Enabling Strategic Inventory Management for the Communications Industry

Executive Overview........................................................................................................ 3
The Strategic Back Office ............................................................................................... 3
Legacy Systems: Holding Back the Business............................................................... 4
Creating New Value with Oracle’s Communications Inventory Management Solutions ........................................................................ 4
Enabling Best Practices ................................................................................................. 5
  Bring the Business and Network Together Around a Strategic Network and Service Inventory .............................................................. 5
  Streamline Service Fulfillment Integration.................................................................. 8
  Manage Data Integrity as a Strategic Asset ............................................................... 10
  Unlock Information for the Business .......................................................................... 11
  Enable the Strategic Customer Relationship ............................................................ 13
  Reduce Costs Through Automation ........................................................................ 14
  Enable Network and Service Transformation .......................................................... 16
Conclusion ...................................................................................................................... 17
Enabling Strategic Inventory Management
for the Communications Industry

EXECUTIVE OVERVIEW
The rapid pace of technological change, increased competition from new entrants, globalization, and the drive toward network convergence continue to shift market dynamics in the communications industry and create new business opportunities and challenges. The business models required for long-term success are changing.

In this new reality, turning the service provider’s back office into a strategic enabler is pivotal in creating competitive advantage and achieving new sources of value. At the core of this approach is a strategic network and service inventory management solution that can effectively manage back-office complexity while enabling cost-effective and customer-responsive service delivery.

This white paper discusses how Oracle’s communications inventory management solutions enable this transformation.

THE STRATEGIC BACK OFFICE
Outdated and fragmented stovepipe systems make it difficult for back offices to efficiently and cost-effectively manage the multidimensional nature of the business, such as the need to support multiple technologies, provide a range of services to residential as well as business customers, and manage critical relationships with both wholesale and resale partners. Also, most back offices are ill-equipped to support the emerging customer relationship model that moves the network and customer closer together and enables more-responsive customer service.

To meet these challenges, service providers need to rethink the role of the back office in service delivery. In particular, you need to recognize its strategic value in the end-to-end business process. By putting this vision into action, you can attain business benefits that are usually thought to be mutually exclusive:

- Reduce operational costs while improving service delivery quality and provisioning reliability
- Increase capacity while reducing net investment in network resources
• Improve productivity while reducing staffing levels in both the front and back office
• Increase customer satisfaction while reducing the cost of servicing customers

LEGACY SYSTEMS: HOLDING BACK THE BUSINESS

Service providers used to turn to custom-built systems for managing back-office business processes. Because business and departmental units were more segmented and acted with relative independence, the design of in-house systems was typically driven by local organizational needs. Consequently, many service providers have inherited a highly fragmented back-office operational environment comprised of various stovepipe systems, spreadsheets, and complex databases.

Common Shortcomings of Legacy Back Office Systems

High cost of ownership—The operation, maintenance, and renewal (upgrades) of multiple uncoordinated custom-built systems are resource-intensive and costly.

Inadequate adaptability to future needs—The introduction of new services or support for new technologies requires lengthy development cycles.

Inaccurate, incomplete, and fragmented data—The back office is unable to reconcile data discrepancies between multiple uncoordinated systems and the live network.

Poor operational visibility and resource optimization—System databases and visualization tools for each functional or technology silo are unable to capture complex network relationships.

Poor scalability—The back office is unable to handle increasing complexity and volumes as services extend across multiple technologies and business units.

Poor business planning—Data inconsistencies between different BOSS components result in misleading conclusions and poor business decisions.

In today’s converged business environment, in which services typically span multiple technologies and product bundling is the norm, legacy back-office systems lack the technical and architectural strength required to pull the business together (see the “Common Shortcomings of Legacy Back Office Systems” sidebar).

CREATING NEW VALUE WITH ORACLE’S COMMUNICATIONS INVENTORY MANAGEMENT SOLUTIONS

By leveraging the robust architecture and deep functionality offered by Oracle’s communications inventory management solutions, you can transform the back office from a cost center into a strategic enabler. These innovative solutions provide a strategic lever for back office automation and network evolution and bring the network, customer, and back office together into a highly effective and efficient operating environment.
On an operational level, Oracle’s communications inventory management solutions enable the automation of several tasks, including provisioning management, resource tracking, design and assign functions, engineering workflow management, and capacity engineering. They also integrate closely with upstream customer support systems (customer relationship management and billing) and downstream business support systems (service activation and service assurance) to enable complete back-office and order-to-activate automation.

