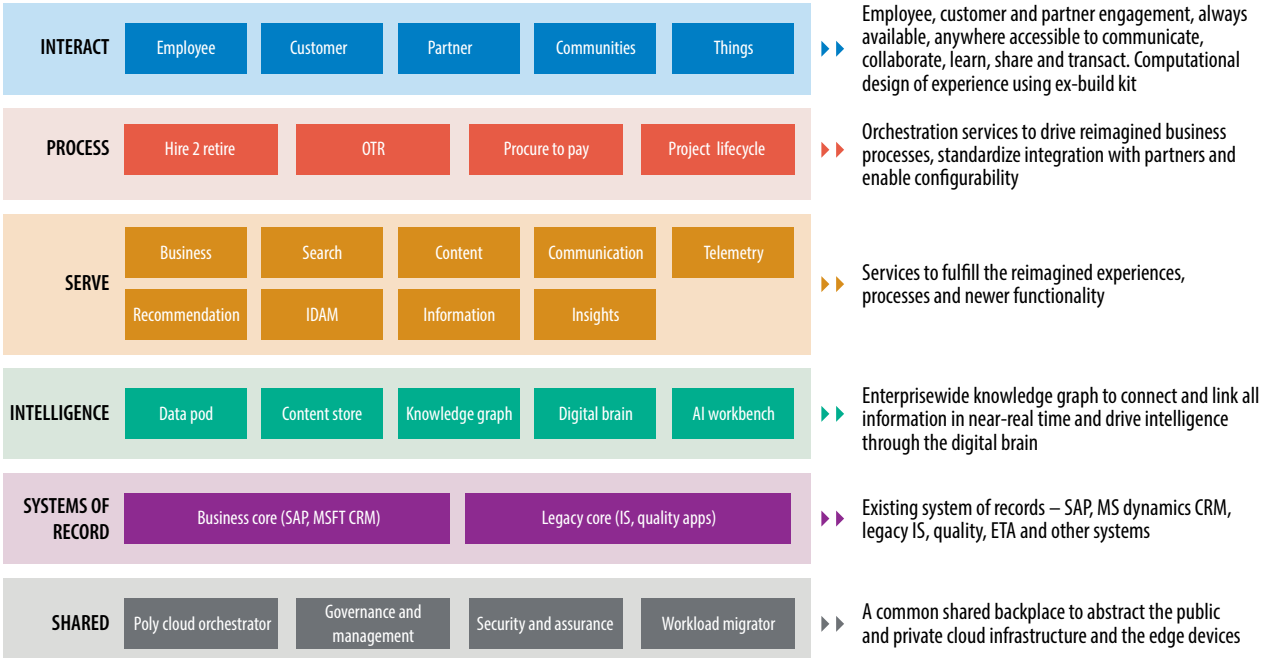
Beyond the disruptive characteristics for the Live Enterprise platform, architectural implementation is quite a challenge. Infosys is building its platform top-down, with new features added across the whole spectrum of experience, process and technology. This abstracted view is a simplified way to view the six-tiered architecture, and is used later in this report.

The platform architecture has been created using design principles that incorporate the objectives, dimensions and characteristics listed above. The following is an overview of the Live Enterprise architecture.

In the 1970s, the telecommunications industry deployed the Open Systems Interconnection model. The model is a good metaphor for Live Enterprise platform architecture. OSI was developed to segment complicated infrastructure into manageable pieces. It was designed to be modular, with interoperable parts known as abstraction layers [9].

The technique of segmenting big systems into overlapping but distinct and manageable elements is a powerful ingredient for agility and speed at scale.

Exhibit 3. Platform characteristics are codified using a 6-tiered reference architecture



This architecture has six distinct tiered layers:

1. The **shared** layer realizes the polycloud architecture by providing a common backplane that abstracts the public and private clouds and provides a common interface to provision, move and manage platform and application services workloads across the enterprise.
2. The **systems of record** layer acts as the technology backbone for data capabilities and processes. This is where existing systems are modernized or integrated with the digital platform. All interactions with these systems are done through existing services provisioned by SAP and existing systems.
3. The **intelligence** layer captures insights, not just from transactions but also from mapping complex interactions around the behavior of people,

networks and devices in the organization. This is where the enterprisewide Knowledge Graph and digital brain do their work, two important components of the sentient experience that are covered below. The intelligence layer also provides tooling to drive insights, reporting and analytics. This layer is critical for the sentient organization to work effectively and develop an employee-centric mode of behavior.

