White Paper

Unlocking Value in Telecom Networks with Oracle Asset Lifecycle Management Solution

Sponsored by: Oracle

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TELECOM SERVICE PROVIDER MARKET OVERVIEW

IDC estimates the global spend on 5G network infrastructure (excluding services) will approach $25 billion in 2025, growing at a CAGR of 18.2% from 2020.

The telecom industry is entering a period of unprecedented change as demand for ubiquitous connectivity of people and things becomes essential to how businesses operate and how consumers conduct their daily lives. According to a recent survey of telecom operators worldwide, many respondents expect growth in 5G investments over the next two years, but increased pricing pressure, due to intensified competition, will challenge operator returns on invested capital.

Amid this growing demand for connectivity, telecom operators have had to rethink all aspects of their business and develop network infrastructure strategies designed to address current and future connectivity requirements. These strategies are being developed in the face of challenging market dynamics that include:

- Slow revenue growth across the industry
- Increased competitive intensity from adjacent markets (cable, satellite)
- Disintermediation from over-the-top (OTT) service providers

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Digital transformation has become a strategic imperative for telecom providers as they respond to these disruptive market forces that are having a significant impact on their business. As a result, significant infrastructure investments are being made to support operators' transformation strategies.

Given the magnitude of network infrastructure spending needed to support telecom operator transformation initiatives, ensuring optimal returns on the capital invested is essential. Subsequently, IDC believes that operators will focus on making improvements to their asset life-cycle management process to optimize capex and drive maximum value from the assets deployed.

TELECOM OPERATOR NETWORK TRANSFORMATION DRIVERS

Telecommunications operators across the globe have embarked on bold strategies to transform the way they do business and enable enterprise and consumer experiences in new ways. This transformation is largely driven by three main priorities:
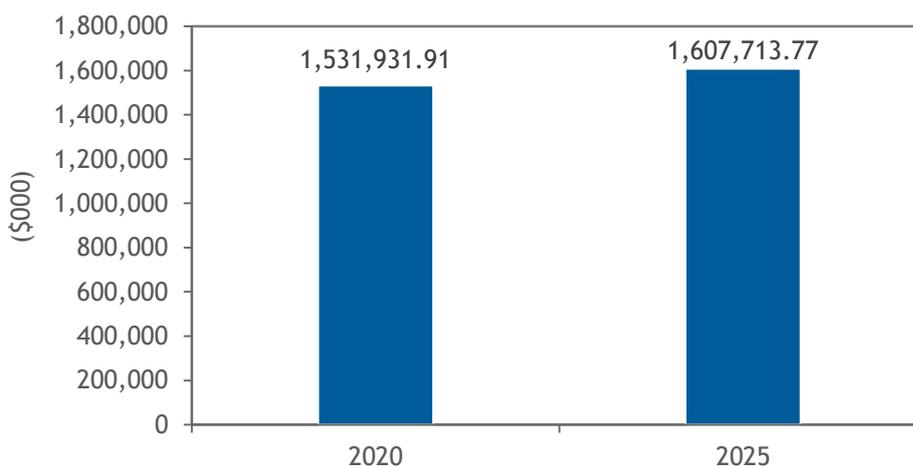
- First, over the past five years, telecom operators have been on a mission to reduce costs as revenue growth has slowed. Operators have implemented a range of strategies to reduce costs, including outsourcing components of their infrastructure and centralizing procurement activities.
- Second, service providers' existing operations are siloed and rigid, lacking the flexibility needed to adapt to changing market requirements. Transforming to a more virtualized and automated operational environment will improve operational efficiency and infrastructure adaptability.
- Last, establishing consistent revenue growth has been a challenge for telecom operators because of competitive intensity and the resulting price pressures. At a global level, telecom revenue has held steady at $1.5 trillion with little to no growth in the past three years. IDC forecasts worldwide telecom revenue will grow from $1.5 trillion in 2020 to $1.6 trillion in 2025, representing a 1% growth rate over the next five years (see Figure 1).

