Digital Transformation Platforms: Competitive Landscape Assessment

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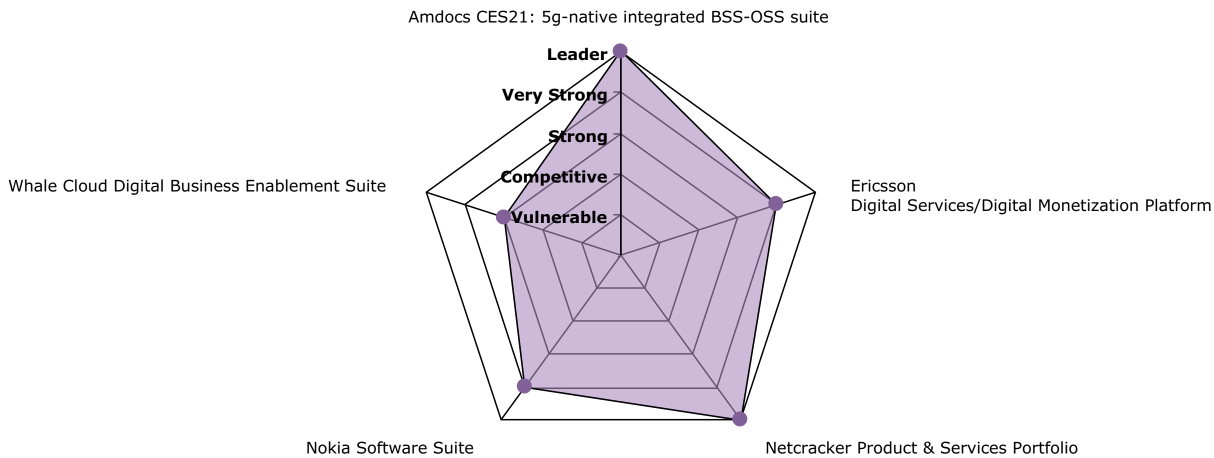
Product Class Scorecard



Market Overview

Product Class	Digital Transformation Platforms
Market Definition	The digital transformation market comprises technology and services that can help the operator substantially improve agility, efficiency, and customer experience. Often digital transformation engagements will also help CSPs enter new markets. Because digital transformation affects the entire organization, primary digital transformation partners are usually large organizations with not only broad IT portfolios, but also extensive professional services capabilities including systems integration, consulting, and training. While no vendor offers a 'digital transformation platform' portfolio per se, all of the vendors in this assessment offer a combination of operational and customer-facing software platforms, and related services, to address the multitude of challenges CSPs face in embracing the sometimes amorphous concept of digital transformation. The key digital transformation suppliers have developed their portfolios to accommodate CSPs' emerging operational and business models, across both legacy and modern technology platforms. Increasingly these platforms must support a combination of on-prem, private cloud, and public cloud environments; support for the latter is quickly becoming a primary component in digital transformation, requiring operators to adapt not just to virtualized operating environments, but increasingly to cloud-native, containerized operations and management. The products in this class deliver the essential components of digital transformation including 5G microservices, omni-channel customer management, integrated revenue management, partner enablement, digital service delivery, infrastructure management, and advanced analytics integration. Through digital transformation, operators achieve the agility required to deliver digital services according to customer demands in a real-time, interactive manner and compete against the digital offerings of webscale, over-the-top (OTT), and other digital service provider competitors. TM Forum standards initiatives, such as the Digital Maturity Model (DMM), play an influential role in providing the tools operators use to assess their digital maturity and plan their digital transformation organization-wide. The digital transformation vendor landscape consists primarily of top-tier IT suppliers whose product portfolios are capable of meeting the end-to-end transformation demands of

operators. While there are a number of software vendors offering some element of digital transformation, the vendor products included in this assessment represent the most comprehensive vendors in the current CSP-focused digital transformation market landscape.