4. With the **serve** layer engaged effectively, the platform provides a set of microservices that are used to simplify user interactions, make them contextual, personalize them and observe and improve them using telemetry.
5. All the process modeling, orchestration and routing is done in the **process** layer. This layer also enables configurability.
6. Applications such as mobile, web, devices, things and smart products communicate with the process and serve layers through APIs in the **interact** layer. This layer enables employees, customers, partners and things to interact seamlessly in an "always available, anywhere accessible" environment.

Several additional architectural considerations follow.

Agility in the shared and systems of record layers

Knowledge and information transparency is a transformation priority and needs to be accessible and consistent as the enterprise grows.

An agile, all-encompassing platform is a crucial ingredient. Effortless information flow is enhanced through adoption of technologies, such as polycloud.

As an example, polycloud provisioning is exponentially faster than traditional methods, happening in minutes instead of weeks.

Live Enterprise combines fast IT provisioning with agile and repeatable frameworks that embed this compute capability into mainline business processes.

Microservices in the serve layer

Live Enterprise utilizes "unbundled functionality" across services — a powerful approach to building software architectures. Traditional service-oriented architectures integrate business applications; microservices architectures are built from small, independent processes that communicate with each other using APIs that are language agnostic.

The serve layer uses atomic services that deliver one purpose with high value and limited access, and composite services that use an assembly of service components deployed together in a single device. This layer is extremely agile and facilitates continuous-delivery software development. Microservices architecture also enables Infosys to update or improve services organized around distinct capabilities such as identity and access management, Infosys Knowledge Graph, security and notifications.

Innovation in the process and serve layers

The serve layer includes a shared set of services to fulfill the reimagined sentient experiences, processes and new functionality that Live Enterprise will provide. It includes an innovation foundry to crowdsource and build innovative features using dedicated repositories in GitHub (design and development) and solution artifacts made available through Lex (Infosys' learning portal). Employees feel engaged and discover insights through the patterns found around the ideas, projects and people that get followed, shared or linked.

Intelligence layer

The Infosys Knowledge Graph and digital brain are used to connect and link all information in near-real time in the intelligence layer. At this level, we also find extreme automation through Infosys Nia & AI services — an AI capability that brings together big data, analytics, machine learning, deep learning, knowledge management and cognitive automation with robotic process automation and natural language processing on a single platform.

Service orchestration in the process layer

The process layer enables coordination and arrangement of multiple services in a well-aggregated composite service. This supports the creation of higher-level business services such as contextual search, collaboration through APIs, and the ability to work offline (these services are required for the interact layer). At the same time, service orchestration drives down costs with services agile and robust enough to handle changes in customer demands and the integration of new applications.

Collaboration within the interact layer

Live Enterprise uses live data from the data pods and graph to create seamless user journeys that an employee may be interested in, based on previous queries and activity.

Along with a sentient experience, employees can also access human knowledge using tools such as Yammer, Teams, WebEx, Skype, Slack and OneDrive. A community is created within the enterprise where employees ask for advice and learn from one another.

Collaboration APIs enable employees to create and publish new Teams groups and channels, along with APIs to set up meetings in Outlook Calendar and WebEx. These interactions put all employees on the same level, no matter their area of expertise. This helps Infoscions learn from one another, dig deeper into complex business challenges and refine previous solutions.

Approaching sentience

Sentient principles for experience, process and technology

In the Antarctic, King penguins huddle together to escape the icy air temperatures that plummet to -50 degrees Celsius in the winter. Research shows that each huddle is constantly changing, in response to both the outside air temperature and penguins overheating. Those in the middle get too hot, move to the outside, cool and find their way back into the crowd. This mechanism keeps the birds alive and only works if all penguins work in unison and react instantly to messages, both verbal and nonverbal.