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In a more connected world, it is imperative that telecom operators monetize their 5G infrastructure investments to deliver solutions that support connectivity-intensive business models in industries like manufacturing, retail, energy, and transportation. Developing innovative solutions in industries such as these is expected to drive new sources of revenue for telecom operators.

FIGURE 1

Worldwide Telecom Service Revenue, 2020 and 2025

Source: IDC's GTI Database, October 2021

INFRASTRUCTURE INITIATIVES DRIVE TELECOM OPERATOR INVESTMENTS

While telecom operator transformation initiatives and migration to 5G will drive heavy network infrastructure spend globally over the next five years, there will also be networking spend related to government mandates to expand broadband to underserved rural areas. IDC expects these initiatives to account for the bulk of worldwide telecom infrastructure spend, with large tier 1 operators in developed countries driving 5G-related spend and a broader variety of service providers, including cable, satellite, utility companies, and smaller tier 2 and 3 operators, driving broadband infrastructure buildouts in rural areas.

This is an important point as most of the large tier 1 operators have established asset life-cycle management processes in place; the challenges they face in optimizing capex is very different from smaller operators that tend to have less mature processes in place for managing assets across the life cycle. IDC believes that an end-to-end process for asset life-cycle management will provide business value to a broad range of operators as infrastructure investments increase across the sector.

Investment in 5G Drives Telecom Transformation

Telecom operator investments on 5G infrastructure is expected to address many of operators' business and operational concerns and provide a path to unlocking opportunities that drive new sources of revenue growth. However, migration to 5G involves a massive architectural shift that includes new 5G radios, a software-defined virtualized network infrastructure, a cloud-native core, and an orchestration layer sitting atop the network. The virtualized infrastructure will also enable operators to move functionality to the service edge of the network and closer to customers' applications where latency can be reduced. Having this capability will give operators the ability to support a broad range of human-to-human, human-to-machine, and machine-to-machine interactions.

These interactions will open opportunities to support new use cases such as smart factories, Smart Cities, augmented and virtual reality, and autonomous vehicles. These are just a few of the use cases that have already been identified; the reality is that there will be many other use cases that are made possible by the specific capabilities that 5G delivers to telecom operators.

While 5G opens new revenue possibilities for telecom operators and helps achieve a desired level of operational agility, the capital cost associated with this level of infrastructure buildout is significant. Although operators are still in the early stages of 5G investment plans, according to the GSMA, spending on 5G-related infrastructure is projected to reach nearly $1 trillion globally between 2020 and 2025. This spending includes investments that are spread across the access, backhaul transport, and core network.

Rural Broadband Initiative

While 5G will account for the majority of telecom operator infrastructure investment activity over the next five years, government mandates/initiatives to build out broadband infrastructure and services in rural areas are another infrastructure priority for operators that will drive heavy investment in the coming years.

Government initiatives to drive broadband access to underserved populations have become a key driver of communications infrastructure spending worldwide. With many essential services being

provided online during the COVID-19 pandemic, the situation helped shine a light on the disparities between rural and urban areas in terms of access to basic internet connectivity, where users in rural areas had either unreliable connectivity or no connectivity at all.

