

# Hype Cycle for Communications Service Provider Operations, 2021

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Initiatives: [CSP Digital Transformation and Innovation](#)

Changes in CSP operations such as operating model, technologies, business processes and data centricity are critical and require consistent planning and investments. This Hype Cycle captures the top operational capabilities for CSP CIOs to plan, invest and enable broader transformation.

## Analysis

### What You Need to Know

It is increasingly crucial that communications service provider (CSP) operations are coordinated with changes to business models and products. Failing to do so undermines the outcome from investments. This is all the more evident from disruptive challenges that have emerged from initiatives such as cloud-native technology utilization and from the inconsistent outcomes of early digital transformation projects.

As operations evolve, they must be viewed as a holistic transformation covering the operating model, business processes, technology, organization structure, skills and talent. CIOs need a concerted effort along with business leaders to execute operations change.

This Hype Cycle includes the key facets of operational change requirements, focusing on the most important innovations. CSP operations and its transformation encompass scores of technologies and capabilities, many of which are continually evolving such as service operations, data monetization, technology sourcing and integration. These changes call for continued investments in critical capabilities that are critical for success.

## The Hype Cycle

CSPs (particularly those that are network-based) are undergoing significant changes. There are disruptive forces from new types of CSPs, IT and system integrator companies as well as players from other industries. In such a scenario, incumbent CSPs need a well-planned approach to continue modernizing their operations. Delaying or resisting changes across commercial, service and infrastructure operations will limit competitiveness and differentiating value creation.

CSP CIOs should use this Hype Cycle to:

- Identify the required capabilities to enable their vision and business strategy.
- Validate with business leaders and execution teams on maturing various capabilities, and solicit support for the evolution.
- Plan investments in all the key capabilities.
- Develop the necessary technology- and process-related capabilities.

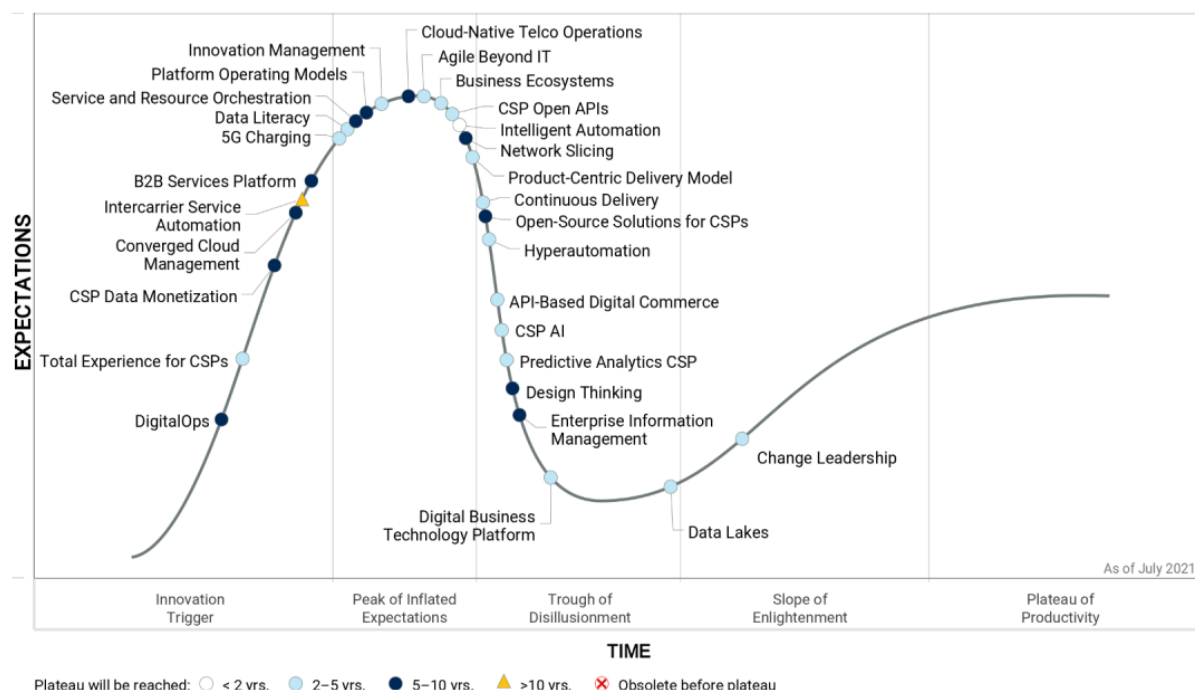
Several new innovations that indicate requirements of broader organizational capabilities have been added:

- Product-Centric Delivery Model
- Design Thinking
- Innovation Management
- Hyperautomation
- Agile Beyond IT
- Data Literacy
- Change Leadership

CSPs looking for guidance about infrastructure capabilities should consult [Hype Cycle for the Future of CSP Networks Infrastructure, 2021](#).

Figure 1: Hype Cycle for Communications Service Provider Operations, 2021

## Hype Cycle for Communications Service Provider Operations, 2021



Gartner

Source: Gartner (July 2021)

## Downloadable graphic: Hype Cycle for Communications Service Provider Operations, 2021

## The Priority Matrix

The Priority Matrix indicates the need for strategic, long-term and sustained investments for capability improvement. Among scores of technologies and capabilities, we have focused on a set that is critically important and needs continuous improvement. Most capabilities will take more than two years for mainstream adoption, and in some cases, five years or more; except intelligent automation, which should be a priority for CSPs to make their operations efficient. Considering that CIOs must strengthen these capabilities sooner or later, these innovations have been prioritized to reflect the challenges that CIOs need to address with execution.

For many of the elements in the Priority Matrix, the predominant focus on technology and process capabilities will not suffice to deliver CSPs' intended outcomes. CSPs require an active strategic orientation toward culture, mindset and structural changes. For example, capabilities such as open-source solutions for CSPs, business ecosystems, converged cloud management, and platform operating models will have significant impact over the next three to five years, as they affect multiple dimensions of the organization.

One point to note is the need for dedicated and executive sponsorship for transformational capabilities such as hyperautomation, cloud-native telco operations, and total experience for CSPs. Deploying/evolving these capabilities may require sourcing of specific skills from outside the organization. Similarly, prioritizing investment in capabilities such as data literacy and agile beyond IT is required to shape various transformation projects for economic efficiency and growth.

**Table 1: Priority Matrix for Communications Service Provider Operations, 2021**

(Enlarged table in Appendix)

| Benefit<br>↓     | Years to Mainstream Adoption |  |   |                                 |
|------------------|------------------------------|--|---|---------------------------------|
|                  | Less Than 2 Years<br>↓       | 2 - 5 Years<br>↓   | 5 - 10 Years<br>↓   | More Than 10 Years<br>↓         |
| Transformational |                              | Agile Beyond IT<br>API-Based Digital Commerce<br>Change Leadership<br>CSP AI<br>CSP Open APIs<br>Digital Business<br>Technology Platform Innovation<br>Management<br>Product-Centric Delivery Model<br>Total Experience for CSPs | Cloud-Native Telco Operations<br>Converged Cloud Management<br>DigitalOps<br>Network Slicing<br>Platform Operating Models<br>Service and Resource Orchestration |                                 |
| High             | Intelligent Automation       | 5G Charging<br>Business Ecosystems<br>Continuous Delivery<br>Data Literacy<br>Hyperautomation<br>Predictive Analytics<br>CSP   | B2B Services Platform<br>Design Thinking<br>Enterprise Information Management<br>Open-Source Solutions for CSPs   |                                 |
| Moderate         |                              | Data Lakes   | CSP Data Monetization   | Intercarrier Service Automation |
| Low              |                              |  |   |                                 |

Source: Gartner

## Off the Hype Cycle

The following innovations were either removed or replaced with one that aligns better with CSP operations:

- Virtual Network Function Marketplace has been removed as it is now more of a product capability as compared to operations.
- Network Disaggregation has been removed and is now included in the [Hype Cycle for the Future of CSP Networks Infrastructure, 2021](#).
- Network as a Service (NaaS) has been removed as it is being offered as a product.

- B2B2X Business Models have been replaced with Platform Operating Models to lay greater emphasis on operational capabilities.
- Services Co-creation has been replaced with Business Ecosystems to reflect the broader set of capabilities required to build, participate in, and/or generate value through ecosystems.
- Multichannel Marketing has been replaced with Total Experience for CSPs to reflect the need to invest in experience across customers, partners and employees/users.
- DevOps has been replaced with Continuous Delivery to emphasize the need to move toward CI/CD-based operations.

## On the Rise

### DigitalOps

Analysis By: Derek Miers

**Benefit Rating:** Transformational

**Market Penetration:** 5% to 20% of target audience

**Maturity:** Emerging

#### Definition:

DigitalOps enables rapid transformation by integrating humans and systems through the direct execution of process, decision and event models to automate business operations. It focuses on the dynamic combination and extension of component models, exploiting both choreography and orchestration aspects of process automation. Leveraging agile methodologies for continuous delivery of business improvement, it delivers a step-change improvement in business agility.

#### Why This Is Important

DigitalOps provides an agile, organized and predictable way of reacting to disruptive internal and external challenges and opportunities. With a focus on the discovery, reuse and execution of patterns that affect the business — processes, decisions and event patterns — DigitalOps supports modeling, analysis, combination, extension and optimization to drive continuous performance improvement. The net result is a tempo that's agile, yet transparent enough to ensure quality.

#### Business Impact

- Supports an emergent and evolutionary approach to optimizing business operations
- Enables the dynamic optimization and recombination of digital products and services through a model-driven approach
- Facilitates the balancing of customer expectations with corporate goals and objectives at the operational level
- Ameliorates the first-mover advantages of digital disruptors by enabling a “fast-follower” business strategy, allowing both Mode 1 and Mode 2 operations to coexist and cross over

## Drivers

- Composable business architecture relies on dynamic extension, adaptation, recombination and optimization of reusable components.
- It has become ever more important to deliver differentiated business offerings incorporating unique, signature customer experiences.
- The growing importance of services in the economy, alongside the trend toward outsourcing of noncore elements, is driving the need for dynamic composition of service delivery, often requiring the ability to incorporate elements of an ecosystem partner's offerings.
- With digitalization, enterprises are usually still constrained by the need for knowledge workers to deliver key elements of organizational products and services. The model-driven nature of DigitalOps enables businesses to scale their operations, despite scarce knowledge worker resources.

## Obstacles

- Collectively, these drivers require organizations to rethink their approaches to automation, relying on reusable models and composition, rather than custom-made code development.
- Most end-user organizations have yet to recognize the opportunity and benefits of driving their businesses with models.
- The prevailing mindset remains dominated by a traditional software development life cycle, which struggles to comprehend model-driven agility and composition.
- Like DevOps, DigitalOps is not a "system" to buy — it's more of an approach or a mindset.

## User Recommendations

EA and technology innovation leaders should:

- Help executives understand the benefits of using business-centric models in a layered approach (e.g., business, IT, third party) to automate interactions at scale.
- Shorten the time to implement and evolve business offerings by reconsidering their organization's approach to business processes, decision models and associated tooling.



- Engage product development teams to co-create their future services together. Make reusability a priority by helping them translate customer journey maps into phased value streams, looking for shared capabilities in each phase, then developing more-granular product descriptions for the common aspects of these business capabilities.
- Ensure careful governance of all the different elements (processes, decision models, common integration components, configurations) over time. They will often have different and distinct life cycles, as well as diverse sets of stakeholders.

## Sample Vendors

Appian; Bizagi; Camunda; Flowable; Pegasystems

## Gartner Recommended Reading

[DigitalOps Helps Connect Business Models to the Digital Business Platform](#)

[Use Co-Creation Workshop Techniques to Enable Innovation and Drive Transformation](#)

[How to Industrialize and Reuse Core Product Capabilities and Processes With DigitalOps Initiatives](#)

[Drive Knowledge Worker Productivity by Deconstructing Your Process Architecture With DigitalOps](#)

## Total Experience for CSPs

Analysis By: Susan Welsh de Grimaldo

Benefit Rating: Transformational

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

**Definition:**

Total experience (TX) is a strategy that creates superior shared experiences by intertwining the multiexperience (MX), customer experience (CX), employee experience (EX) and user experience (UX) disciplines. This is not just about making everything better for the customer and then eventually bringing the EX up to the same level. It's about all of the experiences continually learning from each other, refining and creating an exponentially better experience across them all.

**Why This Is Important**

Customers and employees have increased expectations for digital experience improvements, and TX is a way to use technology and interactions to enhance, empower and embolden both customers and employees. CSPs should evaluate how TX interlinks these experiences, increasing both customer and employee confidence and lifetime value throughout their journeys. TX is about how customers and employees feel about themselves and the decisions they have to make.

**Business Impact**

TX can attract, retain and cultivate greater customer and employee lifetime value, a calculation based on the longevity of the relationship and the value they bring to the organization. Losing profitable customers can impact future growth. But equally, the employee lifetime value has financial repercussions:

- Initial hit to knowledge loss and productivity when an employee leaves
- Impact to existing team members
- Cost of recruiting, onboarding and training new talent with no guarantee of productivity

## Drivers

- CSPs seek to deliver improved digital experiences to their consumer and enterprise customers, as well as partners in their expanding ecosystems. CSPs consider digital capabilities as fundamental to improving engagement, lifetime value and reducing churn, as well as providing a competitive differentiator.
- CSP CIOs perceive that the COVID-19 crisis has accelerated customers' demands in terms of using digital channels and self-service capabilities for communications with CSPs. They expect these customer demands to increase even further in 2021 (see Figure 5 in [2021 CIO Agenda: A CSP Perspective](#)).
- Technology advancements allow greater opportunities to connect across multiple channels with multiple ways of engagement (voice, gestures, touchpoints, etc.). Real-time, low-latency, high-impact interactions supported by edge compute, 5G, IoT, artificial intelligence (AI) and data will provide improved multiexperience to customers, partners and employees.
- Employees can be more customer-centric through digital solutions, such as giving a discount or promo code, unlocking exclusive content or providing additional services.
- Initial investments can be scaled to add external ecosystem partners to increase the long-term value.

Direct and indirect monetization can be realized as organizations are able to anonymize and aggregate personas to see long-range patterns and potential sale of data. For example:

- Data can be aggregated and "sold" back to the users as a subscription service to see a summary view.
- AI can be applied to see how other similar customer issues were resolved and offer the solution to rectify a customer's issue.
- Machine learning can recognize where gaps are and either refine the process or notify a developer to address the issue.
- Recurring patterns or orders can be used to identify how to improve products and services, such as with personalized products or most-requested additional services.

## Obstacles

- **Concept:** TX is a relatively new concept. While CSPs may have focused on each of the experiences independently, they may not have interlinked them from a holistic perspective of the multiparty experiences to have seamless and frictionless UX.
- **Cultural:** The focus is overwhelming on CX, neglecting and even overtly diminishing the value of EX. However, TX can improve the EX, which can then yield a better CX – not only digitally, but also real-world interactions.
- **Inertia:** CSPs making it through the pandemic without drastic changes to the CX may be inclined to stay with what they have versus adopting a TX strategy.
- **Technology:** Even as CSPs transform digitally, they struggle with modernizing for digital experiences that prevent richer MX customer and employee journeys across multiple devices with multiple touchpoints and modalities.
- **Data management:** Required customer data resides in a maze of business and marketing systems, creating persisting data collection and profile unification challenges.

## User Recommendations

- Engage with CX, EX, UX and MX leaders across your organization to form a TX “fusion team” that crosses activity silos.
- Gain support by conducting “art of the possible” meetings to show how TX transformation can lead to greater revenue growth and new customer opportunities.
- Engage with business stakeholders by conducting workshops to determine how TX strategy can transform their roles and increase agility.
- Identify gaps in customer and employee interactions; assess business, operating and service model gaps uncovered during the pandemic to prioritize initiatives that impact overlapping CX and EX to maximize value.
- Find important business opportunities that have been held back by their CX, EX, UX or MX impediments.
- Encourage project teams charged with improving customer experience to also consider how to leverage MX, EX and UX initiatives to improve that experience.
- Invest in technologies that support reimaged customer and employee journeys based on effortless experience across MX touchpoints.