This sort of sentient empathetic intelligence will be a trademark of the Live Enterprise, with all users cooperating at speed to visual cues across an array of channels.

Personalized user experiences will be the norm, and collaboration with customers and partners will be seamless.

Processes and routines will be empathetic to user needs. Codifying the emotional state of mind for employees is an exciting prospect, and will be covered below. Artificial intelligence (and IoT) will make doing the same things over and over again a thing of the past, freeing the workforce to do work that has real meaning in their lives.

To achieve this vision, the platform will be built with design principles in mind.

Some of these principles were mentioned in a discussion of the 25 platform characteristics, including proximity, zero latency, micro feedback, simulation and guided practice. The paper covers these later, in more depth, and reviews how sentient routines and experiences will work.

The adjoining sidebar contains a summary of the design principles across experience, process and technology.

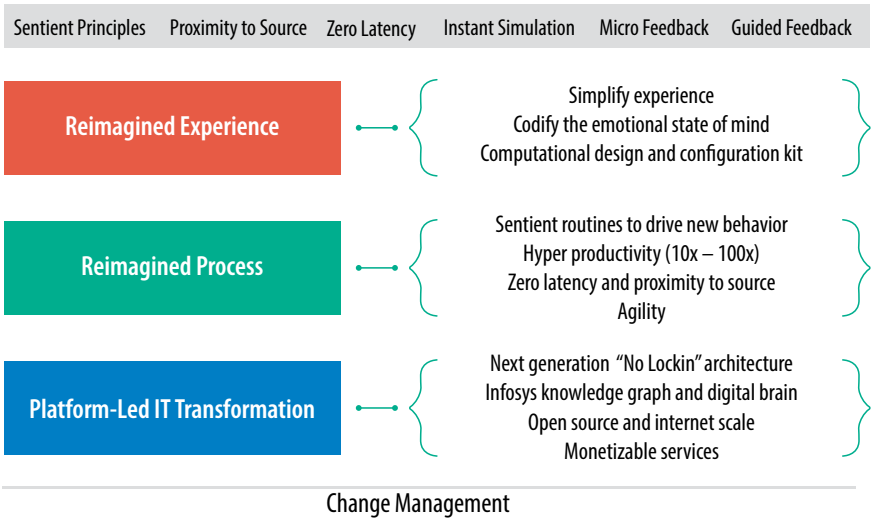
Experience Design	Process Design	Architecture Design
Live Enterprise knows the user and delivers relevant, personalized experience and solutions in every engagement.	Straight-through processing first.	Focuses on business processes and features that make an amazing user experience and ensures seamless and continuous experience across channels.
Anticipates needs and recommends solutions and options that are exactly what are needed, often before the user is aware they are needed.	Provides self-service capabilities to eliminate or minimize nonproductive work and raising of support tickets.	Always uses open source software when there is no credible alternative. Reuses existing investments in "systems of record" like SAP and MS Dynamics.
Offers innovative solutions to communicate, collaborate, learn, share and transact anytime, anywhere and across channels.	Department and functional silos are transparent to users.	Takes an interface- (API-) first approach for all services, ensures they are not tied to proprietary technology and ensures all external components are abstracted. All interfaces should be 100% upgradable.

Experience Design	Process Design	Architecture Design
Processes are simple to understand, easy to use and seamless, making the employee's job easier and more productive.	Processes should be empathetic to users.	The architecture and design will be layered and loosely coupled with well-defined extension points. All components should be replaceable and extensible.
When there is a problem, Live Enterprise quickly solves it, keeps users informed and follows up to make sure all needs are met.	Processes are simple to understand, easy to use and seamless.	Captures business, operational, process and technical information at a granular level. This information insight will be used to improve the platform experience, making it personalized and predictive.
		The platform will be architected to scale and will reliably serve all employees across all geographies. Using commodity hardware, the platform will support millions of transactions with no single point of failure.
		Software engineering will be fully automated with practices like DevSecOps and test automation implemented and practiced.

Live Enterprise framework

The framework introduces strategic thinking for sentience in the enterprise. It also underscores the importance of design principles such as "proximity to source" and presents a unified view of how platform layers work together to drive sentient routines and create a constantly learning user experience. Experience, process and technology are an abstracted view of the six layers covered above.