Although these functions are important, the true value of Oracle’s communications inventory management solutions comes from their ability to enable industry-leading inventory management best practices that create strong competitive advantage.

ENABLING BEST PRACTICES

Maintaining a competitive edge requires rethinking established ways of doing things. With Oracle’s communications inventory management solutions, you can leverage best practices and drive new value and innovation throughout the entire service delivery process.

Bring the Business and Network Together Around a Strategic Inventory Management Platform

Specific technology or service offerings, such as IP services, broadband access, switched voice, and trunk services, are often managed by separate business units with disparate tools and databases. To simplify this complexity, you need to move from a segmented, functional view of the network and service inventory to an enterprise view. You can enable this transformation by leveraging a common network and service repository and the power of a multidimensional inventory management solution.

Leverage the Common Network and Service Repository

As the keeper of network and service information, the inventory platform plays a central role in supporting other BOSS business processes, such as service activation or billing. Leveraging network and service inventory information throughout the entire BOSS infrastructure is essential for streamlining and automating the end-to-end service delivery process, improving decision-making, and enhancing customer satisfaction.

By implementing a common network and service inventory platform across the enterprise, you can automate complex processes in high volumes across multiple technologies. This approach ensures full visibility into all technology assets, including how each piece fits in the overall network and how it is used with other components to provide services and deliver value to the business.
Leverage the Power of a Multidimensional Inventory Management Platform

An advanced, multidimensional inventory management platform organizes and correlates the millions of interrelated facts involved in delivering communications services and brings the business together in ways that were previously thought unachievable.

By leveraging the power of multidimensional inventory, you can achieve real-world business and time-variant perspectives on how services are delivered over complex networks. A multidimensional inventory management platform also allows you to optimize network and service design, by providing a powerful multitechnology and multilayer perspective.

A Real-World Business Perspective

A strategic inventory management solution supports the management of real-world business concepts and facts that go beyond the technical network. For example, when new network equipment is added or removed, there is a corresponding impact on the related physical, environmental, and financial dimensions of the business. Plant managers must assess the impact on available floor space, the power supply, and environmental heating restrictions, and financial managers must ensure that the recorded value of network assets is updated in the financial audit system.
Also, network resources used to deliver services often come from a variety of sources, including components that are owned, leased, and wholesaled, both to and from other providers. From an organizational perspective, it’s critical to have automated systems in place that can manage third-party orders and ensure compliance with service-level agreements. From a financial or revenue assurance perspective, it’s imperative to track third-party transactions and ensure that there is coherency between network leases and revenue. When a connection to a third-party resource is terminated on the network, automated interfaces must ensure that payments for the leased service are also terminated.

Another important yet often overlooked business dimension of the back office is the need to manage the thousands of logical and virtual resources—telephone numbers, IP addresses, virtual ports and paths, dial plans, and routing tables. Although intangible, logical and virtual resources are business assets with associated costs and revenue-generating potential. To minimize costs and maximize revenue, the network and service inventory OSS must move beyond a simple asset-tracking approach and support the full lifecycle management of these assets.

Finally, a strategic back-office inventory solution must support a geospatial understanding of the business, by detailing all network and service dimensions required to serve a geographic market. This perspective significantly enhances business planning for making sales, marketing, and network operations decisions on how to efficiently and cost-effectively expand a coverage area or offer service in a new area.

**A Time-Variant Perspective**

An innovative inventory management solution must model and manage the hundreds of complex lifecycles that customers, services, and network configurations have in the real world. It must provide mechanisms for managing various lifecycle states—such as pending, planned, in-service, and suspended—and provide intelligence on what has changed over time. The inventory system must also understand business processes across the enterprise in terms of projects, internal work orders, and customer service orders. As a time-variant information engine, the inventory OSS must enable much tighter control over the business and provides proactive answers to time-sensitive business questions.

**A Multitechnology and Multilayer Perspective**

The inventory OSS must support a multitechnology and multilayer approach that captures the complete end-to-end environment. By capturing and integrating all technology domains—from DSL to IP—in a common inventory system, you can finally optimize operations by applying consistent network management principles and by identifying where and how different technologies interact in the network.
With this perspective, you can quickly navigate between the different open systems interconnection (OSI) layers to identify dependencies and perform root cause analysis in the event of a network or service problem. This functionality also allows you to establish and enforce capacity utilization rules across and between layers, as well as understand complex relationships between different technologies and resources from two perspectives: the service view and the network resource view.