## Gartner Recommended Reading

[Top Trends in Managing Disruptive Influences for Communications Service Providers in 2021](#)

[Raise Your Game by Going 'All In' on Total Experience](#)

[Build Links Between Customer Experience, Multiexperience, User Experience and Employee Experience](#)

[Success in the Digital Experience Economy Requires Connecting MX, UX, CX and EX](#)

[Transcend Omnichannel Thinking and Embrace Multiexperience for Improved Customer Experience](#)

[Integrate User Experience Into Your Customer Experience to Improve Outcomes](#)

## CSP Data Monetization

Analysis By: Susan Welsh de Grimaldo

Benefit Rating: Moderate

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

### Definition:

CSP data monetization refers to a broad set of capabilities enabling revenue generation through products, business models, tools and techniques beyond standard connectivity products. It often involves big data, and capabilities range from identification of appropriate data to developing and marketing solutions of value to customers. Data monetization has been of interest to many industries including banking, finance, retail and offers cross-industry collaboration opportunities to CSPs.

### Why This Is Important

Many CSPs have started to develop their data & analytics units during recent years and are starting to create or expand data monetization portfolios, though most are in a fairly early stage. With continued focus on data management and analytics for productization, data monetization by CSPs will continue to gain momentum in the next five years or so.

## Business Impact

Data monetization is a key revenue generation goal for CSPs. As CSPs address their operational technology issues and adopt a structured approach beyond specific use cases, there lies potential for new business models and revenue. CSPs moving toward adjacent markets like banking and insurance and adopting an ecosystem approach are better placed for externalizing data monetization capabilities.

## Drivers

- CSPs seeking to generate more value in the face of shrinking revenue growth in their core voice and data services increasingly see anonymized customer data as an asset to be monetized.
- A small section of CSPs have been able to go beyond the specific use cases of personalized marketing and product bundling to developing a platform approach. Such CSPs have been targeting revenue from use cases such as advertisement, credit scoring and helping other industries with specific insights into population or location-specific insights and consumption patterns. Examples of such CSPs include Orange, Singtel, Telefónica and Verizon. Reliance Jio Infocomm is also moving in this direction through a number of applications' bundling and a partnership with Facebook.
- CSPs are further exploring the economic potential of their data repositories. Managing data as an asset has become a critical business function and requires trust-based data sharing across internal and external data sources (see [Top Trends in Data and Analytics for 2021: Data and Analytics as a Core Business Function](#)).
- CSPs' internal digital transformation in sales channels and customer engagement that is ahead of other industries using data, is driving opportunities to sell that experience to their B2B clients.

## Obstacles

- Data monetization has been a challenge for many CSPs due to their legacy complexities and data governance issues.
- With the increasing number of connected devices and reliance on them for a wide range of consumer, enterprise and governmental essential activities, and the occurrence of a number of data leakage incidents, concerns around data privacy are high. This can cause customer concern around data monetization efforts.
- The use of datasets and protection of data and connected devices has ethical implications that must be addressed to maintain trust with customers and abide by regulations.
- Global data protection legislation is maturing and CSPs face ever-higher privacy and noncompliance risks.
- Lack of alignment inside of the organization to put together people who know the use cases with people who know how to manage the data.
- As CSPs divest customer data intensive assets including streaming, OTT and broadcast, they will need to create net new opportunities for data monetization.

## User Recommendations

- Implement a by-design privacy capability, rather than a bolt-on approach, by collaborating with the chief data officer (CDO), security/privacy office and COO to build a consent management process that ensures consumer privacy requirements are met when monetizing personal data.
- Structure data monetization platform initiatives to include strong analytics and partnership capabilities by incorporating BSS modernization, along with integrated analytics and automation tools.

Adapt data monetization initiatives for increased success by:

- Building required capabilities associated with data handling and management, analytics, product life cycle management, near-real-time support services, automated security and assurance and partnerships with external entities.
- Mapping to overall business strategy, market segments of interest, operational technology evolution and platform capabilities, ecosystem development and security, privacy and compliance requirements.

## Sample Vendors

Amdocs; Comarch; IBM; Oracle; Pegasystems; Salesforce; SAS; Thales (Guavus); Whale Cloud Technology

## Gartner Recommended Reading

[Top Trends in Managing Disruptive Influences for Communications Service Providers in 2021](#)

[Top Trends in Data and Analytics for 2021: Data and Analytics as a Core Business Function](#)

[Top Strategic Technology Trends for 2021: Privacy-Enhancing Computation](#)

## Converged Cloud Management

Analysis By: Chee Eng To, Gaspar Valdivia

**Benefit Rating:** Transformational

**Market Penetration:** 1% to 5% of target audience

**Maturity:** Emerging

### Definition:

Converged cloud management integrates the automated provisioning, orchestration and management of separate cloud infrastructure supporting network functions and IT applications. This enables communications service providers (CSPs) to simplify infrastructure management, optimize resource utilization and accelerate service delivery. CSPs can gain efficiency and scale running network functions and IT applications over an unified cloud infrastructure.

### Why This Is Important

CSPs are beginning to implement converged cloud management for their disparate cloud platforms, with the goal of creating a unified cloud infrastructure. This will give them operational efficiency, scale of operations, as well as technical and business agility, crucial for future competitiveness. Most CSPs currently run their network and IT on separate platforms, inflating their costs and adding complexity to their operations, reducing their ability to respond to marketplace demands.



## Business Impact

- With converged cloud management, CSPs can run a whole gamut of network services and communications and IT apps across a unified cloud infrastructure.
- CSPs will have more agility in delivering current and future services through ease of onboarding of new technology and vendors in software over a unified cloud infrastructure.
- CSPs can reduce their costs through easier deployment of standardized hardware, simplified infrastructure management and better resource sharing.

## Drivers

- Converged cloud management is strategic for operational efficiency, service agility and cost containment.
- Early implementations by major CSPs are providing guidance for other CSPs on how to develop an approach and roadmap.
- Hyperscale cloud providers are offering telecom-specific solutions from their wide portfolio of cloud platform services.
- Increasing emphasis by vendors and cloud providers on multivendor and multicloud interoperability will provide incentive for adoption.

## Obstacles

- CSPs still require separate platforms for telecom and IT workloads due to their very different characteristics and requirements.
- Implementing converged cloud management is a big challenge as most CSPs lack sufficient software and integration skills to build such platforms.
- Some CSPs are outsourcing the development to large system integrators (SIs), which also lack experience, besides being costly.
- Some SIs are beginning to build these capabilities, but it will take at least another two to three years before they have acquired sufficient experience.
- Many CSPs are still observing the developments, and waiting for an opportune time to proceed, delaying the decision for adoption.
- Large virtual network function (VNF) vendors continue to push their full-stack systems, and have taken only small steps to decouple their software from their proprietary hardware.

## User Recommendations

- Develop an early reference architecture for a unified cloud infrastructure, taking into consideration the different requirements for network and IT workloads, and the different maturity levels of network and IT cloud platforms.
- Decouple the hardware and software as a standard approach to provide the flexibility of running a wide choice of VNFs and IT applications on fewer and standardized cloud platforms.
- Support open standards and open source software where possible to provide multivendor interoperability, which will stimulate competition from supporting vendors.
- Harmonize and consolidate the separate network and IT cloud platforms progressively for ease of operations, efficiency and scalability.
- Ensure vendors' technology compliance with reference architecture to accelerate future architectural integration, and interoperability across legacy, physical and virtual infrastructure.

## Sample Vendors

Ericsson; Google; Huawei; Red Hat; VMware

## Gartner Recommended Reading

[Hyperautomation: How Can CSPs Prepare for and Implement It?](#)

[Market Insight: Cloud Service Strategy 2.0 for CSPs](#)

## Intercarrier Service Automation

Analysis By: Amresh Nandan

Benefit Rating: Moderate

Market Penetration: 1% to 5% of target audience

Maturity: Adolescent

### Definition:

Intercarrier service automation refers to infrastructure and service orchestration capabilities that are automated for operations and life cycle management across multiple service providers. These capabilities allow CSPs to build and offer network services, such as bandwidth on demand, IoT connectivity and cloud connect services, across multiple partner networks.

### Why This Is Important

Integration, orchestration and automation of intercarrier services have been evolving through multiple CSP' partnerships, as well as standardization efforts by telecom industry bodies such as TM Forum and MEF. With 5G and advanced enterprise services in view, many CSPs have initiated focus on intercarrier services. POCs and trials have been conducted by several leading CSPs. During 2020, some CSPs further focused on developing their strategy for intercarrier service integration and automation.

## Business Impact

- Intercarrier service automation will allow CSPs to build and offer advanced services such as bandwidth on-demand, IoT connectivity and other network services across multiple partner networks.
- Several managed network and security services can also be offered using this capability.
- This will be a major boost for the CSP network service business.
- Ability to orchestrate and automate across carriers will enable better service management, geographical coverage and quality of service focus.

## Drivers

- Intercarrier services automation will make life easy for enterprise customers availing such services because they won't have to deal with multiple service providers and can integrate various services on their own.
- Enterprises prefer to reduce the number of technology and services vendors and wish to get services from a single CSP. This enhances agility and flexibility, especially for international network/connectivity services when connectivity requirements span multiple local connectivity partners.
- This capability allows CSPs to build and offer advanced services, such as bandwidth on-demand, IoT and cloud services across multiple partner networks.

## Obstacles

Adoption of intercarrier service automation is still slow because of several reasons such as:

- Many CSPs with dedicated network-level partnerships continue to use network-to-network interfaces (NNIs) for integration purposes with slow upgrades toward new service-level control and management capabilities.
- Several CSPs have been exploring the best set of APIs applicable for their requirements from the API sets available from TM Forum and MEF. However, most of them want to keep things simple by not adopting a mix of APIs from the two bodies.

- Platform capabilities for enterprise network services management are still evolving, and intercarrier service automation demands a certain level of maturity in enterprise services management and automation.

## User Recommendations

Inter-carrier service automation capability can be a boost for CSPs. As a first step,

- Focus on automating own service orchestration and network service operations. This automation drive needs to mature across multiple service providers in various geographical markets for inter-carrier service automation to become mainstream.
- Pay specific attention to interoperating operating support systems (OSSs) and business support systems (BSSs) functionalities with partners. Use of standard and open API-based integration, end-to-end service orchestration and intent-based networks are steps in the right direction. CSPs should also explore blockchain technology for settlement across carriers.
- Start developing and trialing solutions based on initiatives led by TM Forum and MEF to further drive the capability toward becoming a reality, by focusing on a few key services with near-term business opportunities, like IoT and bandwidth on demand.

## Gartner Recommended Reading

[Market Guide for CSP Business Support System Solutions](#)

[Market Guide for CSP Operations Support System Solutions](#)

[Hyperautomation: How Can CSPs Prepare for and Implement It?](#)

## B2B Services Platform

Analysis By: Amresh Nandan

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

**Definition:**

B2B services platform refers to a set of integrated systems and capabilities, which are decoupled from the underlying network and products and enable B2B customer journey, service design, service creation, provisioning, activation and assurance. The platform is extensible in both directions – supply (for partners to add to the CSP products) and customers (for empowering them with self-service capabilities).

**Why This Is Important**

Enterprise (B2B) digital transformation requirements present several opportunities for network-based CSPs to target growth. These opportunities in the form of IT, security cloud, infrastructure and connectivity, IoT-related services and managed services for various requirements are diverse in comparison to traditional connectivity services. In addition, slow growth of NFV related services further supports the need to adopt an enterprise focused service management platform.

**Business Impact**

Flexibility in commercial models and operational models necessitates a service management platform. Traditional service development, fulfillment and assurance strategies are less than optimal due to their device-centric approaches. A service management platform has many advantages:

- Better coverage of multiple market segments.
- Flexibility in configuring offerings – efficiency through a service factory approach.
- Decoupling from the underlying network and moving toward OTT-type management.

**Drivers**

Enterprise service management platforms can dramatically enhance a CSP's ability in multiple ways – which is important for differentiation among peer companies and competitiveness with cloud-based CSPs. However, a platform approach demands independent service management capabilities with features and functionalities. It is in line with demand for:

- Uniformly designed and created services.
- Provisioned and activated in an automated manner.
- Assured proactively through service impact analysis (by using techniques like advanced analytics).

- Enabling exposure of APIs for partners to leverage underlying platform capabilities (including network/resource exposure) as well as to add to CSP offerings.
- A well-crafted self-service and management portal for customers, partners and CSPs to manage customer journey and service life cycle.

Success with platform opportunities is dependent on multiple factors such as infrastructure exposure, ability to link network and applications performance, processes for service fulfillment and assurance, and exposure of platform capabilities. However, the most critical success factors lie in:

- The ability to decouple service management with underlying infrastructure and products.
- The flexibility of configuring various business models.
- Utilization of partner ecosystems for competitive offerings, such as IoT services.

## Obstacles

- A service management platform may need to be supplemented with professional services, depending on the products/services being offered. Complexities of existing BSS and OSS systems, operational practices and data management issues mean enterprise service management is still at an early stage with CSPs – yet to develop a full-fledged platform.
- With network function virtualization (NFV) or software-defined network (SDN) adoption for enterprise business segment and network as a service (NaaS) offerings evolution, CSPs are evolving their platform strategy for service management. However, CSPs need to go for wide-scale business process reengineering. We see the area still in the adolescence stage, with about 8% to 10% of network-based CSPs using such an approach and some more working toward it.

## User Recommendations

- Develop capabilities to transition from product-specific systems and processes to a platform leading to operational efficiency by gradual movement toward end to end service orchestration — one product at a time.
- Enhance scalability and efficiency by adopting uniformity in product design, service orchestration and assurance.
- Strengthen your enterprise portal, CPQ, service and resource orchestration extensively by process optimization and automation and not just functional breadth.
- Involve enterprise customers in the evolution of your service management platform by using agile and DevOps practices.
- Enhance flexibility and efficiency in leveraging partners and their capabilities in augmenting offerings through standardized/open APIs and exposure of key functionalities.

## Sample Vendors

Amdocs; Ericsson; Netcracker; Nokia; Oracle

## Gartner Recommended Reading

[Routes to the Future for CSPs — Technology Strategy](#)

[How CSPs Can Approach Digital Ecosystems for Successful Collaboration](#)

[Toolkit: CSP B2B Customer Journey and Process Map Development](#)



## At the Peak

### 5G Charging

Analysis By: Amresh Nandan, Sylvain Fabre

**Benefit Rating:** High

**Market Penetration:** 1% to 5% of target audience

**Maturity:** Adolescent

#### Definition:

5G charging refers to implementation of 3GPP-specified new services-based charging and mediation capabilities. This includes one converged charging system (that can now cover 3G, 4G and 5G) with a new charging and billing architecture. It also features corresponding functions and interfaces to address the new requirements associated with charging and billing, and the function's interaction with various 5G core elements and other components.

#### Why This Is Important

5G charging and associated upgrades in CSPs' BSS (particularly revenue management function) are among the top areas of change for CSPs deploying 5G networks. It has significant implications in terms of transition from 4G/traditional charging mechanism to new 5G specification, readiness for future business models and evolution of BSS. We noted many CSPs deploying 5G charging capabilities during 2020, and more can be expected during 2021 as 5G network deployments progress across the world.

#### Business Impact

5G charging implementation promises to enable a diversified set of business model capabilities that CSPs are aspiring for. With service-based architecture and exposure of network capabilities, CSPs can develop value-added products with differentiated charging mechanisms. However, payoffs depend on a number of factors (such as BSS and OSS architecture, partnerships and ecosystem management). Therefore, 5G charging should be viewed as a base capability to enable other capabilities.

#### Drivers

- 5G network deployments and commercialization of 5G-based services require updated charging mechanisms.