Exhibit 4. Reimagined experience and routines are built upon sentient design principles

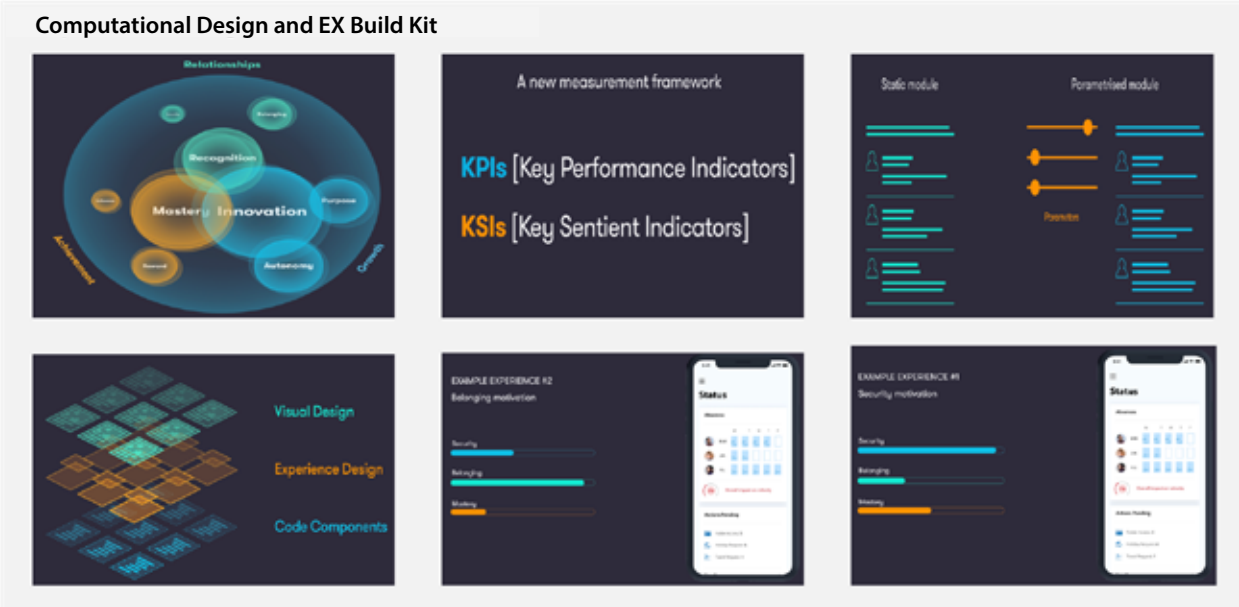


Personalization and codifying the emotional state of mind

The platform reimagines user experience by "codifying the employee emotional state of mind." Though carrying the possibility that users may push back against the sense that their privacy is under threat, this feature, if built, is a way to acknowledge the real world and the way people actually behave in day-to-day scenarios. The platform is saying, "We as a company will meet you where you are and interact with you based on your motivations and predispositions." It's a way of formalizing the way people really think, with the user interface adapting to the needs of the moment.

With Live Enterprise, user archetypes are built into the platform, and the front-end experience is optimized based on parameters such as a user's desire for mastery, security or belonging in their work.

Exhibit 5. Sentient experience uses computational design, with archetype and contextual emotional state



"Different users have different motivations in their day-to-day roles," says Tarafdar. "A salesperson is typically a lot more aggressive in nature than an employee in operations. They are also more connected and a lot more networked. An operations person tends to be more conservative and seeks more security in their job. There are inherently different user behaviors, which drives a lot of the decision making, and what they want to do or expect to do with the system."

The platform uses this information to personalize and contextualize the user experience. It answers the questions, "How do I use that behavioral profile information about that individual and the emotions of that individual and use it in order to make it contextual?" and "Using telemetry (because we are capturing information), how do we show certain users certain information and personalize the experience?"

What is sentient design experience?

The sentient design principle raises the questions, "How does an employee provide feedback as soon as they do something, whether good or bad?" and then, "Using that feedback, how do we as an organization improve what shows next on their radar?"

With Live Enterprise, because feedback and knowledge at the point of question is provided

instantly (proximity to source), the challenge is made that much easier to solve.