Many countries have put broadband programs in place, with available funding for telecom operators to drive investment in infrastructure that would expand broadband access. The high cost of serving rural areas is one of the main reasons for the limited broadband coverage; however, the availability of government funding has removed this barrier to invest and ushered in a wave of interest in rural communications markets for residential and SMB services. This has also increased competitive intensity as various providers have come into the market seeking to gain access to funding to help support their rural infrastructure buildout plans.
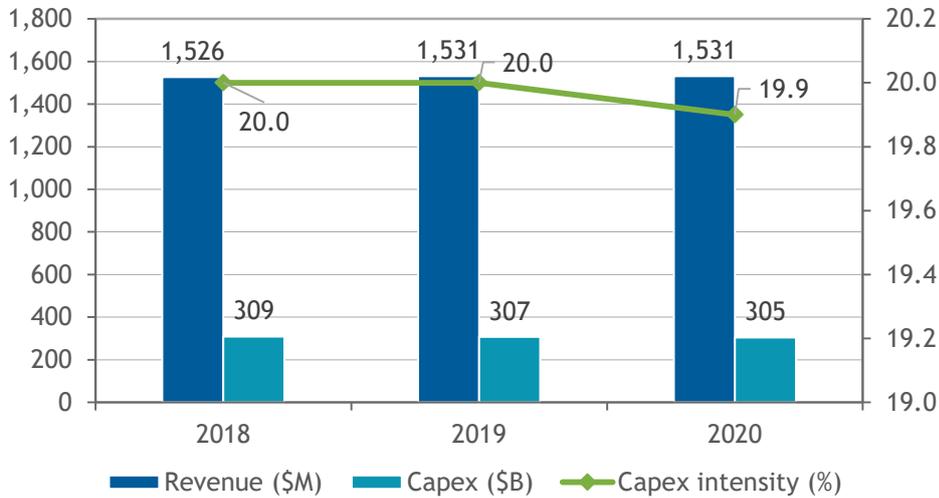
THE CAPEX CHALLENGE FOR TELECOM OPERATORS

IDC conducted direct interviews with 13 telecom operators located in Europe, Asia, and North America to better understand the process that telecom operators use for asset life-cycle management and the challenges they face in maximizing asset value driving adequate returns on invested capital. Across the 13 operators, we interviewed personas with responsibilities for supply chain management, financial planning, and network operations and network planning. Through these interviews, we have identified several challenges that telecom operators face in their approach to asset life-cycle management.

In the 2018–2020 period, worldwide revenue for telecom operators remained largely flat, while capex went from $309 billion in 2018 to $305 billion in 2020. Subsequently, capex intensity during the same period remained at approximately 20% (see Figure 2). The revenue decline during this period represents a longer-term trend taking place in the industry as competitive intensity has put downward pressure on prices. In addition, as telecom revenue has fallen, operators have managed to bring their cost structure down to align with revenue levels. As a result, capex has remained relatively stable over the past few years. However, the industry is experiencing a trend toward shorter technology life cycles across their infrastructure, which will drive faster technology refresh cycles going forward.

FIGURE 2

Worldwide Telecom Revenue, Capex, and Capex Intensity, 2018-2020

Source: IDC's GTI Database, October 2021

As the telecom industry enters this new wave of infrastructure spending for the buildout of 5G, mobile edge compute environments, and rural broadband, ensuring that capital is efficiently utilized to drive optimal investment returns will be a major focus for telecom operators as they attempt to generate above-average returns for shareholders. Between 2017 and 2020, return on capital in the telecom industry has been on a steady decline (see Figure 3).
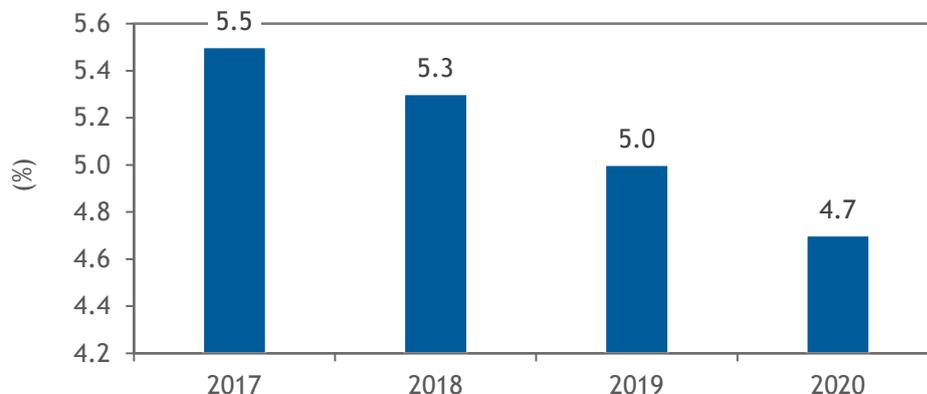
A financial planning manager at a large global operator expressed the following when talking about their view on return on capital: "**From my 10 years of experience in telecom, I can say that investment or the return on investment is getting reduced due to the price restructuring. Around five years or seven years back, the return on investment was around 10-15%, but nowadays, it has reduced to 3%. With network engineering and modification required every two or three years, capex investment is going higher as compared to return on investment.**"