- Mandatory changes brought in by new 3GPP 5G specifications. Changes include the charging mechanism — to support both online and offline charging methodologies and enable a converged charging solution; and new integration mechanism (RESTful APIs) interfaces along with support for backward compatibility through Diameter/CAMEL.
- CSPs' investment in network slicing capabilities and plan to commercialize varied products using network slices.
- Need to support low latency and high threshold in processing charging requests in certain use cases, and to support dynamic pricing configuration.
- Modernization of BSS and OSS to be ready for 5G-based products and services.
- Demand for more flexible, usage-based pricing schemes for 5G private mobile networks.

## Obstacles

- Lack of clarity for a smooth transition path to a converged charging solution for both 5G and legacy products/services.
- Still-evolving vendors' 5G charging products. It should be noted that the majority of existing 5G products can be billed using traditional charging methodologies.
- Majority of CSPs are yet to formalize their 5G business plans and use-cases prioritization.
- Not enough understanding of user requirements, various B2B2X scenarios and their implications on charging and revenue management.
- 5G is still under 20% of newer PMN deployments, and the majority are still using 4G.

## User Recommendations

Plan to deploy 5G charging only after analyzing the broader context of monetization plans and BSS transformation instead of a component replacement tactically. This should include:

- Logical and technical architecture of their future BSS.
- Capabilities associated with new products, in particular ecosystem partners management and settlement based on delivered SLAs.

- Strong data management capabilities with high elasticity and resilience.

Identify 5G charging partner through evaluation of parameters such as:

- A clear roadmap of transition from traditional/4G charging to a 5G converged charging system.
- Easier integration with existing BSS components.
- Clear approach to mediation for different business requirements.
- Solutions for the public 5G network as well as enterprise private dedicated deployments.

### **Gartner Recommended Reading**

[Market Guide for CSP Business Support System Solutions](#)

[Market Trends: Fundamental Changes Await the Telecom BSS Market](#)

[Market Trends: Telecom BSS Evolving as a Set of Federated Capabilities](#)

### **Data Literacy**

**Analysis By:** Alan D. Duncan, Sally Parker, Donna Medeiros

**Benefit Rating:** High

**Market Penetration:** 5% to 20% of target audience

**Maturity:** Adolescent

### **Definition:**

Data literacy is the ability to read, write and communicate data in context, with an understanding of the data sources and constructs, analytical methods and techniques applied. It is the ability to describe the use-case application and resulting business value or outcome.

## Why This Is Important

Data and analytics are pervasive in all aspects of all businesses, in communities and in our personal lives. The ability to understand, interpret and act upon data — data literacy — is increasingly foundational to the digital economy and society. Data literacy helps explain to the board how data and analytics manifest in a company's use cases, explain how to identify, access, integrate and manage internal and external datasets, and describe advanced analytics techniques and enabling AI.

## Business Impact

Data-driven enterprises require explicit and persistent organizational change to achieve measurable business outcomes. Employees know their organization is serious about change only when they see their leaders changing their own behavior. CDOs need to promote and orchestrate "leadership moments" where they act as role models, exemplifying new cultural traits at critical points. Central to success will be the ability to guide the workforce by addressing both data literacy and data-driven culture.

## Drivers

- With the steady rise of the digital economy, and the need for businesses to be digitally literate, there is growing recognition of the role that employees' data literacy plays within an organization's overall digital dexterity.
- The role of the data and analytics function has changed. It is now at the core of an organization's business model and digital platforms.
- CDOs can emulate their higher-performing peers by putting much more emphasis, energy and effort into meeting the change management requirements of their data and analytics strategies.
- Defining what data-driven behaviors are expected, using a "From/To/Because" approach, is central to employee development plans. It ensures that creators, consumers and intermediaries have the necessary data and analytics skills, knowledge and competencies.
- CDOs need to take immediate action to create and sustain data literacy. Quick wins build momentum, but lasting and meaningful change takes time because it requires people to learn new skills and behave in new ways.

## Obstacles

- Lack of common data literacy models/frameworks/standards
- A piecemeal approach to training and certification
- Aversion to change
- Lack of talent and poor data literacy
- Lack of initiatives to address cultural and data literacy challenges within strategies and programs
- “Data literacy” means different things to different providers: from enhanced data visualization skills to fostering curiosity about data more broadly
- Overall adoption will still take years

## User Recommendations

- Create a strong narrative vision of desired business outcomes, particularly with respect to innovation. Raise awareness through storytelling.
- Call out examples of “good” and “bad” data literacy to promote desired behaviors.
- Work with stakeholders who have enthusiasm and appetite, and who recognize that improved data literacy is a factor for success.
- Partner with HR and business leaders to identify the level of data literacy, learning goals and outcomes for various job roles and personas. Use data literacy assessments to evaluate current data literacy levels and desire to participate.
- Go beyond vendor product training to focus on people’s other role-related skills. Use a mix of training delivery methods (classroom, online, community, on the job) to improve overall learning effectiveness.
- Align training and self-service solutions with a broader data literacy portfolio to meet the data literacy needs of both data consumers and creators.

## Sample Vendors

Avado; Coursera; Data To The People; Gartner Consulting; Pluralsight; Skillsoft; The Center of Applied Data Science (CADS); The Data Lodge; Udacity; Udemy

## Gartner Recommended Reading

[Roadmap for Data Literacy and Data-Driven Business Transformation: A Gartner Trend Insight Report](#)

[Tool: Communicating the Need for Data Literacy Improvement](#)

[Chief Data Officers Must Address Both 'Skill' and 'Will' to Deliver Data-Driven Business Change](#)

[Tool: Data Literacy Personas](#)

[Data Literacy Providers Will Accelerate the Time to Value for Data-Driven Enterprises](#)

## Service and Resource Orchestration

**Analysis By:** Susan Welsh de Grimaldo, Chee Eng To

**Benefit Rating:** Transformational

**Market Penetration:** 5% to 20% of target audience

**Maturity:** Adolescent

### Definition:

Service and resource orchestration refers to the core functions in CSPs' operational support system (OSS). Service orchestration includes service catalog, configuration, service policy management, service provisioning and service assurance. Resources orchestration includes resource catalog and inventory, resource planning and design, resource policy management, resource fulfillment and assurance. A platform-based approach supports automated operations for end-to-end service orchestration.

### Why This Is Important

With the introduction of network functions virtualization (NFV) and software-defined networking (SDN), CSPs are taking a new approach to service and resource orchestration to serve the needs of dynamic and complex service environments. They are incorporating the management and orchestration (MANO) framework for coordinating network resources for cloud-based applications and life cycle management of virtual network functions (VNFs), integrating that into their bigger OSS implementation.

## Business Impact

Service and resource orchestration is crucial for CSPs to evolve their future operations to be agile and keep operation costs low. Service automation, with the ability to service-chain multiple services with minimal manual intervention, improves the CSPs' efficiency, time to market, and cost base dramatically. End-to-end service orchestration across different network services and systems, including for 5G and network slicing, enables managing increasing network complexity.

## Drivers

- CSPs seek to increase agility and time to market for services in response to challenges from over-the-top (OTT) providers offering a range of new services and applications in an agile, fast to market way.
- Major CSPs have been taking steps to redesign and rebuild their infrastructure and operations by decoupling hardware and software layers, adopting virtualization and implementing automation.
- Major CSPs are taking ownership of their own transformation, investing heavily in in-house R&D capabilities skills to rearchitect their environment and lead the implementation. A crucial part of their strategy is to align their future architecture with open standards and open source where possible, and use their market power to force vendors to comply with their requirements and specifications.
- Successful implementations by major CSPs are providing valuable lessons for other CSPs. The desire of smaller CPSs worldwide to emulate the major carriers has increased significantly in the past year, which will kick start further transformation.
- CSPs are focusing on improving customer centricity, and implementation of services and resource orchestration when complete will transform the CSPs' capabilities to serve their customers through enhanced SLAs.
- Gartner expects more CSPs will rearchitect their OSS, change their procurement approach. They'll move from relying on a single vendor solution to buying OSS functions as modules of a bigger integrated architecture, relying on open standards and even open source for multivendor interoperability. Most OSS vendors recognize the trend and are overhauling their products to avoid being marginalized by more aggressive players.
- Some vendors are also putting their OSS on public clouds, offering it as a service, which will enable CSPs to align their costs and utilization better. When the vendors' products become more mature in the next two to three years, CSPs will be able to modernize their OSS in greater numbers.



## Obstacles

- Most CSPs worldwide lack the business size and enough technical skills to execute their own transformation. Most telecom vendors and SIs lack broad understanding of CSPs' extensive product portfolio and complex environment, which do not position them well to lead CSPs' transformation.
- The OSS is a critical part of the service and resource orchestration. It is extremely difficult to replace an existing OSS without causing disruption.
- Most OSS vendors provide solutions for a discrete product or service. While OSS vendors are taking steps to adapt their products for CSPs' requirements, progress has been slow and products incomplete.
- Fully automated orchestration across domains for end to end service delivery, for example for network slicing, is still being addressed in standards organizations and will mature at a later date.

## User Recommendations

- Take control of the technology change and future architecture by developing the necessary in-house capabilities to define a best-of-breed platform, emphasizing open source for a multivendor environment.
- Build flexibility into your architecture so that it can evolve to support automated operations, 5G and business model changes.
- Develop a change management plan for operations to guide OSS transformation.
- Source OSS as "components," rather than a single vendor solution, giving preference to vendors that best align with your strategy through flexibility in engagement, solutions and multivendor support.

## Sample Vendors

Alibaba Group (Whale Cloud Technology); Amdocs; Ciena; Comarch; Ericsson; HPE; Huawei; IBM; Netcracker; Nokia

## Gartner Recommended Reading

[Market Guide for CSP Operations Support System Solutions](#)

[Restructure Services Capabilities for a Strategic Role in CSP Operations Transformation](#)

## Prioritize OSS Product Capabilities for CSP Operations Transformation

## OSS Solution Sourcing Criteria Changes for CSP Operations Transformation

### Platform Operating Models

Analysis By: Mentor Cana, Amresh Nandan

**Benefit Rating:** Transformational

**Market Penetration:** 1% to 5% of target audience

**Maturity:** Emerging

#### Definition:

A platform business is an organization that enables value-creating interactions between people, businesses and things. A platform operating model is a way for CSPs to deliver value, whereby most of the value is derived from the business ecosystem. It is a practice that delivers value by enabling providers and consumers (both referred to as “users”) to consummate matches or enable the creation and exchange of services.

#### Why This Is Important

CSPs face intense pressure to create and deliver differentiating value beyond networking and connectivity. With traditional operating models, the organization delivers most value through its own products and services. The four types of platform business models are matching, creation, orchestration and collaboration. With platform operating models, CSPs can derive value from the broader business ecosystem, and can extend value creation with content, collaboration and commerce opportunities.

#### Business Impact

Platform operating models provide CSPs with these major benefits:

- Ability to participate in digital ecosystems as leaders, partners, founders, providers and consumers
- Ability to create and monetize value indirectly
- Extending the ability to diversify and creating new and differentiating value in adjacent markets, such as content, collaboration and commerce

- Accelerating digital business transformation by transforming the I&T operating model
- Rapid scaling of business due to networking effects

## Drivers

- The commoditization of CSPs' traditional value streams, such as connectivity, voice and networking, is driving CSPs to consider value creation with content, collaboration and commerce. To do so, they are considering various platform operating models to expand into adjacent markets.
- Digitally enabled powerhouses — such as the digital dragons Amazon, Apple, Alibaba and Google — are already challenging and eroding CSPs' traditional value enablement in infrastructure and connectivity. In response, CSPs are adopting digital platform models and starting to collaborate with digital dragons to find new revenue opportunities for their traditional services, as well as create net new differentiating value.
- CSPs are subject to disintermediation and disaggregation by nontraditional market entrants, including some from adjacent industries. The result is intensified competition, collaboration and “co-opetition,” creating the urgent need for a new view of value creation and delivery of new communications services that require ecosystem participation and scale. The ability to create new value beyond convenience and price by adopting the four types of platform business models (matching, creation, orchestration and collaboration) requires the implementation of platform operating models.
- If CIOs and their organizations do not adopt a platform operating model in the next two to five years, they will be at risk of being substantially disrupted. Those that do not build such a model will eventually be forced to compete on price and scale, ultimately becoming irrelevant to customers beyond connectivity.
- Adoption of the platform approach to service design and orchestration improves operational efficiencies and moves toward a factory approach.

## Obstacles

- Lack of proactive collaboration between IT and business leaders
- Rigid business and IT operating models
- Rigid governance — command-and-control process priorities over autonomy and embedded, data-driven decision making
- Traditional mindset that emphasizes rules and protective governance (99.999% reliability at all costs) over adaptability and learning
- Siloed approach to value creation and technology platform development
- Point-to-point integrations
- Complexities of legacy systems and technologies
- Lack of a coherent approach to the technology strategy between network and IT

## User Recommendations

CSP CIOs should:

- Proactively explore value exchange enabled in digital ecosystems by collaborating with business leaders to develop platform business models utilizing all the possibilities that digital ecosystems offer. Explore participation as founders, leaders, providers or consumers.
- Identify potential business opportunities that platform business offers by uncovering relationships, roles and potential for shared capabilities.
- Develop and implement your infrastructure capabilities that enable the utmost open collaboration with various ecosystem players (such as developers, hyperscale digital players and digital natives) by adopting DevOps and agile principles, as well as open APIs and reusability principles.
- Accelerate new value creation and digital transformation by aligning your I&T operating model elements and capabilities to enable business outcomes.
- With other technology leaders, start implementing the key elements of an I&T operating model for a flexible and composable future.

## Gartner Recommended Reading

[The Next Era of Communications Services \(Part 1\): Digital Ecosystems and Digital Dragons Drive a Radical Shift in Value Enablement](#)

[5 Digital Ecosystem Types That Will Impact Every Enterprise](#)

[Platform Business Models That Adapt and Disrupt](#)

[Designing and Implementing the I&T Operating Model: Components and Interdependencies](#)

## Innovation Management

Analysis By: David Cearley, Marty Resnick

Benefit Rating: Transformational

Market Penetration: 5% to 20% of target audience

Maturity: Early mainstream

### Definition:

Innovation management is a business discipline that aims to instill a repeatable and sustainable innovation process or culture within an organization. Innovation is defined here as the creation of ideas, processes, tools and technologies that enhance business value.

### Why This Is Important

There is a growing set of examples whereby enterprise architecture and technology innovation leaders are getting in front of the business strategy curve by increasing their focus on technology innovation. EA is shifting toward internal management consultancy and enabling continuous innovation throughout the organization. EA accomplishes this by facilitating and developing innovation management and related disciplines, such as trendspotting, as a growing expectation for the EA discipline.

## Business Impact

Gartner research indicates that when EA and technology innovation leaders engage in innovation in a thoughtful and deliberate way, substantive value is generated by the discovery of new business opportunities. This managed innovation approach also delivers a more effective and efficient process to generate value from these innovations. Ideas that will have the most impact on the business are actionable and help achieve business outcomes. Ideas may not always result in a new product or process, but may lead to continuous improvement, intellectual property, trademark and/or new elements.

## Drivers

- EA and technology innovation leaders must support an environment of creativity and innovation, the demand for which is increasing in order to compete in the digital business world.
- IT organizations are becoming more aware of the need for process and structure in the innovation process.
- Technology Innovation teams are increasingly tasked with facilitating innovation ideation from diverse areas of the business.