![Diagram: Multitechnology and multilayer perspective](image)

**Figure 5: Multitechnology and multilayer perspective**

The service view details—from the customer’s perspective—how a service is actually delivered on the network. Using this view, you can quickly identify all resources that support a specific service, including network equipment and supporting OSI layers. Alternatively, a systemwide network resource view that details all resources, links, layer dependencies, and capacity utilization restrictions is critical for network operations, troubleshooting, and engineering planning.

**Streamline Service Fulfillment Integration**

A fragmented service fulfillment approach hampers rapid service delivery and zero-touch automation of the order-to-activate cycle. With few vendors offering a complete end-to-end order-to-activate service fulfillment solution, most service providers implement point solutions in provisioning management, inventory, and service activation, resulting in cumbersome and imperfect alignment between different OSS systems.

““When service providers choose many best-of-breed [point] systems, the integration required to make them work together often acts as a barrier to faster service deployment due to cost and time factors.” —The Yankee Group

To fully automate the order-to-activate service fulfillment cycle and enable rapid service delivery, the overall service fulfillment solution must integrate the three key service fulfillment functions: provisioning management, inventory management, and service activation. This is best accomplished with a modular, fully tested, end-to-end order-to-activate solution from a single vendor. Unlike piecemeal service fulfillment systems that require expensive integration work, a modular order-to-activate solution is prebuilt and designed specifically to streamline and maximize efficiencies in the overall service fulfillment cycle.
"A best-of-suite approach can often save millions in integration costs and provide the foundation for faster service deployment."
—The Yankee Group

Figure 6: Modular order-to-activate solution

Interactions between service fulfillment components are rationalized to ensure complete synchronization and fail-safe tracking of dependencies. For example, when a service order is received, an order-to-activate solution automatically generates a workflow, selects and assigns necessary network equipment, and—within seconds—sends commands throughout the network to fulfill the order. This accelerates service delivery times, increases profitability, and enhances the overall customer experience, by providing full visibility into the entire provisioning process, including the ability to easily discern service availability, identify bottlenecks, and assign realistic due dates.

As you move toward a converged network and customers increasingly demand bundled services, the integration of provisioning management, inventory management, and service activation service fulfillment functions must extend beyond a single service dimension. It must also support the simultaneous provisioning of multiple services across multiple technologies. This capability enables you to capitalize on the converged network’s biggest value proposition: the ability to significantly reduce time to market and lead in service innovation by quickly bundling a range of voice, data, and video-streaming services.
Manage Data Integrity as a Strategic Asset

Achieving high data integrity across the business is a strategic priority and critical corporate responsibility. Whereas high data integrity leads to higher margins and a strong return on investment, low data integrity is a liability that constrains the business, drains resources, and inhibits growth (see the “Business Costs of Low Data Integrity” sidebar). As governments continue to legislate strict and comprehensive auditing measures (such as the U.S. Sarbanes-Oxley Act), service providers are legally mandated to maintain—for all internal audit systems—the highest level of data integrity.

In a nutshell, you need to manage data strategically to outmanage, outplan, outsell, outservice, and outperform the competition. To do this, the inventory OSS must become a data integrity enabler and automate real-time inventory/network data synchronization.

Transform the Inventory OSS into a Data Integrity Enabler

When implemented at the enterprise level, a strategic network and service inventory OSS is a natural data integrity enabler for the entire BOSS infrastructure.

Figure 7: Enabling data integrity

To enable this role, the inventory solution must provide a common network and service repository for all back-office operations. It must also adhere to leading industry standards initiatives (such as OSS through Java [OSS/J] and the TeleManagement Forum) that define a common information model and set of interfaces for sharing information. These standards enable you to quickly set up automated interfaces between the inventory OSS and other related BOSS business processes.
By transforming the inventory OSS into a data integrity enabler, you can reduce the number of disparate databases and eliminate the complexities of managing data from multiple sources. Information is captured only once, and data integrity is enhanced as manual handoffs in the business process are eliminated. Automated interfaces enable billing, provisioning, interconnection, mediation, and assurance systems to constantly query a common network and service repository for a single version of the truth. This ongoing dialogue between the inventory OSS and related BOSS processes ensures that common data integrity problems (such as revenue leakages or cost drains) are quickly detected and resolved.

**Automate Inventory/Network Data Synchronization**

The task of synchronizing the inventory OSS with the network is overwhelming, given the complexity of the network. Field changes, self-healing networks, and equipment failovers all contribute to an ongoing state of change.