Over the past three years, telecom providers have experienced a steady decline in return on capital, going from 5.5% in 2017 to 4.7% in 2020.

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FIGURE 3

Telecom Industry Return on Capital, 2017-2020

Source: Capital IQ, 2021

IDC believes that there are three main reasons for telecom operators' inefficient use of capital. First, the planning process is not well integrated for many operators, and even when there is an integrated approach, it is typically a highly manual process that is prone to mistakes. One European operator we interviewed talked about the challenge the company faces in the planning process: "Buying parts of the materials or transportation is done directly by us now, but the process is not too mature. It's basically based on Excel files or the best knowledge we have; we need to change that."

Many operators we interviewed pointed to the connection of workflow processes through automation as the key to driving greater integration; however, operators also admitted to not having the required expertise in automation to drive a more integrated planning process. In addition, not all processes will be automated, so the optimal solution for operators will be a coordination of automated and manual processes.

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Second, operators often lack sufficient data to determine optimal placement of the asset or provide active management of the asset during its useful life. The data needed to ensure assets are efficiently utilized is typically spread across functional domains like marketing, engineering, and procurement. While most providers have deployed repositories for tracking all transactions relevant to the asset from initial deployment in the network to its end of life, this also is typically a manual process with many inaccuracies or is inadequately updated to reflect the true history of the asset.

Last, there are a variety of groups involved in various aspects of the asset life cycle, and each group has its own set of priorities that guide their activities. Planning groups are focused on capacity and coverage, procurement groups are focused on cost optimization, and marketing teams are focused on customer requirements; given this siloed approach, there is no shared accountability for maximizing the value of assets throughout their useful life.

As a result of the factors stated previously, telecom operators are evaluating strategies to improve asset life-cycle management by tightly integrating technologies like artificial intelligence (AI) and automation into various process workflows from planning to asset maintenance. While the interviews did reveal that there is greater use of AI and analytics to help drive greater insight into the decision-making process for capex and support tighter integration of workflows across functional groups, only a handful of the most mature telecom operators have implemented these technologies today. The primary reason for this is the limited technical expertise that operators have in these new technology areas.

IDC believes that end-to-end management of the telecom asset life cycle from deployment to decommissioning is critical to maximizing the value of deployed assets and utilization of invested capital. When asked about the level of maturity in using automation to drive workflow processes, one operator mentioned the following: "It is a mix of manual and automated. Our organization structure has different groups like some legacy supply chain groups that are getting combined. We are in the process of automating it more; there's a big initiative."