## Obstacles

A successful innovation management program seldom depends on technology for its success. Creativity and innovation can occur naturally in any organization, but EA and technology innovation leaders responsible for innovation and aiming to maximize its impact need it to be intentional and methodical. A number of challenges need to be managed:

- Lack of clear goals to focus and inspire innovation, which can lead to innovation with minimal business impact
- Cultural barriers in the organization that do not encourage people to bring new ideas to the table and limit idea generation
- Overlooking the inherent risks in transformative or disruptive innovation and an intolerance for any failure, which undermine participation and buy-in from both IT and the business
- Lack of a process that can see ideas through to prototype and implementation with a repeatable process, which leads to innovations that do not scale and are not adopted

## User Recommendations

- Use trendspotting to scan the horizon for emerging technologies that could disrupt or create new opportunities for your business, and act on those disruptive forces.
- Reimagine business capabilities and processes by using emerging technologies and trends as inspiration to provide insights into optimizing or creating new business models for competitive advantage through innovation.
- Evaluate the impact of trends and how to deal with them, and deliver forecasts, perspectives and insights to help leaders plan using strategic foresight and other methodologies.
- Facilitate the processes and practices of innovation by enabling leaders to guide the focus toward innovation and to quickly trigger and elicit exceptional ideas, expose new insights, identify new opportunities, resolve obstacles, remove barriers or speed decisions.
- Utilize trend cards, trend radars, ideation tools, design thinking, and other methods and methodologies to collect, evaluate and communicate information about trends and ideas.

## Sample Vendors

Brightidea; Crowdicity; Exago; HYPE; ITONICS; Planbox

## Gartner Recommended Reading

[Market Guide for Innovation Management Tools](#)

[Inventing the Future With Continuous Foresight](#)

[Technology Innovation Primer for 2021](#)

[Executive Leadership: Innovation Management Primer for 2021](#)

## Cloud-Native Telco Operations

Analysis By: Susan Welsh de Grimaldo

Benefit Rating: Transformational

Market Penetration: 5% to 20% of target audience

**Maturity:** Adolescent

**Definition:**

Cloud-native telco operations refers to application of cloud-native and microservices architecture and related processes to CSP operational technology applications at various levels such as virtual network functions, network management applications, operational and business support systems. These applications could be running in private or public cloud or in some cases both (hybrid cloud infrastructure).

**Why This Is Important**

After many years of discussions, leading CSPs have now moved to adopt cloud-native architecture for operations in some layers of their technology stack to support improved competitiveness and customer centricity. Adopting cloud-native operations entails fundamental changes and impacts both architecture as well as the operating model.

**Business Impact**

A cloud-native approach promises a transformational impact on both CSP operations and services – offering a number of benefits such as flexibility, agility, scalability and improved products and feature velocity. With cloud-native operations, CSPs can invest and scale as per market demand instead of preprovisioning of capacity and capabilities. A cloud-native approach to operations emulates web-scale operations and provides flexibility in sourcing and technology change management.

**Drivers**

- Inadequate benefits from earlier adoption of NFV and complexities of BSS and OSS have motivated many CSPs to adopt a cloud-native approach in their operational technology.
- In operations, it can help develop a layered architecture separating core functionalities of BSS and OSS with capabilities needed for product changes and customer experience/journey management.
- Greater modularity along with cloud-native infrastructure afford higher elasticity, resilience and maintainability. This modularity can allow CSPs to upgrade specific areas of their systems through a “best of component” approach instead of targeting bigger transformations.
- Adoption of cloud-native deployment also increases greater control on technology change and change management to CSPs, thereby the potential to reduce vendor dependence to some extent.



## Obstacles

- Moving to a cloud-native approach demands a new operating model and new ways of working, which can take significant time to develop.
- Lack of software engineering/IT skills and continued separation of network and IT functions in CSPs.
- Significant dependence on vendors in many CSPs leading to inadequate structural and business process changes.
- Still evolving reference models, practices and guidelines. Lack of such artefacts has been a challenge for many CSPs who have also been grappling with skills shortage.
- Lack of readiness in many CSPs to address the complexities of their business processes and governance mechanisms needed for DevSecOps- and CI/CD-based operations.

## User Recommendations

- Adopt cloud-native architecture and principles in phases to assure operational readiness in terms of DevOps, CI/CD, container orchestration and automation tool chain.
- Prioritize specific BSS, OSS and NFV MANO applications as candidates for cloud-native adoption before cloud-native VNFs are implemented. Network functions process control plane and data plane and other functional requirements with specific performance, capacity and latency requirements that must be understood in detail.
- Establish an open environment with open APIs and open tool chain for optimal cloud-native application management.
- Work with suppliers in this change process to balance the complexity and benefits of moving to a cloud-native approach.
- Align implementation of cloud-native operations across various layers of the technology stack to automation goals – zero-touch provisioning, service creation and closed loop service management.

## Sample Vendors

Amdocs; Cisco; Ericsson; Huawei; MATRIXX Software; Mavenir; Microsoft; Nokia; ZTE

## Gartner Recommended Reading

[Market Guide for CSP Operations Support System Solutions](#)

[Predicts 2021: A Paradigm Shift for Technology Service Providers in the Telecom Industry](#)

[Cloud-Native Requires New Thinking for Cloud Operations Service Providers](#)

## Agile Beyond IT

Analysis By: Lorri Callahan

**Benefit Rating:** Transformational

**Market Penetration:** 20% to 50% of target audience

**Maturity:** Adolescent

### Definition:

Agile is a discipline that will help shorten the time it takes to accomplish strategic goals. This discipline focuses on improved investment decision making, iterative and adaptive practices, frequent customer interactions and increased team effectiveness. With more technology decisions driven outside of IT to enable digital business transformation, it is necessary for organizations to become more agile in how they approach all types of work. Agile is not just about IT anymore.

### Why This Is Important

The benefits gained from IT's adoption of agile practices have created interest and momentum in extending these practices throughout the organization. The need to improve business performance holistically has opened the doors to adopting new ways of working in HR, audit, marketing, finance and other functions. Every function needs to be conversant in agile terminology and understand how their own processes need to change in order to effectively work with groups that have adopted agile.

## Business Impact

PPM leaders can support the adoption of agile because of their visibility into planned work and its alignment to strategic imperatives. When adopted and rigorously applied, the mindset can enable the enterprise to move faster and to be more focused on ensuring outcomes that deliver value. This means further integration of business and IT teams, moving from a “me” to “we” culture. New ways of doing business boost performance through group accountability for business results.

## Drivers

Key agile adoption trends that support the extension of agile beyond IT include:

- Organizations continue to turn to new ways of working, like agile, to keep pace with the rate of disruption and change in the marketplace that requires: (1) finding the balance between being adaptive and innovative; (2) removing wasted motion; and (3) creating greater clarity and focused commitment to the desired outcome.
- Agile, steeped in long-standing lean practices, is recognized as a means to create efficiency and make iterative adjustments for higher quality results.
- Business-led IT analysis and investment continue to increase.
- Recognition of the criticality of multidisciplinary (fusion) teams to drive digital transformation success.
- Interest in adoption of enterprise agile frameworks continues to increase.

## Obstacles

- Organizations do not realize the adoption of agile takes discipline, knowledge and practice.
- Existing processes and behaviors are often not suitable for operating in an agile way of working.
- Prioritization practices do not have adequate criteria to ensure work requests are aligned to strategic imperatives, contain defined business outcomes, and articulate the KPIs that will be used to ensure both.
- Infrequent portfolio reviews do not enable the ability to closely monitor proposed, planned and in-progress work to continually reassess performance and replan accordingly.

## User Recommendations

Agile is an approach to achieving customer-centered collaborative results under conditions of uncertainty, and is not limited to IT and software development. Begin by providing general overviews to help orient everyone to the concepts and practices needed to adopt agile. Next, identify a pilot team of dedicated resources to address a specific scope of work with these considerations:

- Limit the amount of interdependencies and complexity.
- Enable the pilot team to commit to the shortest possible deadline required to achieve a viable outcome, without burning out people and without disrupting day-to-day operations.
- Publicize the progress of the pilot team and the shift in their behaviors as they implement agile practices.
- Create opportunities for others to learn about the pilot through demos and pilot team metrics.
- Extend the lessons learned from the pilot to additional areas, playing forward the successes and lessons learned from each subsequent group to the next.

## Gartner Recommended Reading

[Adopting Agile in Audit](#)

[The Agile HR Function](#)

[An Introduction to Agile Marketing Utilization](#)

[Expand Your Process Improvement Toolkit to Include Agile](#)

## Business Ecosystems

Analysis By: Marcus Blosch

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

**Definition:**

A business ecosystem is a dynamic network of entities (people, businesses and things) interacting with each other to create and exchange sustainable value for participants. A business ecosystem allows participants to work cooperatively and competitively to support new products, satisfy customer needs and innovate.

**Why This Is Important**

All organizations exist in a business ecosystem that includes customers, partners, competitors, regulators, suppliers and many other entities. The business ecosystem is a source of opportunity, and many of today's most successful business models are based on taking advantage of the full ecosystem. The business ecosystem is also a source of risk, new competitors, supplier failures, changes in regulations or even global pandemics.

**Business Impact**

Business ecosystems define successful businesses:

- From Alibaba to WeChat and Amazon to Uber, many of the most successful business models of the last decade are business ecosystems.
- Increasingly, business strategy is turning outwards into the business ecosystem.
- The business ecosystem is also the source of solutions to complex problems, from climate change to smart cities, bringing together a diverse range of stakeholders to collaborate on innovative solutions.

## Drivers

- All business strategy takes place in the business ecosystem, from introducing a new product to entering a new market or acquiring another company. Successful strategy depends on understanding the business ecosystems.
- The business ecosystem is a key source of opportunity. Many of the most successful business models, from Alibaba to WeChat and Airbnb to Uber, are based on leveraging the business ecosystem. Business models explicitly based on the business ecosystem are becoming increasingly popular.
- Complex problems often can only be solved by using a business ecosystem that brings together different stakeholders, perspectives and resources. Climate change, urban development and creating smart cities, for example, all required an ecosystem-based strategy.
- Organizations can become more agile and adaptive by using open architectures and leveraging the competencies and capabilities available to them in the business ecosystem. Developments in technology such as cloud, analytics, modular, service-oriented, API-based architectures make this straightforward.
- Information is becoming one of an organization's most important assets, and much of this information is to be found external to the organization and within the broader ecosystem. Sentiment analysis, supplier backlogs, weather patterns and much more can now be used as input to complex algorithms.

## Obstacles

- Business ecosystems represent a change in perspective, away from an internal input-output perspective to an external ecosystem (or complex adaptive system) perspective.
- New skills and competencies are needed to model and understand the dynamics of the business ecosystem. Most organizations lack this expertise today.
- Creating new ecosystem-based business and operating models is challenging, particularly where there is an entrenched traditional business model.
- Some modeling tools are available for organizations to visualize the ecosystem, but they are not widespread.

## User Recommendations

- Understand the concept of business models and learn how organizations have leverage them to transform their operations.
- Develop simple business ecosystem models for your organization; identify the participants, their roles, and relationships and interrelationships.
- Work with business executives to build and refine business ecosystem models to highlight opportunities and challenges that are external to the organization.

## Gartner Recommended Reading

[Expanding Your Business Ecosystem](#)

[8 Ways Ecosystems Supercharge Digital Business Models](#)

[Platform Business Models That Adapt and Disrupt](#)

[Model Your Ecosystem to Identify the Partners Needed for Digital Business](#)

## CSP Open APIs

Analysis By: Amresh Nandan

Benefit Rating: Transformational

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

### Definition:

Open APIs refer to application programming interfaces (APIs) that are publicly available, and developers can use them for programmatic access to proprietary software. Such APIs are often developed by a commercial entity, industry body or industry standardization/specification organizations for the purpose of ease of integration, interoperability and utilization of data and functionalities by the wider community.

## Why This Is Important

Telcos/communications service providers (CSPs) are increasingly focusing on open APIs for better modularity, faster integration and reduced vendor lock-in. Integration requirements among several solutions to move toward platforms and ecosystems have forced detailed specification and standardization by industry bodies, such as 3GPP, ETSI, TM Forum and MEF. Open API adoption in the telecom industry is on the rise among leading CSPs and vendors, and 2020 witnessed further increased interest.

## Business Impact

- There is strong value in adopting open APIs, for faster, easier and cost-effective integration and interoperability.
- Open APIs can have a far-reaching, positive business impact; however, success depends on the level of adoption.
- TM Forum reports greater adoption of their Open APIs by CSPs as compared to vendors and highlights it as an opportunity for vendors. With increase in adoption, value will increase. However, CSPs must push for it instead of waiting for vendors to adopt such APIs.

## Drivers

- One of the key reasons for end-user (CSPs) adoption of open APIs is the desire to achieve greater freedom in sourcing and integrating technologies.
- In addition, such APIs by industry bodies are often specified/developed in a collaborative manner, leading to early identification of nuanced requirements and integration challenges.
- CSPs source technologies from multiple vendors and integration, through open APIs, is the most appropriate way for faster and cost-effective interoperability.
- As CSPs look toward developing ecosystems, open APIs are a necessity to expose data and functionalities, as well as to consumer partner capabilities.
- Many CSPs have started tracking the level of TM Forum Open APIs adoption by the vendor community with a view to evaluate vendors and to formalize their own approach.



## Obstacles

- Continuation of old solutions and architecture in many CSPs is an obstacle for open APIs implementation, though some CSPs have been working on overlay mechanisms.
- Many vendors have also shown reluctance in implementing open APIs to address the threat of substitution and to continue to offer complex integration services.
- Some vendors have developed their own set of APIs and project them as analogous to open APIs. Such an approach is detrimental to open APIs adoption.

## User Recommendations

- Consider using open APIs during platforms/system design for better technology change, to gain greater freedom in sourcing and integration.
- Encourage technology vendors to adopt open APIs by including the topic in RFIs/RFPs and the vendor evaluation process.
- Dedicate resources for participation in API development initiatives, trials and pilot programs as effectiveness of such APIs comes through active participation in the collaborative development process.
- Examples of such initiatives include TM Forum's Open APIs Catalyst programs (associated with telecom BSS, OSS and related areas), where many CSPs and vendors participate to address specific challenges/problems. This allows faster and collaborative development and integration while maintaining a degree of independence in technology change.

## Gartner Recommended Reading

[Market Guide for CSP Business Support System Solutions](#)

[Market Guide for CSP Operations Support System Solutions](#)

[Market Trends: Fundamental Changes Await the Telecom BSS Market](#)

[Market Trends: Telecom BSS Evolving as a Set of Federated Capabilities](#)

## Intelligent Automation

Analysis By: Peter Liu

**Benefit Rating:** High

**Market Penetration:** 20% to 50% of target audience

**Maturity:** Adolescent

**Definition:**

Intelligent automation (IA) is a combination of process automation and artificial intelligence (AI) technologies, which together empower rapid end-to-end process automation. It also contemplates the use of analytics and AI (especially machine learning) to make automated and intelligent decisions, and case management to provide processes with enough flexibility for end-to-end case management success.

**Why This Is Important**

IA empowers rapid end-to-end business or operation process automation. The use of intelligent automation for infrastructure takes many forms and addresses the operations of data centers, workplace services, networks, the edge and application availability on the network. IA allows the workload to be managed with much less intervention and personnel. All this contributes to better efficiency, scalability and reliability; lower operating costs; and improving productivity.

**Business Impact**

- Improve the productivity of employees, getting rid of repetitive tasks and enabling employees to focus on tasks that add value for the company like innovation and creativity
- Improve the operational efficiency and agility, lower operation cost and time of response
- Contemplate the use of analytics and AI to make automated and intelligent decisions

## Drivers

- Technology vendors are starting to embed intelligent automation capability into their radio, network operation and management, BSS and CRM solutions to address the operation efficacy and complex challenge.
- Operation efficiency and lower operational cost are accelerating intelligent automation adoption in CSPs.
- The COVID-19 pandemic refocused businesses and network infrastructure on resilience, which for many, resulted in accelerating the intelligent automation agenda.
- Maturing and expanding data science initiatives, better algorithms, more cost-effective computing power and a substantial increase in available data support the emergence of intelligent techniques.
- The use of intelligence automation will transform how IT and network infrastructure is delivered and supported, including delivering more agility to address resource demand, which is attractive for CSPs building next-generation operation and management platforms.

## Obstacles

- Although automation is not a new idea in the telecom space, adding artificial intelligence and reducing human intervention in the process cycle is a relatively new concept in the telecom space. Employees sometimes have misconceptions about what they should expect as IA becomes part of their work life.
- Employees also lack skill sets to work effectively with the new tools that are now part of their workflow.
- Lack of executive support and business user involvement. Many intelligent automation projects were treated as a technology project without a business user involvement in the beginning.
- The accuracy of algorithm models is limited by the completeness and accuracy of the data being used. Fragmented data and data quality are always a major concern of a successful intelligent based automation adaptation.

