



CENTRALIZED PRODUCT CATALOGS WILL BE KEY TO DIFFERENTIATION IN THE 5G ERA

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1. Executive summary

Product catalog systems have been a part of telecom operations in some form or other for decades. However, these systems have increased in importance in recent years, driven by growth in the number of offerings and also their expansion beyond core services. Today, product catalog systems stand on the cusp of major change, as a set of new but as yet undetermined use cases enabled by 5G are expected to accelerate the transformation of communications service provider (CSP) business and operating models – and, by extension, their incumbent product catalog systems.

In their earliest form, product catalogs were mostly Microsoft Excel spreadsheets, which held information on the CSPs' various offerings and were closely tied to their billing systems. Over time, as subscriber numbers exploded and the range of offerings increased exponentially, Excel sheets were no longer practical and CSPs moved to databases. These databases were often proprietary, domain specific and closely tied to a particular vendor. While the database approach helped to improve operations and management of offers, it has led to the creation of overly complex architecture silos (thanks to mergers and acquisitions and expanding lines of business) with duplicate data sources, intricate monolithic architectures and proprietary interface connectors. Modifications to this setup, such as to add new products or bundles or partner offerings or include exception conditions, can be very expensive and time consuming. Over time, this has led to slower response times, and blunted the competitiveness of many CSPs.

The challenges that CSPs face with legacy product catalog systems will be further exacerbated with the advent of 5G, which is expected to radically transform telco business and operating models. However, a lack of clarity regarding the types of 5G use case that will succeed will diminish the effectiveness of legacy product catalogs. Further, 5G will also require extensive product catalog capabilities for supporting new business models, optimizing usage of network resources and engaging with external ecosystems and third-party partners, in order to effectively monetize new enterprise opportunities. In addition, CSPs' growing emphasis on lean operations and cost control will drive demand for collaborative and configurable product catalogs.

To overcome the inefficiencies of legacy systems and to be better prepared for 5G-enabled use cases, CSPs' approach to product catalog systems of the future should begin with a centralized catalog that is shared across OSS and BSS, allowing for a unified commerce, charging and service catalog. This will enable a thriving partner eco-system and also a cross-vendor framework, with a single source of data. These systems will ideally be cloud-native compliant (allowing for greater architectural flexibility and agility) and design-centered, so that the catalog systems can be configured by business teams without IT support and can provide role-based access. Additionally, product catalogs that support standardized application program interfaces (APIs) will help to accelerate the interactions with third-party service and content providers and also provide a framework for extensive automation in the long term.

Figure 1 outlines the key features that product catalog systems will require in future.

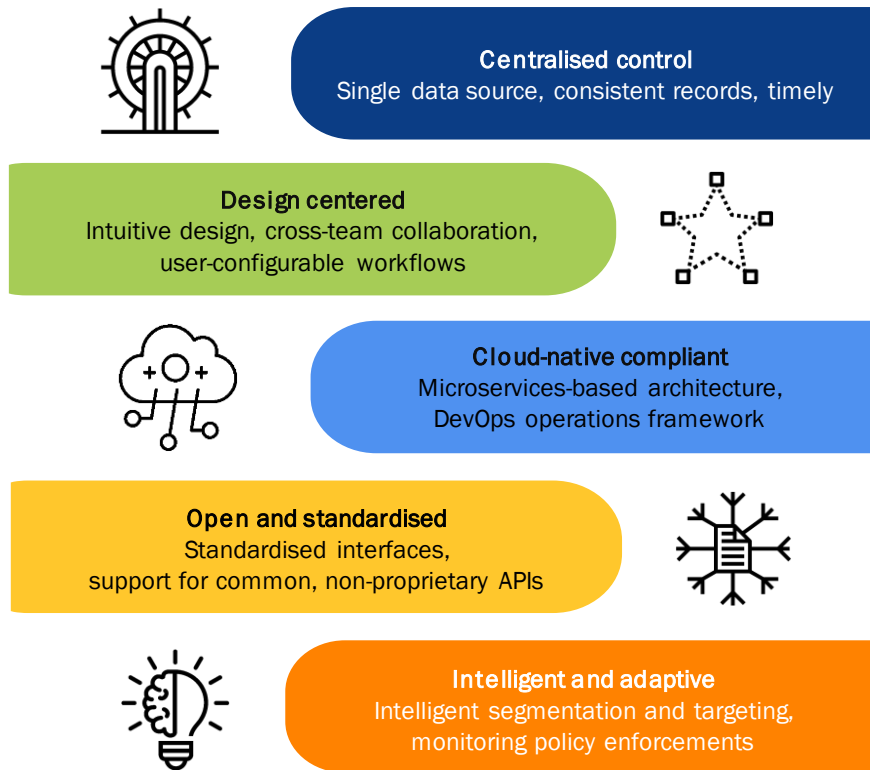


Figure 1: Essential characteristics of product catalog systems of the future [Source: Analysys Mason, 2020]