"Take the travel process," says Tarafdar. "As a manager, how can I get information on what the cost impact is for approving this request and how many more travel requests can we do with the available budget? We want the system to provide information to users at the time that they are making the decision, based on context. Then, as an organization, we can complete that decision within the flow. This is what we're thinking about when designing a sentient experience."

Because the experience is customized to the user, it also needs to be guided.

"We want the user to do things in a certain way. As an example, when booking flights in the system, either the employee can do the entire process automatically and enable one-click booking, or, in another case, we can nudge the user and guide them to do certain activities, so that over a period of time we can bring about behavioral change. The design question is 'how do we make users perform a list of certain activities in a structured way, implemented either through the mobile app or through the platform?'"

Behind the scenes, the platform makes the experience user friendly by providing the user with relevant tool kits (like audio, video and file upload) so that they can implement that process and experience.

"We really want to push the limits of user experience," says Narendra Sonawane, vice president, information systems at Infosys. "Everyone talks about personalization, but we want to make it a sentient experience that takes into account who you are and the context of your communication with the enterprise. This will make it a completely unique experience."

Digital brain — the force behind sentient routines

Every company needs a digital brain — a nexus for continuous, automated learning from data across business units and product lines, providing the enterprise with higher cognition. What makes Google and Amazon so successful is their ability to connect the dots between different micro-processes to exploit synergies and drive intelligent routines that users quickly understand.

With Live Enterprise, the digital brain is this intelligence, using machine learning and automated reasoning to aid the user through nudging and guided feedback.

With the example of booking a flight ticket in the system, the digital brain is the intelligence in the technology layer that understands a user's search history and transaction level activity and proactively guides the experience. In this case, it suggests hotels and taxis that the user might also want to book.

"The brain looks at historical data, your preference and where you stayed. Then it identifies an insight; perhaps this person always stays in a Marriot hotel, and she has booked a particular one in this city on a previous trip. And that is an insight that the digital brain can recommend while booking travel," says Tarafdar.

Sometimes these insights from the brain can be based on what a user is doing in a particular transaction, tying it to insights that the platform has on the company itself:

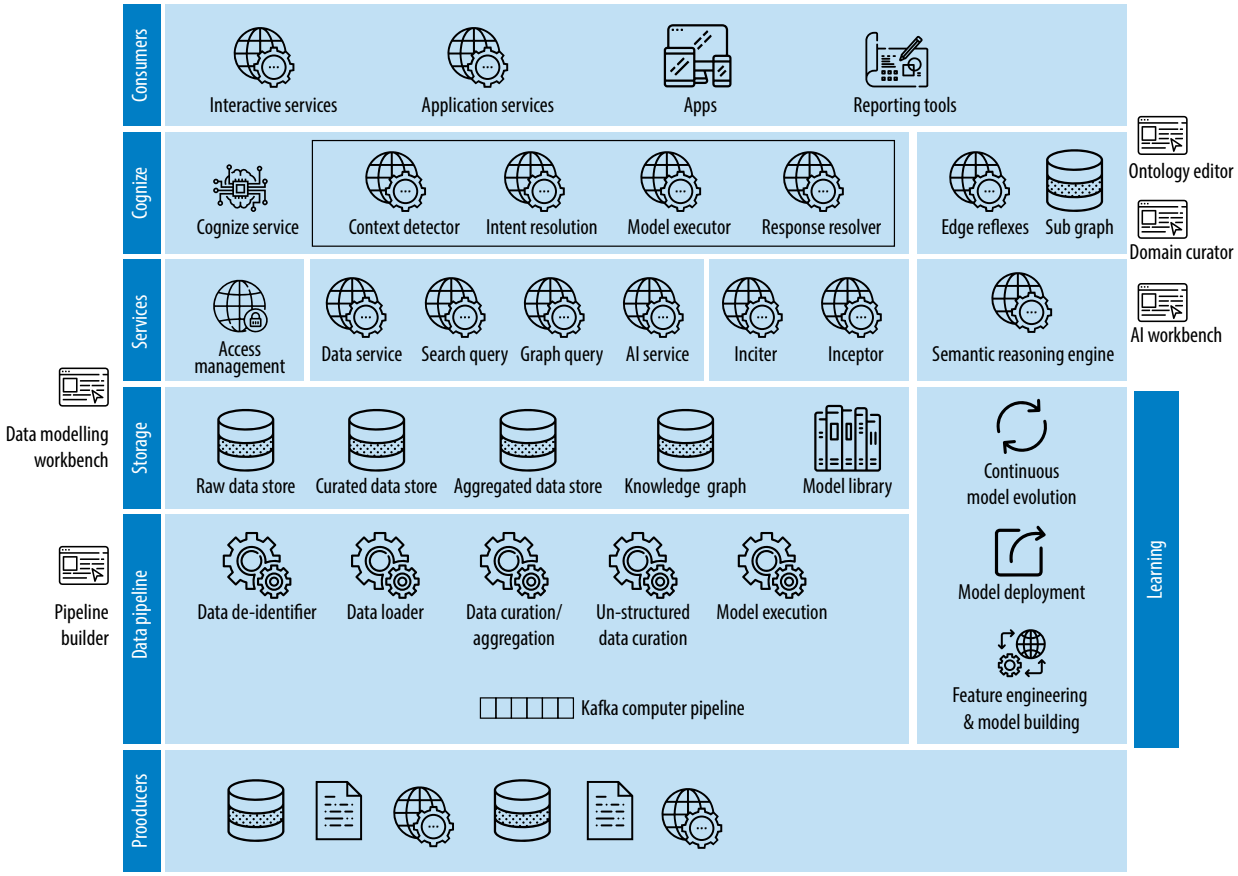
"If a user searches a city and a particular location on a given day, the digital brain's recommendation service can then tell that person, 'if you are booking here, here are potential options where our company has a corporate agreement."