## User Recommendations

- Focus on improving the efficiency of the process before introducing intelligent automation is critical. Introducing intelligence and automation on top of an inefficient process always leads to a worse situation.
- Build a transformational mindset with respect to AI and automation across the company through accelerating your AI skills and talent development.
- Enhance context-awareness through establishing cross-siloed visibility and a strong data foundation for intelligence.
- Establish an automation roadmap through requesting intelligent capabilities into vendors' products — or consider how internal capabilities can be developed that can create this intelligent automation.

## Sample Vendors

Amdocs; Blue Prism; B-Yond; Ciena; Ericsson; Guavus; Huawei; IBM; Juniper Networks; Tupl

## Gartner Recommended Reading

[Predicts 2021: CSP Technology and Operations Strategy](#)

[Hyperautomation: How Can CSPs Prepare for and Implement It?](#)

[Strategic Planning in Crisis: A CSP Perspective](#)

[CSP CIOs Enable Business Outcomes Through AI Augmented Talent and Decision Making](#)

[Infographic: AI Use-Case Prism for Telecommunications CSP Networks](#)

## Network Slicing

Analysis By: Susan Welsh de Grimaldo

Benefit Rating: Transformational

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

**Definition:**

Network slicing is a form of virtual network technology. It allows a network-based CSP to create multiple independent end-to-end logical networks in the form of a network slice on top of a common shared physical infrastructure at the provider's network domain. Each slice can be customized to have its own network architecture, engineering mechanism, network provisioning methodology, configuration and service quality profile based on the requirements that it serves.

**Why This Is Important**

Network slicing allows multiple logical networks to be created on top of a common shared physical network. These logical networks are tailored to meet the specific needs of applications, services, devices, customers or operators. Slicing provides CSPs with a mechanism to translate the business needs of end customers into parameters that can be defined and measured, such as required bandwidth, speeds, latency and reliability, in order to deliver tailored connectivity.

**Business Impact**

With network slicing, CSPs can run multiple independent business end services on a common physical infrastructure. This increases infrastructure utilization and economic efficiency, and it also helps generate new business models, especially for vertical industries. With network slicing, business customers will be able to access highly customized network slices tailored to specific requirements in a cost-effective, timely and efficient way, and backed by a service-level agreement (SLA).

## Drivers

- Broader commercial deployments of 5G stand-alone (SA) with 5G core will serve as a catalyst for more rapid growth of network slicing in commercial service offerings. Slicing does not require 5G or 5G SA, but 5G core will accelerate slicing commercialization as it adds further value.
- More CSPs have started evaluations and trials of network slicing in partnership with their vendors. They include BT, China Mobile, Deutsche Telekom, SK Telecom and Vodafone UK.
- CSPs in China began deploying stand-alone 5G and multi access edge compute (MEC) on a large scale in 2020, which we believe will accelerate the network slice maturity and enable more innovation opportunities.
- Network slicing offers improved security and data traffic isolation, as each slice is completely isolated in operations so that no slice can interfere with the traffic in another slice. This will enable slices on the public network to more cost-effectively deliver private networking services, bringing the benefits of network slicing downstream to smaller businesses through more affordable offers.
- As vertical industries push further in their digital transformation efforts and integrate connectivity, cloud services and sensor data into their mission-critical operations, they have specific requirements that drive a need for ability to deliver SLAs. An example is for secure, reliable low-latency/high-bandwidth connectivity to AI on edge computing.
- Network slicing enables increased agility for customer-centric service creation by creating a mechanism for composable services across network domains and elements, using automated processes driven by slice templates to deliver desired service parameters that can be quantified in an SLA.
- Dynamic network slicing that can be quickly instantiated — and spun down when no longer needed — through automation will provide more agility to deliver required value propositions to customers while reusing integratable and automatable network components to drive efficiency.

## Obstacles

- Numerous capabilities such as comprehensive network inventory, automated data-driven operations, and ability to test and assure SLAs across domains are required for commercializing network-slicing-related offerings; many of the capabilities are still evolving.
- The maturity level of slicing varies across network domains, and multivendor environments add more complexity, thus, enabling the full promise of end-to-end network slicing is a continued challenge in CSP operations.
- 5G SA is still not being widely adopted for commercial deployment, which will delay broader slicing implementation.
- Standards supporting truly dynamic, end-to-end (E2E) slicing across multivendor network domains (core, transport, edge, RAN) are still being developed, necessitating a phased approach to deployment.
- Key areas such as dynamic orchestration for low-touch operations and management of subdomains/subnets still need further development and are likely to be addressed differently by CSPs.

## User Recommendations

- Prepare for slicing by addressing key enablers, e.g., SDN, cloud RAN, edge computing and cloudification.
- Do not wait for full readiness of slicing capabilities to launch offers. Create early wins using static slicing to add value to current service offerings.
- Drive customer centricity by focusing on business outcomes. Work with product teams to translate how technology features can help solve problems or create opportunities for end customers.
- Evaluate technologies and use cases by working with vendors and customers to co-develop solutions, identify performance gaps and measure business impact.
- Identify ways to deliver cost optimization while supporting revenue growth by working with vendors to get the right out-of-box functionality, low-code solutions to support use by business units, flexible procurement for pay as you grow and licensing that fits the use cases.
- Prepare to efficiently scale and drive revenue by adopting automation, monetization and security by design as guiding principles.

## Sample Vendors

Amdocs; Ericsson; Huawei; Intel; Nokia; STL; ZTE

## Gartner Recommended Reading

[Create Value and Drive Revenue With 5G Network Slicing Phased Approach](#)

[Drive 5G Network Slicing From POC to Scale](#)

[Emerging Technology Horizon for Communications](#)

[5G as a Service: Deployment Scenarios of Private Networks in the 5G Era](#)

[Routes to the Future for CSPs — Technology Strategy](#)

## Product-Centric Delivery Model

Analysis By: Wan Fui Chan

Benefit Rating: Transformational

Market Penetration: 20% to 50% of target audience

Maturity: Early mainstream

### Definition:

A product-centric delivery model allows organizations to respond more rapidly to changing demands using agile methodologies. It also allows organizations to deliver incremental improvements to business outcomes with a focus on users and customer centricity.

### Why This Is Important

Volatile, uncertain, complex and ambiguous (VUCA) headwinds in markets, requirements and technologies have resulted in organizations evolving from traditional, project-based frameworks. A product-centric delivery model allows organizations to navigate through turbulence and also to iterate, adapt and refine processes to deliver business benefits efficiently and frequently. A product-centric model can provide competitive advantage sought by many organizations.



## Business Impact

Key benefits of a product-centric delivery model include:

- Stronger focus on incremental improvements to business outcomes
- Increased agility to respond to changing market demands and customer value prioritization
- Reduction of silos, and closer collaboration across the organization
- Minimum quality escapes through DevOps practices
- Flatter and more rapid decision making

## Drivers

- Organizations' need to keep pace with market demands and increased volatility
- Desire to increase speed of improvements that currently take too long to implement and deliver
- Pressure to reduce loss of knowledge caused by continuous disbanding of teams to work on new projects
- Need to overcome inefficiencies caused by the silos between business, finance and IT
- Increasing necessity for continuous innovation

## Obstacles

- Inertia from existing organizational culture
- Difficulty finding talent with necessary skills and open mindset
- Misconception that product-centric delivery models have no plans, documentations, milestones or budgets
- Walls between business and IT
- Lack of clear reasons or defined measurable benefits for transitioning
- Long time frames for transition
- Lack of senior management and organizational support, which leaves adoption in pockets across the organization
- Outmoded governance processes incentivizing control and risk aversion, rather than experimentation and innovation

## User Recommendations

- Clearly identify and train product managers, product owners, business leaders and team members on agile and product management practices to create a baseline of understanding which dispels any myths and misconceptions.
- Utilize agile coaching to aid in the transformation and avoid the temptation to go it alone.
- Use iterative change management practices during the transition that allow for learning and adaptation.
- Establish a strong partnership with colleagues in the various business areas as you adopt this new delivery model; cross-functional collaboration is a prerequisite for success.
- Move to a product funding model that allows for dynamic teams and reallocation of resources based on business demand and changing market conditions.
- Establish clear goals and objectives for the transition anchored on business priorities.

## Gartner Recommended Reading

[Becoming Product-Centric Should Be an Evolution, Not a Top-Down Transformation](#)

[Overcome Objections and Sell the Benefits of Moving From Projects to Products and Agile](#)

[How to Use Product Roadmaps for Funding and Governance of Agile Product Delivery Teams](#)

[Avoid Agile Transformation Failure by Using Agile Coaches](#)

[Prepare Now for the Future of Digital Product Management](#)

## Sliding into the Trough

### Continuous Delivery

Analysis By: Hassan Ennaciri

**Benefit Rating:** High

**Market Penetration:** 20% to 50% of target audience

**Maturity:** Adolescent

#### Definition:

Continuous delivery (CD) is a software engineering approach that enables teams to produce valuable software in short cycles while ensuring that the software can be reliably released at any time. Through dependable, low-risk releases, CD makes it possible to continuously adapt software to incorporate user feedback, shifts in the market and changes to business strategy. This approach requires engineering discipline to facilitate the complete automation of the software delivery pipeline.

#### Why This Is Important

Growing DevOps initiative success continues to drive enterprise investments in CD capabilities. CD improves release velocity and reliability while simplifying compliance enforcement via automation. It is a prerequisite and a first step to continuous deployments for organizations that aspire to push changes with zero downtime.

#### Business Impact

CD is a key practice for a DevOps initiative that reduces build-to-production cycle time. This accelerates the positive impact of new applications, functions, features and fixes by increasing velocity across the application life cycle. The positive impacts include improved business delivery and end-user satisfaction, improved business performance and agility, and risk mitigation via rapid delivery of updates.

#### Drivers

- Agile and DevOps adoption to deliver solutions
- Need to improve release velocity and reliability
- Need to shift left and simplify compliance enforcement via automation

- Need to improve software development life cycle (SDLC) to more consistently deploy application builds and updates, by extending the benefits of Continuous integration (CI) and automated testing to continuously build deployable software
- CD is a prerequisite and first step to continuous deployments for organizations aspiring to push changes with zero downtime

## Obstacles

- Organizational culture and collaboration between teams with different roles and skills is a major barrier to CD success. Agile practices that helped bridge the gap between business and development need to be extended to deployment, environment configuration, monitoring and support activities.
- Lack of value stream mapping of product delivery hinders visibility and quick feedback loops needed for continuous improvements. Teams struggle to improve and focus on value work as they don't have insights to the critical steps in the process, the time each step takes handoffs and wait states.
- Other challenges that impact success of CD include application architecture and lack of automation in all areas of testing, environment provisioning, configuration security and compliance.

## User Recommendations

- When starting a CD initiative, enterprises must consider all associated technologies and take an iterative approach to adoption. This will require collaboration with all stakeholders from product, development, security and operations.
- To enable a higher likelihood of CD success, DevOps teams must also establish consistency across application environments and implement a continuous improvement process that relies on value stream metrics.
- DevOps teams must evaluate and invest in associated tooling, such as application release orchestration tools, containers and infrastructure automation tools. These tools provide some degree of environment modeling and management, which can prove invaluable for scaling CD capabilities across multiple applications.
- DevOps teams need to consider DevOps Value Stream Delivery Platforms (VSDPs) to provide fully integrated capabilities that enable continuous delivery of software.

## Sample Vendors

Broadcom; Calculi; CloudBees; GitLab; Harness; JFrog

## Gartner Recommended Reading

[How to Build and Evolve Your DevOps Toolchains](#)

[Market Guide for DevOps Value Stream Delivery Platforms](#)

[Extend Agile With DevOps for Continuous Delivery](#)

## Open-Source Solutions for CSPs

Analysis By: Mentor Cana

Benefit Rating: High

Market Penetration: 20% to 50% of target audience

Maturity: Early mainstream

### Definition:

Open source is a model for the development, support and distribution of software that encourages and, in many ways, enforces community stewardship of the technology. Communications service provider (CSP) CIOs and CTOs are increasingly focused on deploying open-source solutions. The adoption of open-source software continues to disrupt CSPs' IT and network operations ecosystems, yet enables CSPs to achieve better interoperability and flexibility in the long term.

### Why This Is Important

Because open-source adoption can help reduce vendor lock-in and provide greater control over technology change management, CSPs are embracing open source in their network and IT operations. While the CSP IT operations domain has been embracing open-source software over many years, the adoption of open source in the CSP network domain has picked up among leading global CSPs. Gartner expects that it will further grow over the next few years.

### Business Impact

Open-source solutions provide CSPs with the following major benefits:

- Lower cost of acquisition of technologies and capabilities

- Increased agility with faster time to market
- Accelerated innovation cycle
- Diversifying sourcing mechanisms
- Reducing vendor dependence
- Developing openness in infrastructures and applications
- Easier partnering with ecosystems participants

## Drivers

- Open source presents the single biggest opportunity for CSPs to begin the transition from vendor-locked operations' ecosystems to vendor-agnostic operations' ecosystems. Both, use of open-source and contribution to open-source initiatives, are steps toward vendor independence for CSPs. This allows CSPs to leverage wider innovation, enhance vendor neutrality and gain better control over their technology change management.
- CSPs are increasingly looking to reduce their solution development-, implementation- and support-related costs. In the past, internal research and development has proved to be expensive, time-consuming and inefficient, yielding only mediocre results. However, because the most successful open-source software solution developments are driven by collaborative communities (with active participation by large CSPs) that have hundreds of thousands of contributors around the world, CSPs expect to reap the benefits of community-based innovation and development.
- Open source in the network function virtualization (NFV) management and orchestration (MANO) component is growing rapidly. Examples include open-source solutions, such as Open Network Automation Platform (ONAP), open-source MANO (OSM), and open radio access network and/or physical access. In addition, DevOps, continuous integration/continuous delivery (CI/CD) and cloud-native adoption has also fueled open-source tools adoption. As CSPs accelerate the effort to virtualize their network functions so that they can automate and orchestrate service delivery without specific vendor lockings, the adoption of open-source solutions enables this flexibility as well as speed for CSPs.
- This trend of adopting and operationalizing open-source solutions is expected to continue for the next three to five years.

## Obstacles

- Successful adoption and solution delivery using open-source requires building strong in-house architecture and development teams that can be sustained over the long term.
- General lack of maturity and performance (when compared to proprietary or vendor-led platforms), which can, on occasion, be inconsistent.
- Operational support for open source can prove challenging and is often underestimated by adopters.
- Development, engineering and operational resources can be hard to attain.

## User Recommendations

- Encourage the use of open-source solutions by making it mandatory to have open-source solutions in technology roadmaps for areas of the network where open source can provide the desired outcomes.
- Incorporate open-source solutions in architecture, roadmap and timeline by methodically replacing various vendor-locked proprietary operational software elements with open-source alternatives, where possible.
- Force the development of open-source alternatives by eliminating or severely restricting the funding for vendor-locked proprietary solutions.
- Prioritize the development of open-source software solutions by focusing on enhancing its reliability and implementing internal support processes.
- Promote innovation internally and in the CSP vendor landscape by taking advantage of the open-source ecosystem, especially with vendors that use open source. Invest in programs to instill the culture of innovation.
- Build open-source competencies by hiring new talent to address the needs of open-source solutions, both for development and support.