1. **CSPs should prioritize a centralized product catalog system with a single source of truth** that is able to seamlessly integrate with BSS and also facilitates access to OSS functional capabilities. A common cause of failure which leads to order fallouts is having multiple data sources that are not synchronized with one another. The benefits of having a centralized product catalog system cannot be fully realized unless it allows for a single, consistent source of truth across all relevant systems.
2. **CSPs should expedite the adoption of a cloud-native microservices-based framework for product catalog systems.** It is essential for CSPs to have a loosely coupled microservices-based architecture, if they are to achieve the agility and modularity required to futureproof their operations. Because large swathes of use cases that 5G will enable have yet to be defined, it is very important to have a product catalog system that is highly flexible.
3. **A design-centered approach should be an important consideration for CSPs when evolving their product catalog systems.** The 5G era will accelerate the evolution of product catalog systems beyond IT teams and will increasingly require other departments (e.g. marketing, pricing, strategy) to make extensive changes ‘on the fly’. This calls for a configurable, intuitive, design-centered approach serving both the business and IT teams, which can cut the cost of operations while also encouraging broader cooperation between CSP teams.

2. Disparate, compartmentalized product catalogs hold back innovation

While the importance of product catalogs to CSP operations is well understood, these systems have not received adequate and timely investments and have become an impediment to CSP innovation and competitiveness. However, the advent of 5G is expected to be a key driver of change, as CSPs invest to overcome the inherent drawbacks of their legacy product catalog systems (as outlined in Figure 2).

Figure 2: Key challenges of legacy product catalog systems [Source: Analysys Mason, 2020]

#	Item	Description	Impact
1	Architecture silos	Most CSPs have disparate and heterogeneous product catalogs with solutions from multiple vendors	The absence of a free flow of information between these systems limits CSPs' ability to introduce new products and services in a timely fashion.
2	Order fallout	Disparity between multiple catalog systems can result in orders failing to be delivered, due to inconsistent entries or incomplete exception definitions.	Order fallout leads to revenue loss and can have a huge impact on customer satisfaction and support costs by triggering increased traffic to call centers
3	Support and maintenance	The support and maintenance of disparate multi-vendor systems can be complex given the non-standardized interfaces between these systems.	Support and maintenance costs are disproportionately high, due to the heterogeneous mix of systems which are often interconnected by rigid proprietary APIs.
4	Time to market	It can be time consuming to create a new product or offer across multiple systems with the capability to apply the necessary policy exceptions across different teams.	The time to launch a new product/offer can vary from several weeks to a few months, which can have a significant impact on competitiveness and productivity.
5	Bundled offerings	In order to offer multi-play bundles, extensive coordination is required between product catalogs, which can be challenging in a legacy multi-vendor environment.	Bundled offerings improve both loyalty and the lifetime value of a customer. Inability to launch various product bundle combinations at will can be a serious competitive disadvantage.
6	Multiple data sources	Individual product catalog systems have their own datasets and information flows, which may not be synchronized with adjacent systems.	If individual product catalog systems have inconsistent data this can lead to order fallouts, revenue leakage, poor customer experience and higher support costs.
7	Non-standardized interfaces	Interconnections between systems in multi-vendor environments play an important role in facilitating information flow between systems.	Legacy product catalog systems mostly rely on proprietary API interfaces, which are often expensive to set up and have a high failure rate, requiring manual coding.
8	Lifecycle management	Limited support for end-to-end visibility and management of products and services can be detrimental to revenue growth and customer management.	End-to-end visibility can help to identify new opportunities, ensure profit margins and even help to prevent revenue leakages. However, this may be difficult if the information is spread across heterogeneous systems.
9	Support for third-party offerings	Non-standardized interfaces often limit third-party interconnections because of the major efforts involved to integrate these into multiple catalog systems.	Non-standardized interfaces limit CSPs' ability to participate in ecosystems, which can be crucial in attracting enterprise customers.
10	Regulatory restrictions	Government bodies can mandate specific conditions for certain types of products or services, for reasons of national security, market competitiveness or minimum service requirements.	An inability to track and manage offerings with clear policy definitions can have a significant impact on ongoing operations if it falls foul of regulations.