Rated Competitors

Buying Criteria	Weight	Amdocs	Ericsson	Netcracker	Nokia	Whale Cloud
Portfolio Breadth	30%	Leader	Strong	Very Strong	Very Strong	Strong
Capabilities & Expertise	30%	Leader	Very Strong	Leader	Very Strong	Strong
Tools & Methodologies	20%	Leader	Very Strong	Leader	Very Strong	Very Strong
Delivery & Commercial Flexibility	10%	Leader	Very Strong	Very Strong	Very Strong	Strong
Stability & Momentum	10%	Leader	Very Strong	Leader	Strong	Strong
Overall		**Leader**	**Very Strong**	**Leader**	**Very Strong**	**Strong**
Score		5.00	3.70	4.60	3.90	3.20

Note: Score of 1-1.49 = Vulnerable/1.50-2.49 = Competitive/2.50-3.49 = Strong/3.50-4.49 = Very Strong/4.50-5 = Leader

• Amdocs
• Ericsson
• Netcracker
• Nokia
• Whale Cloud

Additional Competitors

• Huawei
• Nexign
• Oracle

Changes Since Last Update

• June 2021: Amdocs introduced a range of "5G Value Plane" monetization solutions that feature integrated charging and policy functions and a centrally-managed catalog. The initiative is designed to position service providers to play a central role in enabling 5G cloud, and edge use cases.
• June 2021: Amdocs introduced CES21, the latest iteration of its integrated OSS-BSS platform.
• June 2021: Netcracker and parent company NEC announced they have deployed full stack digital BSS/OSS and 5G core on Amazon Web Services as part of AWS's Virtual Village during Mobile World Congress.
• May 2021: Nokia introduced multiple AI use cases delivered over Microsoft's Azure public cloud architecture. The use cases are designed to accelerate digital transformation by managing business complexity associated with cloud adoption.
• March 2021: Vivo (Telefónica Brazil) announced it will deploy Netcracker's service catalog, inventory, and orchestration as part of its multi-year B2B digital transformation program.
• March 2021: Whale Cloud announced it was the first company to achieve the TM Forum's Platinum Open API Conformance Certification for its ZSmart BSS/OSS suite.
• February 2021: Vivo (Telefónica Brazil) signed a six-year agreement under which it will deploy Ericsson Charging. Ericsson supports charging for over 3 billion subscribers globally.

Market Assessment

Operators are focused on implementing DevOps-enabled agile software development, automation, and advanced analytics to accelerate their digital transformation plans. This enables end-to-end orchestration and control over hybrid physical and virtual network environments, including cloud, SDN/NFV, and microservices capabilities. The digital transformation trend augments the overall operator push to achieve agility in both their business processes and network operations.

In addition, major digital transformation solution providers must deliver end-to-end digital enablement portfolios and multi-cloud platform capabilities required to power organization-wide transformation. Top-tier vendors have responded with pre-integration and bundling of full-stack OSS and BSS products with orchestration and management platforms to ease and streamline the complex transformation process. Network virtualization and cloudification pose digital transformation challenges for operators, including emerging service layer complexity, analytics/artificial intelligence integration, and automation of traditional OSS/BSS processes without disruption. This entails a learning ramp and additional training with suppliers now offering NFV-specific assurance tools to ensure the service quality of NFV-enabled capabilities such as NFV MANO and VNF service chains. Increasingly, vendors in this space are offering training and tools to fill in knowledge gaps related to cloud-native, containerization, Kubernetes, and the move to continuous innovation/continuous integration and delivery (CI/CD) principles.

Operators have increased their demand for customer journey management to better understand the entire customer experience. To address this requirement, vendors are incorporating digital interactivity tools, contextual decisioning insights, and channel personalization profiles into their digital transformation solutions to deliver a consistent, accurate service experience to customers across the entire range of customer touchpoints including third-party sites, online, retail stores, social media, email, and mobile devices.

Accordingly, top-tier OSS/BSS suppliers with broad portfolios have flourished in driving operator adoption of digital transformation solutions. In addition to cloud management and advanced analytics, major suppliers have successfully developed digital customer enablement, digital business enablement, digital operations enablement, and cloud infrastructure solutions to meet the specific network-wide and business model demands of operators.