## Sample Vendors

Kubernetes; ONAP; Open Compute Project; OpenDaylight; Open Networking Foundation (ONF); OpenStack; O-RAN ALLIANCE; Open Source MANO; Xen

## Gartner Recommended Reading

[Hype Cycle for Open-Source Software, 2020](#)



[Open-Source Change: Navigating Change in the Digital Era](#)

[Peer Connect Perspectives: Developing an Open-Source Strategy](#)

[OSS Solution Sourcing Criteria Changes for CSP Operations Transformation](#)

## **Hyperautomation**

**Analysis By:** Stephanie Stoudt-Hansen, Frances Karamouzis, David Groombridge

**Benefit Rating:** High

**Market Penetration:** 20% to 50% of target audience

**Maturity:** Emerging

### **Definition:**

Hyperautomation involves the orchestrated use of multiple technologies, tools or platforms (inclusive of, but not limited to, AI, machine learning, event-driven software architecture, RPA, iPaaS, packaged software and other types of decisions, and process and/or task automation tools). Business-driven hyperautomation is a disciplined approach that organizations use to rapidly identify, vet and automate as many business and IT processes as possible.

### **Why This Is Important**

Leveraging multiple best-of-breed tools and processes allows providers to deliver more rapid, complex and successful automation, and allows clients to deliver orchestrated automation outcomes that distinguish them from competitors. Hyperautomation not only is about automation technologies products or services, but also is the approach of combining business process design, IT architecture deployment, governance and greater business agility to drive high competitive advantage.

### **Business Impact**

As organizations demand greater efficiencies and outcomes from service providers, providers are leveraging hyperautomation for greater outcomes and to distinguish themselves.

- The level of efficiency that providers have achieved through automation in areas such as service desk management, hybrid infrastructures and reduction of incidents ranges from 40% to 80%.

- Gartner estimates that by 2024, organizations will lower IT and business operational costs by 30% through hyperautomation solutions.

## Drivers

- Hyperautomation initiatives have grown and investment continues to increase. There was a demand prior to the pandemic and the crisis has served to accelerate the growth, as organizations seek to automate for future resilience.
- The pandemic has broken down business barriers to some employees' resistance to automation, based on the abundance of legacy, disconnected systems and suboptimal processes, creating an urgency to digitalize.
- Organizations trying to automate using a single solution, such as RPA, were failing because RPA alone can only automate tasks, not processes. They need the full suite of hyperautomation tools to achieve process automation and functional orchestration.
- Organizations are looking up to service providers for hyperautomation solutions, which draw on the orchestration of interrelated automation technologies and processes to streamline their environments and achieve greater outcomes.
- The hyperautomation approach integrates and orchestrates automation using AI, machine learning, event-driven software architecture, RPA, iPaaS, packaged software and other automation tools.
- Leveraging multiple best-of-breed tools and processes allows providers to deliver more rapid, complex and successful automation, and allows clients to deliver outcomes that distinguish them from competitors.

## Obstacles

- Gartner estimates over 85% of enterprises have dozens of automation initiatives underway. These have varying degrees of success, as organizations' traditional build-up of technical debt and a patchwork of technologies have made the move to automated and hybrid environments challenging.
- Hyperautomation tools are currently immature with vendors who started from different baseline solutions (RPA, BPM and low code/no code), all descending on the same destination with a hotchpotch of tools with differing levels of maturity and integration.
- Many of the solutions are horizontal in nature being sold to a wide variety of industries, and lack the process knowledge and rules requiring investment in configuring and training the tools.
- RPA, AI and iBPMS vendors often lack the combination of technology solutions to create the best process to meet customer requirements. As a result, buyers struggle to integrate disparate complex technologies to achieve their automation goals.

## User Recommendations

- Establish a mixologist approach to automation tools to avoid being overly obsessed with one technology. Avoid incorrect use by identifying vendor solutions for RPA, BPM, chatbots and optical character recognition (OCR) that can be combined to achieve the desired business outcome.
- Determine a litmus test on what needs to be automated and work with your providers to determine where you will gain your greatest ROI. Also, discuss the value of their proprietary offerings versus being vendor agnostic to avoid lock-in.
- Collaborate with your provider to create a blueprint, and continuously work to update your environments based on the hyperautomation technologies and processes that will create the greatest leverage.
- Develop automation disciplines, governance and structure within your organization by starting small with simpler automation tools such as RPA or BPM to build the foundations for wider automation.

## Sample Vendors

Accenture; HCL Technologies; Hexaware; IBM; T-Systems; Wipro

## Gartner Recommended Reading

[Competitive Landscape: Hyperautomation Service Providers](#)

[Predicts 2021: Accelerate Results Beyond RPA to Hyperautomation](#)

[Emerging Technologies and Trends Impact Radar: Hyperautomation](#)

[Tech CEOs Must Use Hyperautomation to Enhance Offerings](#)

[Communicate the Value of Hyperautomation Using ROI](#)

## API-Based Digital Commerce

Analysis By: Mike Lowndes

Benefit Rating: Transformational

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

### Definition:

API-based digital commerce (also commonly known in the market as “headless” digital commerce) is the use of APIs to decouple front ends from core commerce services, and to integrate commerce capabilities within any touchpoint where selling is required.

### Why This Is Important

The proliferation of touchpoints requires a multichannel, multiexperience approach to applications. This requires the decoupling of the presentation from commerce services that an API-based approach offers. Some vendors provide pure-play, API-based commerce platforms, while others retain a native storefront but also provide full APIs for headless operation, known as “head optional.” It is the enabling step toward composable commerce.

## Business Impact

Decoupling the front end is a step toward a modern, modular commerce architecture that provides business flexibility and IT agility. As commerce journeys become multiexperience, this is an enabler for delivering consistent experiences across touchpoints. The storefront and other touchpoints must be delivered independently of the commerce application (via a DXP or a custom front end). This provides ultimate flexibility for delivering unique experiences, but requires digital maturity to succeed.

## Drivers

API-based digital commerce is being rapidly adopted by midsize to large, digitally mature organizations, and is becoming the standard approach for delivery of experiences by the enterprise, even if the underlying application remains monolithic.

Such adoption is driven by:

- Recognition of the quality of digital experience as a key differentiator across multiple touchpoints (for example, native mobile apps, marketplaces, social platforms, in-store experiences, the Internet of Things, wearables, smart homes and vehicles).
- Maturity of front-end frameworks, and the emergence of the single-page application (SPA) and progressive web application (PWA) as the dominant “next generation” of client-side, JavaScript-based presentation.
- Growth in digital experience platforms (DXPs) in supporting “experience-driven commerce.”
- Commerce as an enabling part of a wider digital business technology platform.
- Pace of innovation in digital commerce driving more flexible, modular architectures.
- Expense and complexity of some leading “monolithic” commerce platforms, when a more agile, flexible subset of capability is desired.

## Obstacles

API-based digital commerce improves business agility; however:

- The “headless” buzz has caused some disillusionment among those expecting it to be easy to achieve. Despite this, it is rapidly moving toward mainstream acceptance.

- Commerce experiences can be more complex to implement than single-vendor “full stack” solutions due to the increased emphasis on integration efforts and governance of the decoupled front-end technology.
- A key challenge is ensuring business users retain no-code control over the storefront(s). This adds complexity to implementations and the business UIs required to support presentation and commerce processes.
- Most vendors’ native commerce platform storefronts are shifting from server-side “themes” or template engines toward client-side SPA/PWA. Thus, some of the benefits of API-based are becoming available from almost all vendors. However, having an API is not the same as being built “API first,” and not all the benefits of this new approach are realized.

## User Recommendations

API-based commerce may fit your requirements if you:

- Want to retain granular control over multiexperiences, including by deploying a DXP, building via an MXDP, or developing an SPA/PWA presentation tier.
- Are looking to support multiple digital and physical channels equally from the same business logic, and support cross-channel continuity of experience.
- Already have (or are looking to implement) a DXP to provide a more consistent customer experience across commerce, brand and other digital properties.
- Have a large, inflexible, legacy, monolithic, full-stack commerce application that cannot be replaced in a single step, and want to migrate to a modular architecture.
- Have a unique commerce business model that full-stack vendors cannot support without considerable front-end customization.
- Need commerce integrations to support wider digital business strategies.

## Sample Vendors

commercetools; Elastic Path; Fabric; Kibo; Spryker; VTEX

## Gartner Recommended Reading

[Magic Quadrant for Digital Commerce](#)

[Choose the Right Digital Commerce Platform Architecture](#)

## Harness the Core Capabilities of a Digital Commerce Platform

### Industry Vision: Commerce to You

#### CSP AI

Analysis By: Peter Liu

**Benefit Rating:** Transformational

**Market Penetration:** 20% to 50% of target audience

**Maturity:** Early mainstream

#### Definition:

Artificial intelligence (AI) applies advanced analysis and logic-based techniques, including machine learning, to interpret events, support and automate decisions, and take actions. CSP AI refers to how communications service providers (CSPs) leverage AI and machine learning technology to improve customer experience, reduce costs, optimize their IT and infrastructure operations, and generate new revenue opportunities.

#### Why This Is Important

AI promises to be one of the most innovative and disruptive technologies in the next five to 10 years and has been identified as top game-changer technology by 61% of respondents from CSP CIOs survey (see [2021 CIO Agenda: A CSP Perspective](#)). The early promise and function of the AI technology in the telecom industry are mostly focused on improving existing network and IT operations, enhancing customer experience and augmenting effective business decisions.

#### Business Impact

- Leverage AI to shift from “knowing what happened and dealing with it” to “predicting and being proactive.” This helps CSPs better design their offerings and achieve greater customer satisfaction and profitability.
- CSPs leverage AI and data science to improve network performance, reliability, and security. CSPs are also able to monetize the additional opportunities that AI applications and data analytics created, such as smart cities, enabling efficient marketing campaigns in other industries, etc.

## Drivers

- The COVID-19 pandemic refocused businesses and network infrastructure on resilience, which for many resulted in accelerating the artificial intelligence adoption.
- Maturing and expanding data science initiatives, better algorithms, more cost-effective computing power and a substantial increase in available data support the emergence of intelligent techniques.
- Advance of the newest wireless networks, such as 5G and Internet of Things (IoT), lead to a more complex infrastructure and diversified requirements. To efficiently manage these challenges, CSPs are facing an increasing need for intelligent solutions.
- Unlocking data's full potential using artificial intelligence will provide CSPs with new insight in accurate network planning and management, providing preemptive service assurance, customer experience improvement and precise target marketing.
- Improve customer engagement efficiency and target marketing effectiveness. CSPs need a deeper, real-time understanding of the needs and behaviors of their subscribers that drive the AI adaptation in the customer engagement journey.

## Obstacles

- CSPs are struggling to measure the business value of AI and are challenged in aligning AI initiatives to business outcomes.
- The greatest challenges to apply AI in CSPs' business and network is the right quality of data, which includes siloed data sources, incompleteness, accessibility and cleanliness.
- The legitimate excitement about the transformative power of AI leads to unrealistic expectations of AI within the CSPs. In addition, the loose link between theoretical/conceptual frameworks and their business value fuels a deepening skepticism.
- Lack of relevant skills and staff resources to devote to training AI/ML algorithms. In addition, lack of trust toward the technology in the organization.
- Lack of leadership and business users' support for AI initiatives and competing priorities for investment.
- High cost of the AI/ML implementation.



## User Recommendations

- Avoid data silos through implementing an extendable data management platform on Day 1. Make sure the platform is able to integrate smoothly across your whole organization.
- Start small with modest, straightforward projects, such as simple algorithms in network planning or intelligent automation. Expect effective adoption of AI to be a learning journey.
- Design an architecture that is able to support AI across multiple business functions in the organization. Use early projects as learning platforms for more complex midterm projects.
- Obtain senior management and business sponsorship for projects needed to underpin AI and machine learning.
- Accelerate the use of AI beyond optimization and incremental improvements by prioritizing AI initiatives that can drive new and differentiating value.
- Accelerate your AI skills and talent development by implementing a variety of use-case prototypes. This will help to identify the breadth and depth of AI skills and talent you will need.

## Sample Vendors

Ericsson; Guavus; Huawei; IBM; Juniper Networks; Nokia; Nuance Communications; Oracle; P.I. Works; ZTE

## Gartner Recommended Reading

[Routes to the Future for CSPs – Technology Strategy](#)

[Predicts 2021: CSP Technology and Operations Strategy](#)

[Hyperautomation: How Can CSPs Prepare for and Implement It?](#)

[Top Trends in Capturing New Value for Communications Service Providers in 2021](#)

[Top Trends in Driving Operational Excellence for Communications Service Providers in 2021](#)

## Predictive Analytics CSP

Analysis By: Peter Liu

Benefit Rating: High

Market Penetration: 20% to 50% of target audience

Maturity: Adolescent

### Definition:

Predictive analytics is a form of advanced analytics that analyzes current and historical data or content to make predictions about future or otherwise unknown events. It is characterized by techniques such as data mining, regression analysis, multivariate statistics, pattern matching, predictive modeling and forecasting.

### Why This Is Important

CSPs face more complex network and diversified business cases, which continue to drive predictive analytics adoption in the telecom industry. Leading CSPs today use sophisticated algorithms and machine learning techniques to analyze huge volumes of data to support the future state prediction. They also extract actionable insights to provide better customer experiences, improve operations and increase revenue through new products and services.

### Business Impact

- By understanding likely future or otherwise unknown events (such as equipment status, traffic patterns and customer behavior), CSPs can make better decisions and anticipate threats and opportunities, being proactive rather than reactive.
- Interest continues to grow in new use cases and more traditional applications of predictive analytics (for example, churn management, cross-selling, propensity to purchase, and sales and financial forecasting).

## Drivers

- Maturing and expanding data science initiatives, better algorithms, more cost-effective cloud-based computing power and a substantial increase in availability of curated data support the emergence of predictive analytics techniques.
- The COVID-19 pandemic refocused enterprise end users and network providers on resilience. A good understanding of future network states is critical, which increases demand on business and infrastructure prediction.
- Predictive use of network data has much more potential; as CSPs gain experience and skills with predictive analytics, they extend deployment to additional uses. It can, for example, add accuracy from network planning to marketing and make service assurance and customer care more productive.
- Real-world best practices with proven performance metrics (e.g., proactive customer care, predictive maintenance, business forecasting, predictive fraud management) accelerate adoption.

## Obstacles

- Current predictive analytics solutions usually require data scientists with a deep understanding of areas such as statistical modeling and Python, which CSPs normally lack.
- The accuracy of predictive analytics models is limited by the completeness and accuracy of the data used. Fragmented data and data quality are always a major concern of a successful predictive analytics adoption.
- Predictive analytics alone does not guarantee better decision making but may be marketed as such, creating unrealistic market expectations.
- Current predictive analytics adoption often uses a packaged application. However, packaged applications' pretrained models do not exist for every analytics use case. Packaged applications may also often not provide enough agility, customization or competitive differentiation.
- Predictive analytics often are consumed as an individual tool and are difficult to integrate into organizations' information architecture.

## User Recommendations

- Use customer-centricity as the key anchor point for all kinds of decision making and concentrate on building analytics models that have the maximum impact in meeting those objectives.
- Do not deploy predictive analytics in a siloed way, but focus on the integrity capabilities (such as open API) of the predictive analytics solution to maximize impact. Developing an enterprisewide data strategy is also critical for predictive analytics success.
- Incorporate effective data management strategies in order to integrate, unify and standardize data from different sources. Also, make sure the data is accessible for analysis, since predictive analytics success is dependent on the quality and completeness of the data.
- Establish a learning environment and increase the related AI skills of your own people. Key to ensuring adequate, appropriate, and feasible use of AI for new value creation heavily depends on the symbiotic relationship of AI with employees' skills and competencies.

## Sample Vendors

Amdocs; Cisco; Cloudera; Ericsson; Huawei; IBM; Juniper Networks; Microsoft; MYCOM OSI; Nokia; Subex

## Gartner Recommended Reading

[Infographic: AI Use-Case Prism for Telecommunications CSP Networks](#)

[Routes to the Future for CSPs – Technology Strategy](#)

[Predicts 2021: CSP Technology and Operations Strategy](#)

[How CSPs Can Approach Digital Ecosystems for Successful Collaboration](#)

[Hyperautomation: How Can CSPs Prepare for and Implement It?](#)

## Design Thinking

Analysis By: Gene Phifer

Benefit Rating: High

**Market Penetration:** 20% to 50% of target audience

**Maturity:** Early mainstream

**Definition:**

Design thinking is a multidisciplinary process used to improve the design of digital and analog products and services. It starts with empathy for users and the gathering of insight about their needs and motivations. These are then developed using an iterative, experimental approach. Deep customer insight, combined with a creative process, is ideal for digital innovation and digital product development. Design thinking helps to design high-value solutions and improve their usability.