To provide clean data to other BOSS processes, the inventory OSS must support a sophisticated data integrity management platform that carries on a regular dialogue with the network to ensure that the back office and the network are always in agreement. Network and service discovery reaches into the network to find and catalog network resources. By identifying how network resources are configured and what services are using them, the discovery process provides a true and comprehensive view of the live network.

A reconciliation process then integrates the live view of the network and services with the inventory view to ensure ongoing alignment. Discrepancies in both the physical and logical network are automatically identified and resolved through a rules-based approach that enforces strict processes involving timing, translation, matching, correlation, and synchronization.

**Unlock Information for the Business**

By leveraging rich multidimensional inventory intelligence, a strategic network and service inventory solution can significantly enhance decision-making throughout the enterprise. To do this, it must deliver the right information to the right stakeholders at the right time and support a time-variant information perspective that enables proactive planning based on past trends and future needs.

**Deliver the Right Information to the Right Stakeholders at the Right Time**

As the repository of millions of network and service facts, an inventory system can provide a wealth of business information. A strategic network and service inventory solution must pull together as much or as little of the network and service inventory picture as needed to drive business decision-making throughout the enterprise. This requires a user-centric approach in which network and service inventory information views are customized to support job-specific needs:
• Executives need timely, concise information for measuring overall business performance, including information on order volumes, asset utilization, and workforce productivity.

• Revenue assurance personnel need to identify discrepancies between billing records and services delivered or received.

• Marketing and sales personnel need statistics for evaluating the success of various service offerings.

• Customer service agents need real-time information on the progress of service orders and how network problems affect customers.

• Field technicians need real-time access to work orders and network configuration information.

• Network engineers need an accurate database of record for tracking and managing network resources and capacity.

• Operations personnel need real-time status reports that identify bottlenecks and track the progress of service and work orders.

The solution must also enable either process-oriented, navigational, or dashboard information delivery approaches. For example, service provisioning tasks benefit from focused and process-oriented information views, service assurance tasks require a navigational approach that is conducive to research and troubleshooting, and management tasks are best served by dashboards that provide high-level summaries but also support drill-down access to more-detailed information when it’s needed.

Finally, given the dispersed nature of most service provider organizations, the network and service inventory OSS must support remote access through a secure Web-based portal. This enables remote stakeholders (such as field technicians) to access network and service intelligence directly from the work site as they need it, eliminating costly data rekeying, scrubbing, and error-prone manual handoffs.

Leverage a Time-Variant Information Perspective

Unlike traditional inventory systems that are tactically focused on the immediate needs of the business, a strategic network and service inventory OSS must support a time-variant information perspective. A time-variant capability enables the business to look into the past, present, and future and facilitates a planned and strategic approach to business decision-making.

For example, the task of optimizing network capacity and planning for future demand is overwhelmingly complex, given that network usage patterns are continually evolving. However, managing capacity requirements is critical for running a profitable business. Without actual numbers on network and equipment utilization—that can be projected over time—you may overspend on capital investments and negotiate less-than-optimal leasing or wholesale agreements. Poor
capacity projections also result in service problems when limits are exceeded or erode margins when capacity is underutilized.

By closely integrating the inventory OSS with network monitoring tools, you can access detailed records about past and current network configurations and then correlate them with capacity utilization information. This analysis enables you manage capacity not only from the perspective of the here and now but also with an eye to pending plans and activities.

Through trend analysis, you can proactively pinpoint when a network configuration will near its maximum capacity and drive upgrades and grooming accordingly. You can also predict large spikes in usage due to repeatable events (such as a sports event) and make temporary capacity adjustments to accommodate increased demand.

Enable the Strategic Customer Relationship

Responsive customer service is possible only when you have a clear view of how customer services are delivered on the network. To close the gap between the network and the customer, a strategic network and service inventory OSS must enable real-time bidirectional interoperability with upstream customer-facing systems (such as order capture, billing, and customer relationship management systems), to ensure alignment between back-office and front-office processes.

![Figure 8: Enabling the strategic customer relationship](image-url)

The solution must enforce a consistent view of customer services across the enterprise. It should provide a common picture of past, current, and future activity
with the customer, including information on currently assigned services and inventory, as well as provisioning orders in progress.