The largest digital transformation market opportunities are related to accelerating operator strategies. Through digital transformation, operators are ramping up their business-to-business (B2B), business-to-consumer (B2C), and business-to-business-to-customer (B2B2X) commerce models, requiring the scaling of massive volumes of online transactions and the build-out of digital storefronts. Digital transformation platforms allow operators to gain new digital business revenues by offering real-time partner/customer management and user-selected channel interactions. Many operators have struggled to implement digital capabilities; as a result, adopting pre-integrated, full-stack digital transformation platforms stand out as essential in jump starting the first wave of operator digital journeys.

Market Drivers

• Digital Services Build-out: Operators are looking to introduce new digital services for consumers and enterprises, particularly to help monetize investments in 5G infrastructure. This requires using digital transformation platforms that deliver consistent customer experiences, including holistic customer journey management and personalized channel profiles across all screens to meet the digital interactive and personalization demands of customers.

• Ensuring Seamless Customer Experience: Operators are looking to provide consistent customer service across multiple channels, including increasingly a mobile-first approach supported by self-care portals, smartbot customer support, and personalized service plans. The digital management of the customer omni-channel experience counters enables new services and can provide a level of service that enables operators to compete more effectively against Webscale digital brands like Amazon, Google, and Facebook.

• Organizational Collaboration: Operator decision makers are eager to work cross-functionally, integrating non-technical functions such as marketing and sales with network and IT functions. Investment in inter-organizational platforms, such as low-code platforms (which telcos have been using in one early form or another for a while) or end-to-end dashboards can help reduce cultural resistance and promote organization-wide support for digital transformation initiatives.

• DevOps, Containers, and Cloud-Native Apps Are Key: Digital transformation requires managing complex hybrid physical/virtual/containerized implementations. Operators are looking to DevOps collaboration frameworks to accelerate microservices capabilities in 5G-IoT environments.

• Intent-based Networking Rising: Key to operator digital transformation goals is using intent-based networking to automate service onboarding, executing automated fixes to network breakdowns, and proactively avoiding or mitigating damage from outages or network failures that degrade quality of service and experience. Operators are increasingly looking to artificial intelligence to enhance their offerings and differentiate from competitors.

Buying Criteria

• Portfolio Breadth: In order to assess true portfolio richness, GlobalData assesses each vendor's focus across three main areas: OSS/orchestration, BSS, and customer-facing channels. In addition, we consider the vendor's level and degree of support for various public cloud platforms, notably Amazon Web Services, Microsoft Azure, Google Cloud Platform, and Alibaba Cloud. Other factors considered include prime systems integrator capabilities; support for operations outsourcing; testing and certification outsourcing services; and degree of support for passthrough/B2B2X services offered to consumers and/or enterprises.

• Capabilities and Expertise: Within this area, GlobalData examines the vendor's total workforce devoted to digital transformation, including for various functions such as consulting and systems integration, user experience/design, and training. We also assess vendor support for relevant certifications, including those related to customer care, network, and retail. Additional criteria include analysis of the most relevant digital transformation partnerships; digital transformation-related R&D and intellectual property assets; and any cutting-edge technologies such as blockchain being put to use.

• Tools and Methodologies: GlobalData assesses vendors' utilization of AI and analytical tools and methodologies to enhance their digital transformation capabilities. We also consider any tools being offered to assist CSPs in managing third-party ecosystems in support of digital transformation goals. Finally, we assess the degree to which agile development and other relevant tools or methodologies were being used to provide unique value to customers.

• Delivery and Commercial Flexibility: Our analysis focuses on flexibility of business models being enabled by vendors, including support for "as a Service" or "pay as you go" delivery models; support for risk/reward and outcome-based delivery models; and joint innovation models in cooperating with CSPs. We also analyze flexibility in terms of being able to offer modular support in order to cater to customers not ready or willing to embrace the vendors' full stack of digital transformation software platforms or functionalities.

• Stability and Momentum: We assessed vendor stability by analyzing recent financial performance, including revenue and margin performance, debt profile, and other factors indicating corporate stability. Momentum was analyzed by referencing total digital transformation customer base; recent momentum with "showcase" customers; and new badges as well as expanded customer relationships in the past year.