**Why This Is Important**

Design thinking is a proven methodology applied to a broad range of business problems, but typically used to enhance usability and user experience (UX) of analog and digital products/services. UX is a key element of total experience, impacting both employee experience and customer experience. Leading organizations regularly practice design thinking on new, digital projects/products. Design thinking can also link to lean startup and agile methodologies, further enhancing application development.

**Business Impact**

Design thinking can be a crucial element for UX, which is critical for both employee experience (EX) and customer experience (CX). Higher levels of usability ensure that digital solutions are accessed and used by the end-user community. Usability also impacts CX key performance indicators (KPIs) like customer satisfaction, Net Promoter Score and customer effort score, and financial KPIs like customer retention, conversion, revenue and market share.

## Drivers

- The growing importance of digital engagement with customers and employees has forced enterprises to take design seriously. Design teams, centers of excellence (COEs), user-centered design, usability testing, usability labs and skilled designers are but a few of the efforts made by enterprise IT to improve design. While these generally work well, a methodology for improving design as part of the development effort is needed. This is where design thinking comes in.
- Design thinking impacts UX, and UX impacts CX and EX (the two significant investment areas for enterprises). The relationship between UX, CX and EX is encapsulated in the concept of total experience, which is an emerging focus area for enterprises.

## Obstacles

- Design thinking is a structured methodology, and as such, follows a specific set of steps. However, some developers may be unwilling to spend the necessary time at the design stage.
- Some experience in design and training in design thinking will ensure smooth application of design thinking. Fortunately, a high-end developer with years of design thinking experience isn't required; some basic training in design and design thinking is adequate. However, the relationship between the designer and the developer is important. The designer-developer pairing is a best-practice model for implementing design in projects and products, and for making design thinking work effectively.
- Design thinking has historically been accomplished by a group of people in the same location, frequently a dedicated space. With COVID-19, these gatherings are not possible and design thinking is forced into a remote-only model. This can be challenging, especially for steps like ideation and prototyping.

## User Recommendations

- Identify opportunities for the application of design thinking to improve usability, especially in new digital projects and product development.
- Build cross-functional teams, drawing from business units and the IT department. Train them in the process of design thinking and give them time to practice it.
- Start simply and on a small scale in most cases. Take on more complex projects progressively as your experience grows. Eventually, consider building design COEs.
- Evolve your design thinking approaches to support the contactless world of COVID-19 and the post-COVID-19 era by supporting remote design thinking workshops. The key elements are: (1) a collection of digital collaboration tools; (2) electronic conference rooms; (3) multiscreen capabilities for individual WFH workers; and (4) application of DesignOps.
- Evaluate new tools for remote design thinking workshops to facilitate remote workers.

## Sample Vendors

Accenture; frog; IBM; IDEO; Oracle; Pegasystems; Salesforce; SAP

## Enterprise Information Management

Analysis By: Andrew White, Ted Friedman

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

### Definition:

Enterprise information management (EIM) is an integrative discipline for structuring, describing and governing information assets across organizational and technological boundaries to improve efficiency, promote transparency and enable business insight. Implementing EIM helps D&A leaders align people, process, data and technology in order to align data management and governance, and cohesive global data ecosystems.

## Why This Is Important

Organizations seek to accelerate digital strategies, leveraging data and analytics. Such data and analytics exist in ERP, CRM and custom-developed apps, as well as those in the analytics pipeline. Organizations also seek to meet divergent governance requirements (e.g., privacy, quality, retention). EIM is a disciplined effort that starts small and scales over time linking critical people, process, data and technology across initiatives with the most business impact.

## Business Impact

- Data and analytics drive better business decision making and D&A initiatives need to coordinate common and widely shared people, process, data and technology assets.
- EIM coordinates the people, process, data and technology with the biggest business impact while also driving IT productivity.
- All industries may adopt EIM and gain value from it. Indeed, the more fragmented your information silos, greater the business impact.

## Drivers

- Most organizations continue with disparate and divergent data and analytics siloed capabilities. Increasingly, business pressures such as scaling digital business or improving decision making lead to a demand to connect these silos.
- Technology-centric approaches have been tried to cope with the siloes challenge from enterprise data warehouses or lakes, to self-developing semantic catalogs. At the end of the day technology can help, but it is not sufficient. EIM complements those efforts.

As a discipline, EIM demands organizations to identify when information management must be deliberate and formalized or when it can be relaxed and more reactive across a range of drivers, known and unknowable before they materialize:

- Increased demand for analytics use cases for exploring and innovating with data science using trusted, reliable information assets and governing analytics definitions (e.g., customer engagement insight).
- Compliance use cases whereby organizations have to publish data to third parties on a range of objectives (e.g., GDPR).



- Data management use cases that provide a uniform set of capabilities to manage, move, store, access and then archive or remove information (e.g., information exchange and sharing).
- Data and analytics governance use cases such as Master Data Management (MDM) or Application Data Management ([ADM] e.g., for your application data) that provide the least amount of governance effort for the maximum business impact (e.g., connecting data privacy, data security and analytics governance).
- It is very common for organizations to think about EIM and start with a narrow, smaller focused program such as MDM or maybe ADM to help govern ERP or application data. These programs however end up becoming giant silos focused on their own needs and few organizations recognize the need to limit scope creep and then augment this with Enterprise Metadata Management to help govern and manage shared metadata assets.

## Obstacles

- Too many firms try to implement overweight, wall-to-wall, costly data and analytics programs. Having too many business priorities and risks should not be confused with trying to manage and govern all data equally with a perfect solution. The result is a constant need to balance and rebalance numerous initiatives and an almost manic focus on the data that matters most to business outcomes.
- Additionally, the last year has highlighted the chronic challenges that organizations face in governing, managing and using their enterprise data. D&A leaders are challenged to both orchestrate multiple initiatives that share common assets — people, process, data and/or technology.
- At the same time, our CDO surveys, year-in, year-out, suggest that culture and lack of data literacy are the biggest obstacles to effective data and analytics initiatives like EIM. See Survey Analysis: Fifth Annual CDO Survey — Growth Must Continue in Order to Achieve Real Impact.

## User Recommendations

- Achieve EIM outcome-driven initiatives connecting one at a time, and synergy and leverage of D&A will increase; at the same time, the discipline across D&A will lead to higher performing teams.
- Organize and resource EIM to ensure that you can support lean, agile, cross-disciplinary product delivery teams (e.g., XOps) for each program as necessary.
- Explore and exploit the most important data and analytics assets across those initiatives. This compares to traditional approaches that try to manage everything everywhere equally. These shared reusable assets might be analytics, models, algorithms, documents or just raw data that has the greatest value, or risk, to their organization.
- Use Gartner's Strategy and Operating Model to implement EIM. Strategy will prioritize initiatives with business impact. The operating model can be used to implement MDM, metadata management, data hub strategy, data and analytics governance, data fabric, composable analytics, etc.

## Gartner Recommended Reading

[Modernize Your Organization's Data and Analytics Strategy to Achieve Digital Business Success](#)

[Roadmap for Data Literacy and Data-Driven Business Transformation: A Gartner Trend Insight Report](#)

[Tie Your Data and Analytics Initiatives to Stakeholders and Their Business Goals](#)

[Toolkit: Creating a Modern Data and Analytics Strategy and Operating Model](#)

[IT Score for Data & Analytics](#)

## Digital Business Technology Platform

Analysis By: Bill Swanton

Benefit Rating: Transformational

Market Penetration: 20% to 50% of target audience

Maturity: Early mainstream

**Definition:**

A digital business technology platform (DBTP) integrates and orchestrates new and existing platforms for IT, customer engagement, data and analytics, ecosystem partners and Internet of Things. It senses business events, decides what to do and implements a response that creates value for those involved. Platforms share data, algorithms and transactions with business ecosystems to match, create and exchange services.

**Why This Is Important**

A DBTP enables enterprises to build a digital business and deliver digital products and services to customers and partners. Without it, enterprises will be unable to gain the business benefits of digital business. DBTPs empower people, businesses and things to give, take or multiply value creation for the enterprise.

**Business Impact**

DBTPs make it easier for new market entrants, startups, competitors and smart machines to create and pursue new business opportunities. Leveraging DBTPs, organizations can rapidly respond to core business disruptions, such as revamping supply chains disrupted by the COVID-19 pandemic. DBTPs also enable platform business models, which can create rapid market growth and, potentially, dominate industries.

**Drivers**

- Competition is shifting to digital delivery of value added services, in addition to the traditional products and services. So, traditional businesses need to build a DBTP to compete and/or participate in new digital markets.
- Regulatory requirements in some regions require organizations to share business services through digital platforms. For example, PSD2 requires banks in the EU to provide mandatory access to customer accounts for regulated third parties, a trend now being followed in many other regions.
- Service providers help almost all initial DBTP developments by providing skills, training and reusable assets inevitably sold in conjunction with significant services.

## Obstacles

- Managing an inherently hybrid IT infrastructure for the platform and existing applications is a major challenge.
- There is currently no specific market or vendor for a base platform suitable for building digital use cases and data assets. Companies need to assemble components and tools from generally available cloud frameworks, a cluttered market of Internet of Things vendors, public and private APIs and other IT assets.
- While digital-native organizations are adept at these technologies, traditional companies often struggle with new architectural approaches required for large-scale implementations, such as microservices architecture, event-driven architecture and programmable infrastructure.
- A skills learning program is critical as most organizations do not yet have the skills to implement and manage this technology. So skills transfer and culture change need to be a part of any service provider contract.

## User Recommendations

- Work with business leaders to identify use cases for your digital business.
- Build out the DBTP as needed to implement the initial digital use cases. The process will take years and may require refactoring as the business scales and the technologies mature. Treat the platform as a continuously evolving product guided through its long life cycle by a product manager.
- Work with technology and service providers to determine what technologies are needed to implement the use case. Most organizations do not yet have the skills to implement this technology so skills transfer needs to be included.
- Ascertain what APIs you might need to consume or provide to interact with customers and/or ecosystem partners inside or outside of the enterprise.
- Keep existing platforms loosely coupled by using techniques such as API mediation so you can modernize those platforms without disrupting your digital business build-out.

## Sample Vendors

Amazon Web Services (AWS); Google; Microsoft; NXN; Red Hat; Vantiq; VMware

## Gartner Recommended Reading

[Use Gartner's Digital Business Layers to Communicate Your Digital Intent](#)

[How to Build a Digital Business Technology Platform](#)

[Building a Digital Business Technology Platform Requires Clear Goals and a New Team With Cloud Skills](#)

[Building a Digital Business Technology Platform Requires New Technology and Service Provider Support](#)

## Data Lakes

Analysis By: Philip Russom, Henry Cook

Benefit Rating: Moderate

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

### Definition:

A data lake is a concept constituting a collection of storage instances of various data assets combined with one or more processing capabilities. Data assets are stored in a near-exact, or even exact, copy of the source format and in addition to the originating data stores. Structured and semistructured data may also be held.

### Why This Is Important

Data lakes are important because they enable advanced analytics and complement traditional data warehouses. For example, the massive repository of source data that typifies a data lake supports broad, flexible and unbiased data exploration, which is required for data mining, statistics, machine learning and other analytics techniques. Furthermore, a data lake can provide scalable and high-performance data acquisition, landing and staging for data to be refined and loaded into a data warehouse.

## Business Impact

A data lake can be a foundation for multiple forms of business analytics. For example, data science is a common first use case for a data lake, which leads to predictive analytics that help a business retain customers, execute impact analyses and anticipate issues in maintenance, logistics, risk and fraud. Similarly, using a data lake for self-service data access is a growing business use case that contributes to programs for business transformation and digitization.

## Drivers

- **User organizations are increasingly driven by data and analytics.** This is so they can achieve their goals in business transformation, digitization, data democracy, operational excellence and competitiveness. A data lake provides data and supports analytics for these high-value goals.
- **Organizations need to expand their analytics programs.** Established forms of analytics will continue to be relevant, namely reports, dashboards, online analytical processing (OLAP) and statistical analysis. Hence, organizations must maintain these while expanding into advanced forms of analytics, such as data mining, natural language processing (NLP), machine learning, artificial intelligence and predictive analytics. A data lake provides the scale, structure-agnostic storage and processing options that advanced analytics require.
- **Data exploration has become a common practice.** This is true for many user types, from data scientists and analysts to business end users who are capable of self-service data prep. To achieve their productivity and discovery goals, each type of user needs massive volumes of broadly collected data that is in a condition suited to their skills and analytics techniques. A data lake, when designed properly, can provision data for the diverse exploration requirements of multiple user types and use cases.
- **Data warehouses continue to be relevant, but only when modernized.** Many legacy data warehouses were designed primarily for reporting, dashboards and OLAP. Instead of redesigning a warehouse to accommodate the massive stores of detailed source data that advanced analytics demands, many organizations prefer to build a data lake for advanced analytics. In these cases, the warehouse and lake are integrated by shared datasets, platform infrastructure (DBMS brands and storage, whether on-premises or cloud) and architecture components (data landing/staging). Hence, a data lake can modernize a data warehouse, to extend its investment, relevance and life cycle.

## Obstacles

- **Data lake best practices are still evolving.** There is still much confusion about how to design and govern a data lake, as well as how to optimize a lake's data without losing its purpose as a repository for data science and advanced analytics. An emerging best practice is to design the internals of a data lake to include multiple data zones for business use cases (data science, exploration and self-service) and technology architectural components (data land/staging and special data structures or latencies).
- **Today's cloud data lake differs from the old Hadoop data lake.** The first data lakes were built on Hadoop, for data science only, and they lacked metadata, relational functionality and governance. If you build that kind of data lake today, it will fail. Today's data lake is on cloud, and it supports multiple analytics techniques (not just data science). For example, self-service data prep on a data lake requires business metadata, SQL for ad hoc queries and data curation.

## User Recommendations

- Build a competency in data science and advanced analytics by first building a data lake as a foundation.
- Staff the data lake for maximum value by hiring data scientists and analysts who have the skills required to conduct data exploration and analytics with the lake's data.
- Create business value by designing a data lake that addresses multiple high-value business use cases, such as data science, analytics, self-service data access, customer 360, data warehousing and operational intelligence.
- Enable broad data exploration, multiple analytics techniques, and machine learning by populating a data lake with broadly collected data in various structures, formats and containers.
- Modernize a data warehouse by extending it with an integrated data lake and/or a logical layer.
- Keep each data lake from becoming a data swamp by governing the use of data in the lake, curating the data allowed into the lake, and documenting data via metadata and other data semantics.

## Sample Vendors

Amazon Web Services (AWS); Cazena; ChaosSearch; Databricks; Dremio; Google Cloud Platform; Infoworks; Microsoft; Snowflake

## Gartner Recommended Reading

[Building Data Lakes Successfully — Part 1 — Architecture, Ingestion, Storage and Processing](#)

[Building Data Lakes Successfully — Part 2 — Consumption, Governance and Operationalization](#)

[Metadata Is the Fish Finder in Data Lakes](#)

[Data and Analytics Essentials: Data Warehouses, Data Lakes and Data Hubs](#)

[Best Practices for Designing your Data Lake](#)

[Market Guide for Analytics Query Accelerators](#)



## Climbing the Slope

### Change Leadership

Analysis By: Elise Olding, Suzanne Adnams

**Benefit Rating:** Transformational

**Market Penetration:** 20% to 50% of target audience

**Maturity:** Early mainstream

#### Definition:

Change leadership is culture-driven change embracing the flux of business and building sustainable organizational skills. The ESCAPE change leadership model distills change leadership into steps that leaders can apply to bolster change success. The model has two 3-step phases: (1) Inspire: envision, share, compose; and (2) Engage: attract, permit, enable. Change leadership applies a continuous and iterative approach to aid composability and adaptability at an enterprise level.