3. 5G will accelerate the evolution of CSP business and operating models

5G is expected to radically transform business and industrial processes in a range of sectors, by enabling the adoption of new technologies. But it will be especially disruptive for CSPs, as they become the enabler, driver, and provider for 5G infrastructure and applications. The roll-out of 5G services has started in earnest, and leading CSPs are at various stages of planning, designing or deploying new infrastructure.

5G is expected to have a considerable impact on incumbent product catalog systems, particularly across the areas shown in Figure 3 and discussed below.

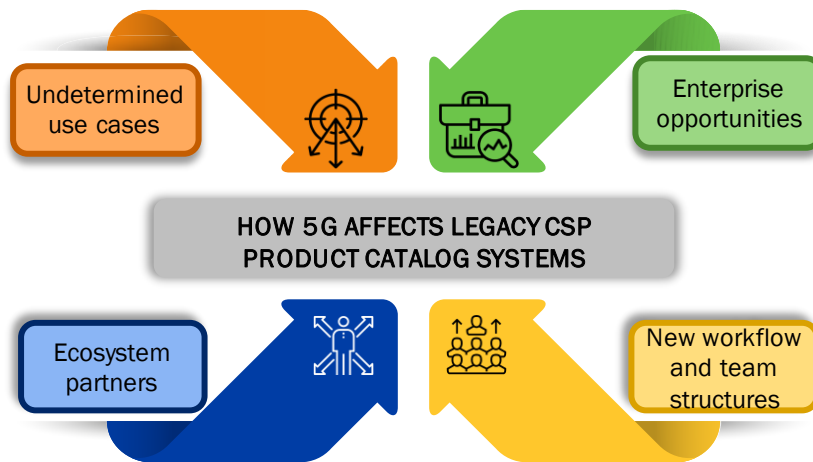


Figure 3: The impact of 5G on legacy product catalog systems [Source: Analysys Mason, 2020]

1. **Undetermined use cases** – The lack of clarity regarding use cases is changing how CSPs upgrade or replace their underlying support systems. CSPs have traditionally adopted a use-case-centered approach to upgrading their systems or deploying new ones. In this approach, CSPs begin by identifying the use case that needs to be supported and then map the necessary requirements onto existing systems. Wherever an existing system falls short, a decision is made to invest in a new system, either as an adjunct or as a new stack. With 5G, however, a lack of clarity regarding use cases means this approach is untenable, especially since emerging use cases will require comprehensive end-to-end support, from offer definition through to resource allocation, activation, charging, and commerce definitions. Systems such as product catalog will need to be exceptionally agile and flexible to support any combination of use case and business model.
2. **Enterprise as a major new opportunity** – For many CSPs, the business case for 5G is heavily reliant on expanding revenues from enterprises. From a product catalog standpoint, this calls for substantial changes to how existing systems function, with greater flexibility in related functions such as bundling, discounting, ordering, etc.
3. **Ecosystem partners** – Ecosystems and partnerships will play an important role in the effective monetisation of 5G use cases. Most current catalog systems are incapable of seamlessly onboarding external partners and combining their offerings with those of the CSP. However, it will be critical for the systems to do this, if CSPs are to compete successfully against other digital service providers, and the ability to do this in a timely manner will have an impact on the size of the market opportunity.

4. **Changing operating models** – Increasing CSP emphasis on lean operations is changing workflows and processes for functions such as the creation and launch of new products and offers, with relevant elements such as pricing, policy and service resources made easily available. CSPs' focus on making the creation and launch of new products and offers collaborative and configurable without back-end IT support calls for change in how incumbent product catalog systems function.

4. An agile and futureproof product catalog will be key to effectively embracing 5G-enabled opportunities

To embrace emerging opportunities in a timely and effective manner, CSPs need to be ably supported by an agile and futureproof catalog system.