Vendor Recommendations

• Meet E2E Orchestration Demands: All digital transformation platform suppliers need to develop and market automated OSS/BSS processes that support E2E orchestration of hybrid physical/virtual services and enable 5G network slicing. However, E2E in this context does not require ownership of all the supporting infrastructure – a crucial point as many CSPs are eager to prevent vendor lock-in; accordingly, vendors should embrace open interfaces and showcase experience integrating software from multiple third parties.

• Flexible Licensing Encourages Innovation: Digital transformation vendors need to show their portfolio development enables the software licensing models required to drive digital service deployment innovations like flexible pricing of virtual networking implementations using VNF instance pay-per-use metrics, and blockchain applications.

• Target Organizational Transformation: All digital transformation suppliers must develop and deliver platforms that meet operator demands for business outcomes. This focus should also extend to outcome-based engagements, which require the vendor to have strong discipline and delivery methodologies.

Buyer Recommendations

• Evaluate Full Stack Options: Operators need to explore the implementation benefits of full-stack digital transformation solutions, including integration of digital platforms with advanced analytics, converged revenue management, and service orchestration assets to improve time-to-market launch of new digital services and reduce integration costs. That said, a full stack can include best-of-breed partners so long as they are integrated seamlessly into the stack.

• Broad Portfolio Benefits: Operators pursuing digital transformation strategies must consider the breadth and comprehensiveness of vendor digital transformation portfolio offerings. Of particular importance are their orchestration, analytics, and OSS/BSS products, i.e., in accelerating and easing the integration and scaling of the 5G-IoT, microservices, and multi-cloud aspects of digital commerce models.

• Develop a Public Cloud Strategy: Operators should identify partners that can help guide decisions on whether, and what, OSS and BSS systems to migrate to the public cloud in order to create flexibility and encourage innovation. Such a migration path will need to start with an inventory of existing OSS and BSS systems and dependencies, and also address a new set of operational challenges likely to emerge.

Rated Competitors

Product Name	Amdocs CES21: 5g-native integrated BSS-OSS suite
Current Perspective	With CES21, Amdocs offers the most comprehensive portfolio across digital experience, service delivery and monetization, and network domains along with a longstanding focus on cloud-native, microservices-based solutions. Amdocs was also one of the

	early adopters of public cloud adoption, with active engagements with all three major public clouds. In particular, Amdocs has been the most prolific in establishing a cloud-focused division to help CSPs address the multiple complexities that emerge with moving to private and public cloud environments and to identify innovative partners that can assist in operator digital transformations. As it has always done, Amdocs enhances its software portfolio assets with services capabilities related to delivery and operations, which can lead to shorter time-to-market for new services and help in areas such as 5G monetization which are growing increasingly important to CSPs. Amdocs has also been among the most proactive in building the case for network slicing – a capability that should take more of a priority as 3GPP release 16 and 17 mature over the next few years. Amdocs' broad portfolio and product-led services approach has traditionally resonated most effectively with large Tier 1 operators; in point of fact Amdocs relies on just 10 customers for approximately 2/3 of its revenue. However, that's down from 75% of total revenue five years ago – a sign that Amdocs is slowly but steadily increasing its relevance to smaller CSPs.
Buying Criteria Rating	• Portfolio Breadth: Leader • Capabilities & Expertise: Leader • Tools & Methodologies: Leader • Delivery & Commercial Flexibility: Leader • Stability & Momentum: Leader
Product Scores	Leader
Strengths	• Comprehensive CES21 portfolio addresses all major CSP requirements in customer engagement, commerce and digital experience, business enablement, service enablement, monetization, and network automation and orchestration. • Years of focus on cloud-native enablement and microservices development pervades entire digital transformation focus. • Extensive public cloud partnerships, newly-formed cloud unit, and cloud consulting practice. • Programmatic approach to project scoping guides complex, multi-year digital transformation projects. • Israeli base provides strong basis for innovation and ecosystem development. • "5G value plane" offers compelling way to envision platform assets as monetization enablers.
Limitations	• Amdocs continues to largely cater to large operators, particularly AT&T and other U.S. operators, and has yet to establish a reputation as a points solution provider among smaller CSPs. • Amdocs' retention of multiple brands acquired via acquisitions – such as Kenzan, Vindicia, and Brite:Bill – showcase innovation but may impact Amdocs' ability to convey as clear overall focus as it could.