#### Why This Is Important

The ability to adapt organizational culture to a constantly changing business landscape is a competitive differentiator for the survival of an enterprise. Adapting in the face of disruption requires everyone in the organization to be part of co-creating change. Leaders must identify the changes they need to make and be acutely aware of how their actions foster or inhibit organizational and culture change.

#### Business Impact

- Leadership actions and beliefs are critical factors for transformation success. The ESCAPE cycle for leading change outlines the actions that leaders must take to overcome barriers to change, and promote culture-driven and transformative change.
- ESCAPE defines the steps to make positive changes that will inspire members of the organization, and increase employee engagement and autonomy.

#### Drivers

- An increase in unanticipated changes requires enterprise readiness and the ability to continually adapt.

- Sustained change requires the alignment of leadership behaviors with employee behaviors. Change leaders must improve employees' coping skills by framing change as normal and expected.
- The increased pace of change can overwhelm an individual's ability to cope and adapt. Using strong change leadership that prepares the organization to embrace change will mitigate this challenge.

## Obstacles

- Leadership behaviors must change and are not often examined as part of a transformation. Employees don't change because leaders ask them to; they change because of how leaders behave, and because of the working environment that the leaders have nurtured.
- Employees react instantly, positively or negatively, to changes in the environment, primarily in response to the leader's actions. The wrong actions or the wrong environment can promote or negate the desired changes.
- Dictating change to employees has proven to be a time-consuming and frustrating process, resulting in limited success. Change adoption takes time. Change leadership accelerates this by building a work environment that inspires individuals toward change and engages everyone on the change journey.

## User Recommendations

- Work with your peers and direct reports to develop the skills, competencies and experience required to inspire and engage your team, stakeholders and members of your organization. This means recognizing the ongoing, iterative nature of transformation, and the cumulative effect on people and the workplace.

Use Gartner's ESCAPE model for change leadership. The six steps, represented by the six letters of the ESCAPE model, are:

- Envision — Create a compelling vision to help employees imagine the future.
- Share — Continually share the vision with a goal to make it everyone's vision.
- Compose — Define and transition to the leadership practices needed for the future.
- Attract — Draw in early adopters to overcome organizational change resistance.

- Permit — Create psychological safety and share examples of new behaviors that allow employees to change.
- Enable — Create the structures and mechanisms to move from experimentation to execution.

## **Gartner Recommended Reading**

[Use the ESCAPE Model to Develop Change Leadership](#)

[Start Organizational Change with a From/To/Because Model](#)

[CIOs Need to Address Culture, People and Process Change in Dynamic Environments](#)

[Culture Change Succeeds or Fails in Leadership Moments](#)

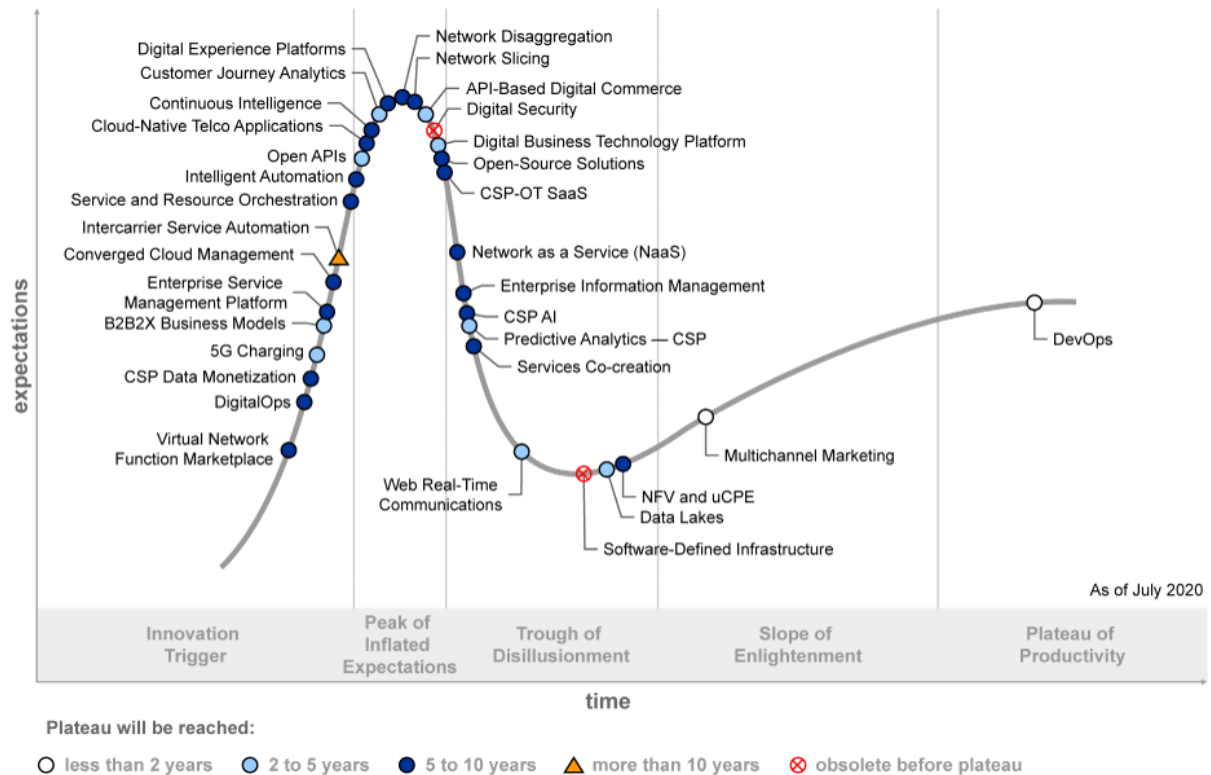
[3 Actions Leaders Can Take to Navigate Through Crisis](#)

[Boost Enterprise Agile Adoption Using the From/To/Because Model](#)

## Appendixes

Figure 2: Hype Cycle for Communications Service Provider Operations, 2020

### Hype Cycle for Communications Service Provider Operations, 2020



Source: Gartner  
ID: 441609

Gartner.

Source: Gartner (July 2020)

## Hype Cycle Phases, Benefit Ratings and Maturity Levels

**Table 2: Hype Cycle Phases**

(Enlarged table in Appendix)

| <i>Phase</i> ↓                       | <i>Definition</i> ↓  |
|--------------------------------------|--|
| <i>Innovation Trigger</i>            | A breakthrough, public demonstration, product launch or other event generates significant media and industry interest.   |
| <i>Peak of Inflated Expectations</i> | During this phase of overenthusiasm and unrealistic projections, a flurry of well-publicized activity by technology leaders results in some successes, but more failures, as the innovation is pushed to its limits. The only enterprises making money are conference organizers and content publishers.   |
| <i>Trough of Disillusionment</i>     | Because the innovation does not live up to its overinflated expectations, it rapidly becomes unfashionable. Media interest wanes, except for a few cautionary tales.   |
| <i>Slope of Enlightenment</i>        | Focused experimentation and solid hard work by an increasingly diverse range of organizations lead to a true understanding of the innovation's applicability, risks and benefits. Commercial off-the-shelf methodologies and tools ease the development process.   |
| <i>Plateau of Productivity</i>       | The real-world benefits of the innovation are demonstrated and accepted. Tools and methodologies are increasingly stable as they enter their second and third generations. Growing numbers of organizations feel comfortable with the reduced level of risk; the rapid growth phase of adoption begins. Approximately 20% of the technology's target audience has adopted or is adopting the technology as it enters this phase. |
| <i>Years to Mainstream Adoption</i>  | The time required for the innovation to reach the Plateau of Productivity.   |

Source: Gartner (July 2021)

Table 3: Benefit Ratings

| <i>Benefit Rating</i> ↓ | <i>Definition</i> ↓   |
|-------------------------|---|
| <i>Transformational</i> | Enables new ways of doing business across industries that will result in major shifts in industry dynamics  |
| <i>High</i>             | Enables new ways of performing horizontal or vertical processes that will result in significantly increased revenue or cost savings for an enterprise |
| <i>Moderate</i>         | Provides incremental improvements to established processes that will result in increased revenue or cost savings for an enterprise                    |
| <i>Low</i>              | Slightly improves processes (for example, improved user experience) that will be difficult to translate into increased revenue or cost savings        |
|                         |   |

Source: Gartner (July 2021)

**Table 4: Maturity Levels**

(Enlarged table in Appendix)

| <i>Maturity Levels</i> ↓ | <i>Status</i> ↓  | <i>Products/Vendors</i> ↓                            |
|--------------------------|--|--|
| <i>Embryonic</i>         | In labs  | None   |
| <i>Emerging</i>          | Commercialization by vendors<br>Pilots and deployments by industry leaders                 | First generation<br>High price<br>Much customization |
| <i>Adolescent</i>        | Maturing technology capabilities and process understanding<br>Uptake beyond early adopters | Second generation<br>Less customization              |
| <i>Early mainstream</i>  | Proven technology<br>Vendors, technology and adoption rapidly evolving                     | Third generation<br>More out-of-box methodologies    |
| <i>Mature mainstream</i> | Robust technology<br>Not much evolution in vendors or technology                           | Several dominant vendors                             |
| <i>Legacy</i>            | Not appropriate for new developments<br>Cost of migration constrains replacement           | Maintenance revenue focus                            |
| <i>Obsolete</i>          | Rarely used  | Used/resale market only                              |

Source: Gartner (July 2021)

## Document Revision History

[Hype Cycle for Communications Service Provider Operations, 2020 - 22 July 2020](#)

[Hype Cycle for Communications Service Provider Operations, 2019 - 11 July 2019](#)

[Hype Cycle for the Future of CSP Network and Business Operations, 2018 - 24 July 2018](#)

[Hype Cycle for the Future of CSP Network Operations, 2017 - 26 July 2017](#)

[Hype Cycle for Communications Service Provider Operations, 2016 - 11 July 2016](#)

[Hype Cycle for Communications Service Provider Operations, 2015 - 16 July 2015](#)

[Hype Cycle for Communications Service Provider Operations, 2014 - 4 August 2014](#)

[Hype Cycle for Communications Service Provider Operations, 2013 - 25 July 2013](#)

[Hype Cycle for Communications Service Provider Operations, 2012 - 30 July 2012](#)

[Hype Cycle for Communications Service Provider Operations, 2011 - 29 July 2011](#)

[Hype Cycle for Communications Service Provider Operations, 2010 - 29 July 2010](#)

[Hype Cycle for Communications Service Provider Operations, 2009 - 22 July 2009](#)

[Hype Cycle for Carrier Operations, 2008 - 9 July 2008](#)

[Hype Cycle for Carrier Operations - 3 August 2007](#)

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## Recommended by the Authors

Some documents may not be available as part of your current Gartner subscription.

[Understanding Gartner's Hype Cycles](#)

[Create Your Own Hype Cycle With Gartner's Hype Cycle Builder](#)

[Top Trends in Driving Operational Excellence for Communications Service Providers in 2021](#)

[Top Trends in Managing Disruptive Influences for Communications Service Providers in 2021](#)

[Top Trends in Capturing New Value for Communications Service Providers in 2021](#)

[Predicts 2021: CSP Technology and Operations Strategy](#)

[2021 CIO Agenda: A CSP Perspective](#)

[Hyperautomation: How Can CSPs Prepare for and Implement It?](#)

[Market Guide for CSP Business Support System Solutions](#)

[Market Guide for CSP Operations Support System Solutions](#)

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Table 1: Priority Matrix for Communications Service Provider Operations, 2021

| Benefit<br>↓     | Years to Mainstream Adoption |   |   |                                 |
|------------------|------------------------------|---|---|---------------------------------|
|                  | Less Than 2 Years ↓          | 2 - 5 Years ↓   | 5 - 10 Years ↓  | More Than 10 Years ↓            |
| Transformational |                              | Agile Beyond IT<br>API-Based Digital Commerce<br>Change Leadership<br>CSP AI<br>CSP Open APIs<br>Digital Business Technology Platform<br>Innovation Management<br>Product-Centric Delivery Model<br>Total Experience for CSPs | Cloud-Native Telco Operations<br>Converged Cloud Management<br>DigitalOps<br>Network Slicing<br>Platform Operating Models<br>Service and Resource Orchestration |                                 |
| High             | Intelligent Automation       | 5G Charging<br>Business Ecosystems<br>Continuous Delivery<br>Data Literacy<br>Hyperautomation<br>Predictive Analytics CSP   | B2B Services Platform<br>Design Thinking<br>Enterprise Information Management<br>Open-Source Solutions for CSPs   |                                 |
| Moderate         |                              | Data Lakes  | CSP Data Monetization   | Intercarrier Service Automation |

| Benefit | Years to Mainstream Adoption |               |                |                      |
|---------|------------------------------|---------------|----------------|----------------------|
| ↓       | Less Than 2 Years ↓          | 2 - 5 Years ↓ | 5 - 10 Years ↓ | More Than 10 Years ↓ |
| Low     |                              |               |                |                      |

Source: Gartner

Table 2: Hype Cycle Phases

| Phase ↓                              | Definition ↓   |
|--------------------------------------|--|
| <i>Innovation Trigger</i>            | A breakthrough, public demonstration, product launch or other event generates significant media and industry interest.   |
| <i>Peak of Inflated Expectations</i> | During this phase of overenthusiasm and unrealistic projections, a flurry of well-publicized activity by technology leaders results in some successes, but more failures, as the innovation is pushed to its limits. The only enterprises making money are conference organizers and content publishers.   |
| <i>Trough of Disillusionment</i>     | Because the innovation does not live up to its overinflated expectations, it rapidly becomes unfashionable. Media interest wanes, except for a few cautionary tales.   |
| <i>Slope of Enlightenment</i>        | Focused experimentation and solid hard work by an increasingly diverse range of organizations lead to a true understanding of the innovation's applicability, risks and benefits. Commercial off-the-shelf methodologies and tools ease the development process.   |
| <i>Plateau of Productivity</i>       | The real-world benefits of the innovation are demonstrated and accepted. Tools and methodologies are increasingly stable as they enter their second and third generations. Growing numbers of organizations feel comfortable with the reduced level of risk; the rapid growth phase of adoption begins. Approximately 20% of the technology's target audience has adopted or is adopting the technology as it enters this phase. |
| <i>Years to Mainstream Adoption</i>  | The time required for the innovation to reach the Plateau of Productivity.   |

Phase ↓

Definition ↓

Source: Gartner (July 2021)

## Table 3: Benefit Ratings

| Benefit Rating ↓        | Definition ↓  |
|-------------------------|---|
| <i>Transformational</i> | Enables new ways of doing business across industries that will result in major shifts in industry dynamics  |
| <i>High</i>             | Enables new ways of performing horizontal or vertical processes that will result in significantly increased revenue or cost savings for an enterprise |
| <i>Moderate</i>         | Provides incremental improvements to established processes that will result in increased revenue or cost savings for an enterprise                    |
| <i>Low</i>              | Slightly improves processes (for example, improved user experience) that will be difficult to translate into increased revenue or cost savings        |

Source: Gartner (July 2021)

Table 4: Maturity Levels

| Maturity Levels ↓ | Status ↓   | Products/Vendors ↓                                   |
|-------------------|--|--|
| Embryonic         | In labs  | None   |
| Emerging          | Commercialization by vendors<br>Pilots and deployments by industry leaders                 | First generation<br>High price<br>Much customization |
| Adolescent        | Maturing technology capabilities and process understanding<br>Uptake beyond early adopters | Second generation<br>Less customization              |
| Early mainstream  | Proven technology<br>Vendors, technology and adoption rapidly evolving                     | Third generation<br>More out-of-box methodologies    |
| Mature mainstream | Robust technology<br>Not much evolution in vendors or technology                           | Several dominant vendors                             |
| Legacy            | Not appropriate for new developments<br>Cost of migration constrains replacement           | Maintenance revenue focus                            |
| Obsolete          | Rarely used  | Used/resale market only                              |

Source:Gartner (July 2021)