Product catalog systems of the future will have five essential traits, as shown in Figure 4.

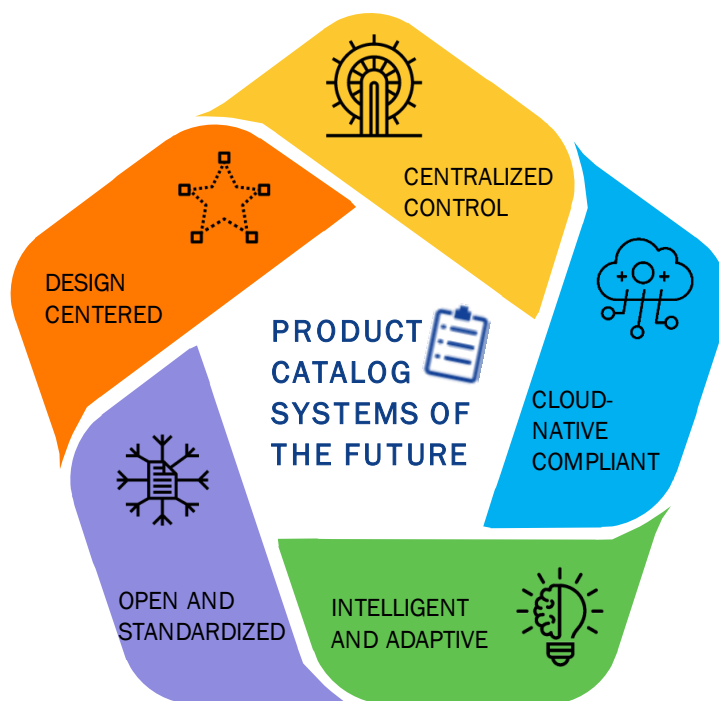


Figure 4: Essential traits of product catalog systems of the future
[Source: Analysys Mason, 2020]

1. **Centralized, cross-vendor product catalog** – A centralized product catalog will go a long way towards overcoming the inherent challenges of having multiple, domain-specific catalogs. Multiple data sources and data inconsistency between different catalog systems often play a key role in extending time to market and increasing support costs, besides having a detrimental effect on customer engagement due to inconsistent channel experience. Having a common catalog that serves the needs of commerce, charging and network resources and that is a single source of data is essential for ensuring speed and agility, and it can also help to accelerate engagement with third-party service providers. When moving to a centralized product catalog, CSPs may wish to consider a phased approach in order to minimize the risk of disruption to ongoing operations.
2. **Design centered** – CSP emphasis on lean operations has an impact on operations workflows and team structure, and as a result the user profile of product catalog systems has evolved. Whereas in the past the product catalog was fully managed and controlled by the IT team, in future it needs to provide shared access

to multiple business and operations teams, with user-configurable workflows and support for cross-team collaboration. Users from different teams will have their own access screens and control points, depending on the role. The key here is for CSPs to invest in extreme agility and configurability, as this will allow workflows to be redefined in future if required. CSPs will also need to consider future use cases, where some part of their product catalog may need to be made accessible to external entities.

3. **Cloud-native compliance** – It will be essential for product catalog systems to be cloud-native compliant, to ensure they remain agile and futureproof. Applications in a cloud-native architecture are developed as microservices that are stateless and loosely coupled. Microservices share a common data framework, which allows for greater interoperability between compliant microservices from different vendors. Each one can also be easily updated at run-time without affecting others in the composition. An important component of cloud-native computing is the ‘DevOps’ operations framework. Under a DevOps model, development and operations teams are brought together for greater coordination across development, deployment, and operations – which has a huge impact on a CSP’s agility.
4. **Open and standardized** – Given the multiple product catalog systems from different vendors that are regularly in use at numerous CSPs worldwide, the interconnection between these systems is of paramount importance. The more proprietary and closed each catalog system is, the more expensive, siloed, and difficult to expand it becomes. The provision of support for common, non-proprietary APIs and standardized interfaces will help to accelerate interactions with third-party service and content providers. This is a vital characteristic for the 5G era, as ecosystems become an important channel for participating in new opportunities.
5. **Intelligent and adaptive** – The portfolio of products and services and bundles that CSPs offer will continue to increase, especially with the advent of 5G and a growing emphasis on expanding the enterprise business. As the number and complexity of offerings increase, the intelligence capabilities of the product catalog system will become a vital tool for optimizing offerings faster, improving the targeting of end customers, monitoring policy and exceptions or even simulating responses to changes – all of which can help to lower the cost of operations. In the medium to long term, these capabilities can drive greater automation, which will further improve the overall efficiency and improve engagement with the end customer.