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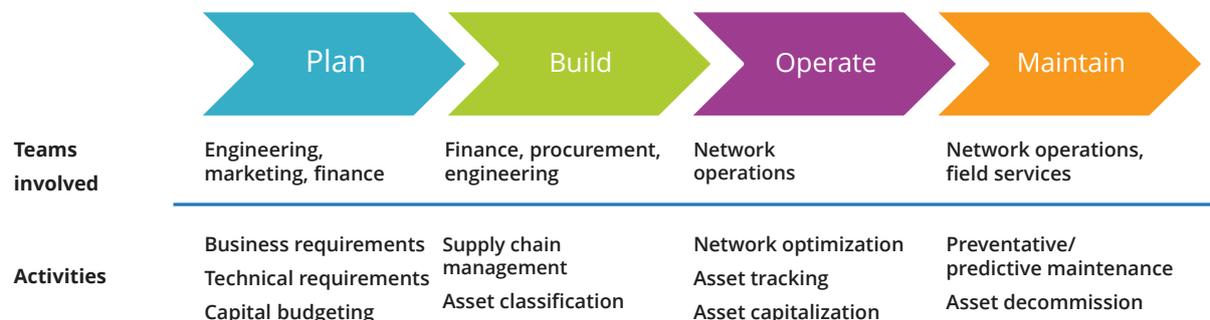## TELECOM NETWORK ASSET LIFE-CYCLE MANAGEMENT CHALLENGES

All telecom operators have a process in place for asset life-cycle management; however, what varies by operator is the level of workflow automation used, the level of integration between various processes, use of analytics to drive actionable insight, and the level of end-to-end visibility across the plan, build, operate, and maintain phases of the asset life cycle. Figure 4 depicts the typical telecom asset life cycle and associated activities within each stage.

One challenge telecom operators have is executing the sheer number of capital projects that get approved and the variety of teams involved in specific processes. Telecom operators' capex is typically approved for three types of activities:

- **Maintenance:** Spending supports upgrades needed for existing services and maintains customer service levels. Engineering teams drive this component of capex. Revenue levels are generally known, thus ROI metrics are positive.
- **Success based:** Spending supports new functionality or increases in subscriber or traffic growth. Marketing/sales drive this model. Spending in this area assumes that incremental revenue will result from added functionality being implemented.
- **Growth:** Spending supports new areas of growth, which includes infrastructure to support new services. Multiple stakeholders are involved in this model as the capital outlay is large and tied to business objectives. Current communications SP transformation initiatives fit the model of capex.

FIGURE 4

Telecom Network Life Cycle

	Plan	Build	Operate	Maintain
Teams involved	Engineering, marketing, finance	Finance, procurement, engineering	Network operations	Network operations, field services
Activities	Business requirements Technical requirements Capital budgeting	Supply chain management Asset classification	Network optimization Asset tracking Asset capitalization	Preventative/ predictive maintenance Asset decommission

Source: IDC, 2021

It is important to note that telecom operator network rollout plans cover sites located across a large territory that can be regional or national. Operators typically view each site build as a separate project with its own criteria for costs, expected revenue, and the type of infrastructure to be deployed. Based on the direct interviews conducted with service providers, it was clear that coordinating the activities of multiple groups across a number of life-cycle activities creates challenges throughout the asset life cycle.

Plan

One of the challenges identified in the early planning process for telecom operators is the lack of coordination between the technical team and the business team whose spending motivations are not aligned (see Figure 5). The activities of these groups are often driven by very different objectives, and the applications used within each function is tied to a specific activity, which can make an integrated business planning effort very challenging. This often results in spending on projects that lack a clear ROI.

The figure depicts various groups involved in asset life-cycle management and the different areas of focus that lead to a more siloed approach and lack of accountability.

In addition to the challenge of coordinating across functional groups, the expected increase in infrastructure spending for 5G and mobile edge computing will also put heavy pressure on telecom operators' resource capacity needed to deploy, operate, and maintain this new infrastructure. Ultimately, driving resource efficiency will be key to driving acceptable return on invested capital. Toward this end, one European operator stated the following: "We'll have a very limited budget in this time for new investments. Our divisions are focused mainly on the new infrastructure, but we have limited resources for new products."