Product Name	Ericsson Digital Services/Digital Monetization Platform
Current Perspective	Ericsson continues to enjoy popularity among its BSS point solutions, including triple-digit customer counts for its billing, charging, and mediation products. In Q1 2021, Ericsson reported over 30 new contracts or renewals across its BSS portfolio, and is especially showing traction in deals that include an orchestration component along with BSS software deployments. In March 2021, Ericsson showcased innovation around its approach to policy with the introduction of its 5G Core Policy Studio. While policy is arguably tangential to CSPs' approaches to digital transformation, the new studio approach should help operators monetize 5G services and network slicing by enabling dynamic adjustment of network service characteristics using a graphical user interface. Ericsson's digital transformation portfolio strives to shine from within the company's Digital Services unit, in which BSS assets reside alongside OSS/orchestration and cloud/packet core assets which capture a good deal of attention. This somewhat siloed approach could prevent Ericsson from embracing a more comprehensive digital transformation vision than some of its peers.
Buying Criteria Rating	• Portfolio Breadth: Strong • Capabilities & Expertise: Very Strong • Tools & Methodologies: Very Strong • Delivery & Commercial Flexibility: Very Strong • Stability & Momentum: Very Strong
Product Scores	Very Strong
Strengths	• Monetization and digital experience platforms create comprehensive focus. • Continued success and momentum in charging. • Expanding focus on analytics and AI to enhance customer intelligence and user experience. • Strong professional services help operators meet digital transformation objectives. • Combined network, OS and BSS portfolios facilitates integration of BSS with OSS and network requirements.
Limitations	• Laggard in supporting increasingly popular public cloud deployment options for digital transformation-related platforms. • Limited focus on helping CSPs develop third-party ecosystem to build new revenue generation opportunities. • Profitability in Digital Services unit remains elusive.

Product Name	Netcracker Product & Services Portfolio
Current Perspective	Netcracker offers a strong roster of OSS and BSS products, with particular strength in 5G monetization. The company focuses on providing an end-to-end and programmatic view of transformation that encompasses a variety of business and technology services. This includes a wide range of services that are focused on helping operators are setting the right operational and customer-facing KPIs, building a comprehensive digital transformation and migration roadmap, and working internally with operators to ensure that staffing and systems are in place to deliver on digital transformation goals. Netcracker has invested heavily in ensuring its delivery specialists have achieved the requisite certifications and training to deliver on customer outcomes; this rigor extends across customer care and network-focused engineers. The company has also significantly expanded and showcased its affiliation with all three major public cloud providers, and has an extensive and expanding focus on cloud transformation, cloud strategy design, and cloud delivery that align with rapidly-evolving customer requirements. The company also introduced a cloud-based BSS solution in 2021 that includes marketing and commerce, sales and customer service, and revenue management products. While some of its competitors can claim larger overall market share or particular strength on specific point solutions, Netcracker has seen continued momentum across a diverse portfolio of customers that includes a variety of large, multinational operators and smaller, national operators; it also enjoys continued popularity across mobile, fixed, cable, and converged operators as well as a number of adjacent industries.
Buying Criteria Rating	• Portfolio Breadth: Very Strong • Capabilities & Expertise: Leader • Tools & Methodologies: Leader • Delivery & Commercial Flexibility: Very Strong • Stability & Momentum: Leader
Product Scores	Leader
Strengths	• The Netcracker Digital BSS/OSS portfolio targets multiple pain points for operators embracing cloud-native digital transformation initiatives. • Greatly enhanced focus for multi-cloud adoption and leading position on fostering low code platform development. • Nimble focus on "out-of-the-box" platform adoption in addition to full-stack capabilities. • Enhanced focus on professional services to enhance platform value. • Strong focus on "minimum viable product" (MVP) approach to help CSPs realize business benefits early and often. • Major emphasis on internal training and certifications.
Limitations	• Full-stack approach may not resonate with customers seeking individual point solutions. • While parent company NEC continues to post positive financials, lack of Netcracker-specific publicly-reported financials obscures ability to gauge traction and profitability.