These sentient routines use automation within the digital brain to nudge the user. Design principles such as proximity to source, zero latency and guided practice are crucial here. Zero latency ensures that the processes that exist in the process layer above the digital brain are as seamless as possible, with straight-through processing of information. Steps in the process layer can then execute without intervention.

Knowledge Graph — improving search

The Knowledge Graph sits within the technology layer and maps relationships between all data enterprise islands, including entities, interactions, events and information content.

Exhibit 6. Knowledge Graph links all information across enterprise islands



"The Knowledge Graph is a big component of how we link all the information across our enterprise islands," says Tarafdar. "They are islands of information, and we are using the Knowledge Graph to connect these islands to get better visibility and better insights, and then drive a lot of intelligence on top of it."

As an example, Infosys has many employees with specific skills, working on distinct projects, who develop specific software for a range of clients. All this data can be modeled as a network — a graph — so that each employee can be linked to their specific skills, projects and other artifacts.

The graph is used to drive contextualization and search, where, depending upon the context, relevant information is prioritized and shown to users.

"In a relational database, finding multiple relationships becomes very difficult and takes a lot of time," Tarafdar continues. "In a graph, I can model relationships and make searching easy. If an HR employee looks for someone with a skill in journalism, they can perform an executive search. While they may not find someone in journalism, they could find someone who is a blogger, since certain skills are common to both. This gives the organization a way of finding these subtle relationships. In a normal relational model, that would be very difficult."

Looking ahead

Super ant colonies number more than 1.3 million individual ants. They work as a single organism, relaying messages to each other through their pheromones. Seamless communication with zero latency is achieved as they walk the same path. If one ant is placed on another trail, it immediately follows a new directive. Each ant has access to the data it needs for the entire ecosystem to stay on mission.

For our clients to stay on mission, their version of the digital platform powering Live Enterprise must enable increased velocity of ideas, immediate response to market forces, frictionless experience, and employees that are truly autonomous and hyper productive.

Only then will they keep up with disruptive competitive forces and ever-changing employee expectations.

The Infosys Knowledge Institute published a report on digital transformation progress based on research leading up to the World Economic Forum in Davos, Switzerland, in early 2019. It found that visionary organizations transform to pursue a comprehensive change of their business. Explorers focus on the experience elements of the user journey, while watchers focus on operational efficiency [10].