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FIGURE 5

Telecom Operator Focus by Functional Group

Company Domain	Focus
Business vision	• Competitive differentiation • Revenue growth
Engineering	• Operational efficiency
Procurement	• Cost optimization
Marketing	• Customer focused
Finance	• Maximizing asset value and driving strong returns on invested capital

Source: IDC, 2021

Build

There are many moving parts in the build phase of a network rollout that includes sourcing and supplier management, equipment tracking, resource capacity, and asset capitalization. As previously mentioned, management of large-scale telecom infrastructure deployments is difficult as these projects often include site builds that span multiple geographic regions. While telecom operators manage these deployments as separate projects, it can lead to inefficiencies in supply chain coordination as activities become more localized with limited to no end-to-end visibility across the project.

Through the direct interviews conducted, it was revealed that many operators are using Excel spreadsheets for tasks like asset tracking and supplier management. In addition, a few operators stated that the lack of coordination between tasks often led to challenges in sourcing and supplier management.

Investments in automation are ramping up for supply chain activities for some operators, but others indicated that the lack of automation expertise within their technical teams is an obstacle to broader implementation.

Operate

Effective and continuous tracking of assets is essential for operators to determine whether deployed assets are delivering maximum value. In the interviews conducted, most operators have a system in place for tracking the utilization of assets, but the level of historical detail on network assets related to utilization, upgrades performed, and maintenance history varied.

This level of visibility can help determine whether assets identified as being underutilized can be redeployed elsewhere in the network to maximize the value of the asset. More importantly, having this insight can save operator capex by curtailing unnecessary spending.

One of the main challenges uncovered through the course of the interviews is that telecom operators have a mix of tools and platforms that they rely on for managing/monitoring assets as part of their ongoing operations. These include platforms for activities like inventory management, maintenance, warehousing, logistics, asset capitalization, and retirement. In most cases, these are disparate solutions with little to no integration across platforms, leading to a lack of end-to-end visibility of assets.

Limited visibility of assets is also a problem for telecom operators that have elected to outsource their networks. IDC has witnessed a recent move by telecom operators to insource the management of infrastructure that was previously outsourced to a third-party managed service provider. This has also created operational challenges as operators try to combine outdated internal operational processes with those inherited from their managed service provider partners.

One operator we interviewed indicated that bringing the procurement process back in-house has been particularly challenging, given the recent component shortages that have occurred during the COVID-19 crisis.

Maintain

There is a shift taking place in the maintenance and support of telecom equipment as operators have moved from reactive maintenance solutions to preventative/predictive support. Given that most telecom operators are focused on improving customer experience, the move to preventative/predictive maintenance will allow for better network performance and reduced network downtime. IDC estimates that the average cost of downtime per hour for telecom operators is approximately $1.4 million, and this number has been rising as outages have become more common. In fact, in a recent IDC survey on support and maintenance trends, nearly 75% of telecom operators surveyed worldwide indicated that proactive/preventative support services are a critical technical feature.

In addition to telecom operators' move to preventative/predictive maintenance, comprehensive tracking of an asset's maintenance history has been a common practice. Most telecom operators we interviewed have a mature process and system in place for tracking an asset's maintenance history. Through frequent health checks and logging to past service calls and upgrades performed on the asset, the operators can determine whether an asset can be kept in service or retired.

Within each phase of the life cycle, there are varying levels of process integration, but this has done little to help ensure that telecom operators are spending capital effectively. What operators need is an approach that gives them end-to-end visibility across the various tasks within each asset life-cycle phase. Greater coordination and integration across the life cycle will give operators the level of insight needed to make better capex decisions.

ASSESSING ORACLE'S APPROACH TO END-TO-END ASSET LIFE-CYCLE MANAGEMENT

Oracle provides a unified asset life-cycle management solution for helping telecom operators better manage assets across the life cycle. The Oracle solution is cloud based and includes an integrated suite of solutions for business planning, supply chain management, project management, financial

management, and asset maintenance. Through this unified approach to asset life-cycle management, Oracle provides deep insight for telecom operators to improve decision making regarding capex.