5. Amdocs CatalogONE overview

Amdocs CatalogONE is a smart product catalog that allows business users to independently create and launch new digital offerings for both consumers and enterprises in minutes. Cloud-native compliance is an important tenet in the development of CatalogONE, which aims to help CSPs move faster, lower IT costs, and scale dynamically. CatalogONE also provides support for end-to-end commerce to network requirements.

The solution is designed to:

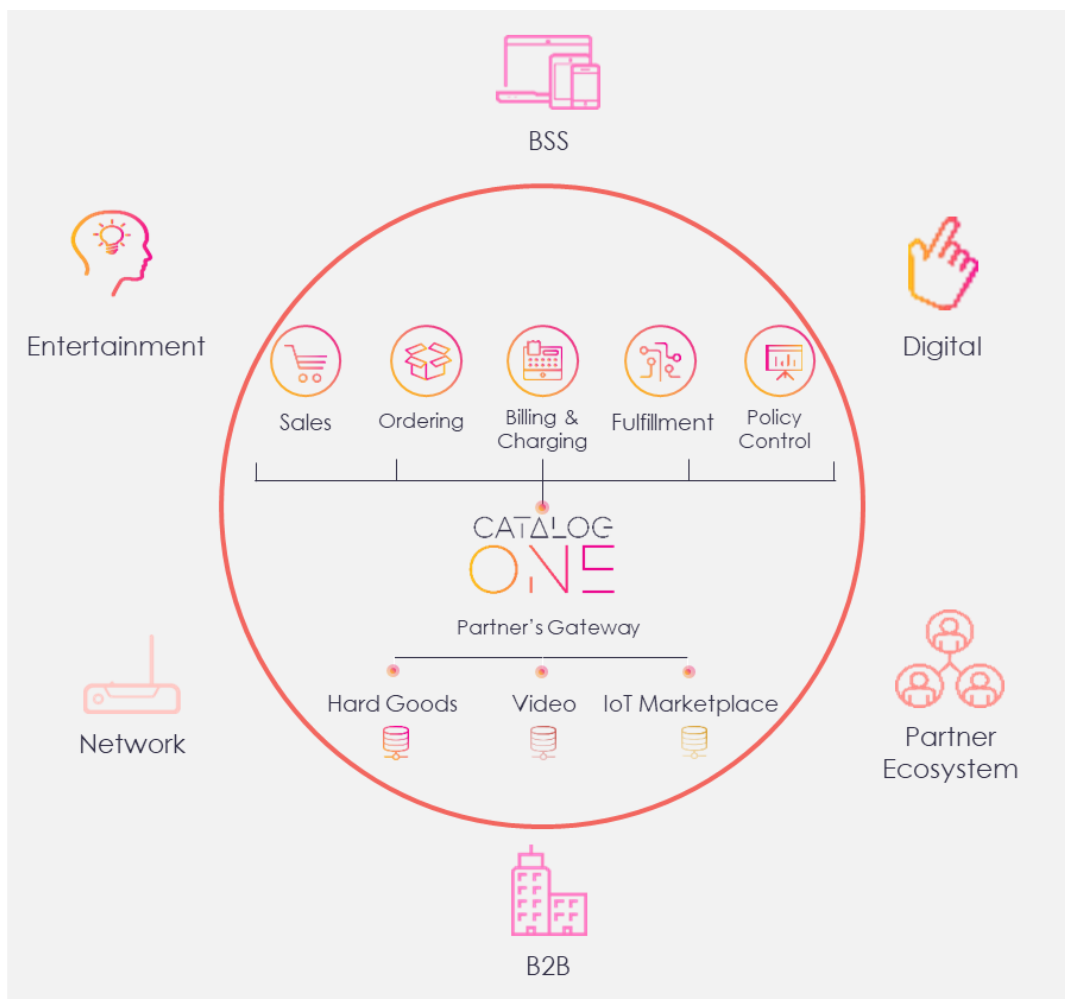
- help accelerate business growth by allowing the rapid onboarding and bundling of digital third-party and traditional products in just hours or days
- serve as a centralized catalog, either as a single catalog or in a federated manner
- support all offer-related elements, from commercial and pricing features to network resources and services
- empower business users to define new propositions without dependency on IT
- enable synchronization of data and collaboration between users, to reduce data duplications and manual processes

- provide a centralized, unified view of the product portfolio
- enable run-time services by exposing catalog data in real time through TMF-compliant APIs.