Product Name	Nokia Software Suite
Current Perspective	Nokia offers a suite of portfolio solutions that increasingly focus on 5G-related OSS and BSS imperatives. The company's Digital Operations Center integrates service fulfillment, orchestration, and assurance following a cloud-first approach. Nokia's OSS focus is increasingly targeted at orchestration, both across increasingly virtualized and containerized network elements and across business dimensions. On the BSS side, Nokia focuses its development on convergent charging and mediation along with policy control, all optimized around emerging 5G business use cases. Nokia enhances its digital transformation proposition with a smart digital care consulting service that helps operators implement customer-facing digital enhancements such as chatbots that can boost customer satisfaction/NPS and also identify new revenue opportunities. While technically not an element of the digital transformation analysis, Nokia does distinguish itself with its strong end-to-end security portfolio that includes a Security Gateway, Nuage virtualized security services, DDoS Deepfield Defender, Managed Detection and Response, and the NetGuard Adaptive Security Operations suite. This approach is augmented by security consulting services offered by Nokia Bell Labs.
Buying Criteria Rating	• Portfolio Breadth: Very Strong • Capabilities & Expertise: Very Strong • Tools & Methodologies: Very Strong • Delivery & Commercial Flexibility: Very Strong • Stability & Momentum: Strong
Product Scores	Very Strong
Strengths	• Strong focus on important software assets across BSS, customer care, device management and business/customer analytics. • Digital Operations Center smartly packages multi-vendor, multi-domain, and multi-technology CSP operations to bridge existing

	service offerings with emerging 5G imperatives. • Comprehensive roster of supporting systems integrators. • Proactive "Any Cloud" strategy encourages openness and flexibility to meet individual operator migration preferences. • Multinational IoT ecosystem WING is one of the most mature multi-company, B2B2X ecosystems in the telco market. • Nokia AVA AI-as-a-Service enables a growing portfolio of telco AI use cases.
Limitations	• Reliance on partnerships for certain digital transformation capabilities potentially limits Nokia's ability to claim a comprehensive digital transformation portfolio. • While Nokia also offers more traditional licensing models, some operators may not yet be ready to embrace Cognitive Services' outcome-based pricing models.

Product Name	Whale Cloud Digital Business Enablement Suite
Current Perspective	Whale Cloud offers an impressive approach to digital transformation that is based on a focus on identifying and benchmarking digital maturity and then building a roadmap to address challenges. The company's "STRATO" strategy provides a blueprint for addressing driving forces of demand, supply, and competitive approaches that are pushing transformation forward. Whale Cloud's Digital Telco Maturity Map enables Whale Cloud to assist CSPs in evaluating their capabilities across four main fields: customer satisfaction, operational excellence, vertical innovation, and "technology fusion." Whale Cloud is also proactively leading operators toward a "mobile first" strategy, including assisting with the development of mobile applications that can improve customer satisfaction. The company also promotes a "cloud first" strategy, enhanced by cyber-security services, that gets a boost from Whale Cloud's position as a business unit of Alibaba Cloud. However, it is far less proactive with other Western public cloud providers – this likely limits Whale Cloud's appeal for many operators.
Buying Criteria Rating	• Portfolio Breadth: Strong • Capabilities & Expertise: Strong • Tools & Methodologies: Very Strong • Delivery & Commercial Flexibility: Strong • Stability & Momentum: Strong
Product Scores	Strong
Strengths	• Pre-integrated architecture enables flexible and modular deployment of platform. • Digital Telco Maturity Map and other digital transformation toolkits help assess CSP digital transformation goals and priorities. • Whale Cloud devotes significant focus to enabling CSPs to cater to specific vertical opportunities, including e-commerce, automotive, and smart city. • Collaboration with Alibaba Cloud is appealing to operators in some markets in Europe and especially Asia.
Limitations	• Many Western operators will be reluctant to engage with Whale Cloud or Alibaba Cloud due to geopolitical concerns.