Live Enterprise will be a visionary disruption to the operating model status quo — an approach to achieve higher levels of agility, insight and value from their information sources. It will also enable organizations to capture a greater proportion of users' attention, time and value.

Creating the platform paradigm involves a tremendous amount of change management that goes beyond anything that can be captured in a strategic plan. It requires a candid assessment of the current state: Where are the data silos, and what are the constraints to agility? How is anytime, anywhere access achieved at scale? How can true integration be achieved across experience, process and technology, to standardize sentient routines?

In the Infosys example to build the Live Enterprise platform, the work will be done in discrete stages in order to minimize complexity and risk from too many simultaneous variables.

"We will take one slice of the feature-set at a time," says Nabarun Roy, senior vice president and group head of quality, productivity and risk management at Infosys. "There are two ways to do this. One approach is to sequentially build the platform, then the process, then the experience. But our approach is to identify a slice of functionality. We will build that feature end to end and then release it. Think of a leopard that doesn't have any spots, and we're adding one spot at a time; so you will not see the leopard at the beginning, but then over a few months, you will finally see a leopard because all the spots are there."

It will be necessary to build teams that promote and mentor this environment. These are the early adopters — a select group of people who take part in the pilot effort.

The approach is to focus on a few early wins and success stories that then inspire others to take note.

"Digital Transformation is as much about cultural transformation as it is about bringing in technology, architecture, experience and business process redesign," says Sonawane. "The elephant in the room, in a journey like ours, is how to strike a good balance between the legacy IT and the new. It requires a deep engagement with all stakeholders so that they are also excited about the vision and the journey. You need to keep people informed and enthused about the upcoming changes, assure people of the benefits and identify champions who will be your brand ambassadors within the larger community. This is the fuel which feeds success, creating a virtuous cycle that accelerates the entire transformation."

As the platform rolls out, Infosys plans to find common ground with GAFA and BAT — delivering an ecosystem that reaps value from customer engagement. The difference is that Infosys desires to go one step further. Customer centricity is not enough, and to drive optimal value the operating model must be centered around employees, the people who make the organization what it is.

Conclusion

Today's high-performance employees require that their experience at work is both innovative and personalized. They want a better experience at all touch points, including one-call resolution and streamlined, multichannel processes that aid better decision-making. With user sentiment now a priority, the way to leverage it is to create a sentient platform with embedded automation and intelligence. The result will be a continuously learning and improving user experience with sentient routines that delight and inspire the employee to work better, faster and more effectively.

By assessing behavior and outcomes and codifying sentient principles into Live Enterprise, enterprises can answer questions like: What are our employees and partners saying and doing? How are they likely to act in the future, and what are the next logical steps to influence those actions?

How can the enterprise make the most of every touch point it has? How does the enterprise get feedback if people are happy, and how does it turn a bad situation into a good one, fast?

The experiences and learnings from the Infosys Live Enterprise will be shared with clients and the market, to help others think through the journey to build their own platform.

Platform ecosystems similar to Live Enterprise will play a crucial role defining the future of talent and work.

This future will be made up of data-centric enterprises that create competitive advantage from anytime, anywhere seamless communication between business and employee. The services and products created deliver unique value propositions, strengthening employee and customer relationships, and raise the barrier to entry for others wishing to follow suit. They also build highly defensible positions rooted in economies of scale and scope.

In considering where to start on this journey when you are a large enterprise, this paper offers some guidance and answers. Live Enterprise must stay relevant to its customers and enabling to its employees.

Live Enterprise success will be driven by the culmination of countless instances of data-driven decision-making, innovating at the speed of data so that the workforce is free to do higher-value work.

There is significant potential for firms that adopt this blend of the right experiences, processes and technology. Finding the patterns within the flood of data and knowledge rushing at the organization is difficult. But as more agile and intelligent systems are in place, and more automated processes spread across the organization, more employees can make a difference and benefit the enterprise overall.

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Authors

Mohammed Rafee Tarafdar
SVP and Unit Technology Officer
Bangalore

Jeff Kavanaugh
VP and Head, Infosys Knowledge Institute
Dallas

Harry Keir Hughes
Senior Consultant, Infosys Knowledge Institute
London

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