Oracle's Asset Lifecycle Management (ALM) solution includes the following components:

- **Oracle Integrated Business Planning and Execution (IBPX):** This solution leverages advanced technologies like artificial intelligence, analytics, and automation to support end-to-end planning for meeting telecom operators' business objectives. IBPX provides scenario-based analysis with recommendations for multiple planning options that enable operators to meet their business KPI targets.

- **Oracle Project-Driven Supply Chain (PDSC):** This is an end-to-end solution across Oracle Cloud Supply Chain Management (SCM) and Cloud Enterprise Resource Planning (ERP) applications. This solution is designed to support telecom companies that need supply chain processes to work in the context of a specific project. In such cases, all activities of the supply chain, including order management, procurement, sourcing, supplier management, contracts management, material management, sales, and maintenance, are tracked and executed within projects. This ensures end-to-end integrity of supply and associated costs.

  Given the size of the network rollout plans, many large tier 1 operators segment large deployments into smaller discrete projects that are coordinated by a project manager. Through the course of the service provider interviews, it was clear that mature and advanced providers were using automation to integrate sourcing and resource planning activities. When asked how integrated the supply chain and resource planning activities are, one large European operator stated the following: "It is highly integrated. In order to minimize capex, we need to have an integrated model. We need to optimize the cost to control the flow of materials."

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- **Asset capitalization to retirement:** Through integration of the Oracle Procurement, Project Management, and Financial Budgeting applications, telecom operators have visibility to manage asset capitalization, project status, equipment and material costs, and asset retirement and disposal.

- **Asset tracking and maintenance:** Oracle's Maintenance Cloud enables effective and efficient maintenance operations. Oracle's IoT Intelligent Applications continuously monitors network assets throughout the asset life cycle, from initial purchase of the asset to retirement and disposal. Oracle also provides real-time management of an asset's health with predictive analysis about performance degradation and asset failure. Predictive analysis triggers an automated repair process.

MARKET OUTLOOK FOR ORACLE ASSET LIFECYCLE MANAGEMENT SOLUTION FOR TELECOM

Oracle provides a comprehensive approach for telecom operators to better manage assets through the asset life cycle. The solution addresses many of the challenges that telecom operators face today when attempting to maximize the value of assets and generate an acceptable return to the business. An analysis of the opportunities and challenges for Oracle's Asset Lifecycle Management solution is provided in the sections that follow.

Opportunities

- As telecom operators begin a period of heavy infrastructure spending, Oracle's ALM solution will enable telecom operators to efficiently allocate capital.
- ALM provides end-to-end visibility across the asset life cycle that enables telecom operators to drive improved decision making for asset planning.
- ALM will help telecom operators support greater coordination of activities throughout the asset life cycle.
- While larger tier 1 operators have established processes in place, smaller operators can benefit from a more comprehensive approach to asset management.

Challenges

Oracle's ALM solution must integrate with legacy systems that telecom operators already have in place to drive an integrated approach to asset life-cycle management.

Advanced technologies like AI, analytics, and automation will play a key role in supporting processes and decision making across the asset life cycle. Oracle must work closely with telecom operators that are in the very early stages in implementing advanced technologies in their day-to-day operations.

Siloed organizational structures within many telecom organizations can compromise the value of an end-to-end asset life-cycle solution.

ESSENTIAL GUIDANCE

As operators continue their transformation journey, growth-based capex initiatives tied to 5G rollout, rural broadband deployment, and mobile edge compute deployments will dominate capex over the next five years. As the level of competition intensifies, there will be added pressure on telecom operators to optimize capex efficiency. Even more important will be the effective monetization of new infrastructure that is put in place to drive revenue growth. Solutions are available to improve the traditional approach to the asset life cycle and help service providers better utilize assets while maximizing capex efficiency. Subsequently, with massive infrastructure investments on the horizon, IDC believes telecom operators should act swiftly, rethinking their approach to asset life-cycle management.

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

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