CatalogONE also contains all pricing configuration, allowance policy, prepaid policy, spending limit definitions and flexible pricing attributes in a federated or centralized manner.

CatalogONE fits into Amdocs's broader CES20 customer experience suite, which is an open and modular suite of cloud-native, 5G-ready BSS and OSS solutions designed to accelerate service providers' journey to the cloud. CatalogONE is a modular catalog that provides standard models for telco services from customer to service to resource. It gives CSPs greater control in the 5G ecosystem by allowing them to rapidly launch their own or partner-supported offerings, with flexible price plans and bundling options and associated network resources. Figure 5 provides an overview of the environment within which CatalogONE functions.

Figure 5: Overview of Amdocs CatalogONE [Source: Amdocs, 2020]



Key features of the CatalogONE solution include:

1. **Ease of use** with an intuitive interface, role-based user interface, ready-to-use templates and building blocks that simplify the creation and management of personalized and contextual offers, pricing, and promotions – as well as reducing time to market
2. **Openness**, to enable innovation with easy partner onboarding, and enrich the offering by allowing third-party services to be bundled with traditional products

3. **A collaboration platform** for ease of use and clarity, to enable effective cooperation both within and outside the CSP organization. The platform also supports the full product lifecycle – including short iterative cycles, working in agile mode, simulations, automation, parallel work, workflow, and approval management
4. **Cloud-native compliance**, driven by microservices and containers, to ensure elasticity, scalability, and always-on capability
5. **Intelligence driven with built-in analytics capabilities** and intelligence-driven recommendations for optimizing bundles and offers.

Although CatalogONE is designed to be cloud-agnostic, Amdocs is cognizant of the growing popularity of Amazon Web Services (AWS) among CSPs. Consequently, CatalogONE was built in accordance with the AWS Well-Architected Framework, based on AWS best practices for a secure, high-performing, resilient, and efficient infrastructure. CatalogONE leverages native AWS Infrastructure as a Service (IaaS) and Platform as a Service (PaaS) services, such as Amazon EKS, MSK, ElasticSearch, RDS, Auto Scaling and more. The CatalogONE infrastructure is distributed across multiple AWS availability zones for high availability and fault tolerance.

6. Conclusion

Product catalog systems have become a vital ingredient in the enablement and adoption of next-generation use cases. As 5G roll-outs expand worldwide, the importance of these systems will increase further, with the emergence of radically new business and operating models. However, for many CSPs, their current product catalog systems are far from adequate, often held back by complex architecture silos that mean slow response times and unnecessarily high support costs. Moreover, these legacy systems have multiple data sources and non-standard interfaces which further exacerbates the challenges.

To overcome the inefficiencies of legacy systems and ensure that they are effectively futureproofed for the onset of 5G-enabled use cases, CSP approaches to product catalog systems of the future should be based on a centralized cross-vendor system with a single source of data. They should prioritize a design-centered, cloud-native compliant open and intelligent solution that is capable of supporting as yet undetermined 5G-enabled use cases, from commerce to charging, policy, and network needs. In the long run, product catalog systems that incorporate such capabilities may give CSPs an important competitive advantage in the 5G era.

7. About the author



John Abraham (Principal Analyst) leads our digital transformation research, including three research programmes: *Customer Engagement*, *Monetisation Platforms* and *Digital Experience*. His areas of focus include customer journeys and experience, the impact of 5G on BSS systems, telecoms enterprise opportunities, cost transformation, ecosystems and value chains, and micro-services-based architecture models. John has over ten years' experience in the telecoms industry. At Analysys Mason, he has worked on a range of telecoms projects for operators in Africa, Europe, India and the Middle East. Before joining the company he worked for Subex, a BSS vendor, and before that for Dell in India. John holds a bachelor's degree in computer science from Anna University (India) and an MBA from Bradford University School of Management (UK).

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