A strategic inventory management solution must also sort out and simplify the complexity inherent in customer services that rely on diverse parts of the network. This involves managing services as a distinct layer between customers and the network and providing an end-to-end view of how services are delivered on the network. This enables you to relate customer services to the logical and physical network resources involved in their delivery, regardless of whether these resources are owned or leased, or whether the services are provisioned on a multitechnology, multilayer network.

Customer service becomes a true differentiator when it is proactive and exceeds customer expectations. Here, a strategic network and service inventory OSS can play a key role. During initial service delivery, the inventory system can enable the automatic reservation of network capacity when a service request is received, thereby guaranteeing service as soon as the customer places the order. It can then provide automated, proactive notification to upstream customer-facing systems at key milestones throughout the service provisioning process.

The solution must provide tools for automatically assessing the impact of network problems or upgrades on customer services. These tools allow you to quickly isolate the problem, determine its impact, and contact customers before they even realize there is a problem. When scheduling routine maintenance, you can use these tools to identify the best time for upgrading equipment and then notify customers in advance.

**Reduce Costs Through Automation**

Reducing costs and maximizing margins is a key driver in business performance. A strategic network and service inventory solution can significantly reduce operational expenditures (OPEX), by streamlining and automating service design, network change processes, and engineering buildouts.

**Automate Service Design**

Due to the multitechnology, multinet, and multilayer nature of most services and the fact that networks typically contain thousands of network elements and nodes, the manual design and creation of services is a time-consuming and error-prone process.

To simplify service design, the inventory OSS must leverage built-in algorithms and intelligent path analysis functions to automate the process. These features enable network engineers to quickly identify—after selecting just a few key criteria—an optimal service design based on rules such as least-cost routing, diversity, quadriversion, and preferred carrier. The tools should also return multiple service design options. Once an optimal service design is identified and selected, the
inventory OSS assigns network elements to the end-to-end service to ensure effective tracking of service details and capacity requirements.

Because most services span multiple technologies, networks, and OSI layers, the value of automated service design is directly related to its ability to provide a complete end-to-end view—from optical to IP—of all components used to provision the service. It must handle the complexity inherent in networks, such as the ability to traverse network rings and multiple OSI layers and take into account embedded networks.

Automate Network Change Processes

Implementing critical business goals on the network (such as network expansion and technology upgrades) presents huge operational and cost challenges. Although the business goal may be straightforward, the impact on the network is often complex and involves thousands of discrete changes. Business-related network changes typically consume enormous amounts of resources for technical analysis, troubleshooting, and manual reconfiguration.

The challenges of large-scale network change can be dramatically reduced by the automation of complex steps in the grooming and rehoming process. Grooming is used to move capacity in the network to areas where it is needed the most. Rehoming is used to alter the switching hierarchy in the network to better support current usage patterns.

Mass network change automation tools facilitate the process of translating a high-level business need into an exhaustive list of the underlying tasks. This involves generating a complete workflow of all discrete tasks, managing dependencies, and orchestrating the complex sequence of activation and deactivation states. These automation tools must generalize the network reconfiguration process as well as support customization. Finally, they must be configurable and require only minimal programming, enabling a service provider to easily tailor implementations to its unique network environment.

Standardize Process-Based Engineering Buildout Tools

As your company grows in scale, through regional or global expansion or acquisitions, there is a need to standardize ad hoc engineering buildouts across sites. Too often, network expansion and maintenance projects are managed by manual processes and are left to each site’s local interpretation of best practices. The downside of localized approaches to managing network change is that

- Accountability to the head office is less visible
- Buildouts are more error-prone
- Service delivery often takes much longer
- Operations costs are higher, due to duplication in network planning functions at each site
To streamline and standardize network buildouts and maintenance across the enterprise, you need to implement engineering process tools—such as standardized network design templates and engineering work orders—that enable greater automation. When integrated closely with the workflow management and inventory systems, these tools facilitate the management of network projects—big or small—from planning to completion. They enable you to optimize the buildout process by identifying all affected resources, tracking dependencies, and providing status updates to ensure the optimal allocation of resources. These tools must be capable of handling all buildout situations, including multitechnology and multisite buildouts, customer-initiated requests, and general maintenance.

Enable Network and Service Transformation

Customer needs, technological developments, and the competitive landscape are continually undergoing change in telecommunications. To evolve seamlessly and cost-effectively with each market development, you need to implement a flexible and standards-based inventory architecture that supports productized solution modules and an evolutionary approach to network and service transformation.

Implement a Flexible and Standards-Based Architecture

Adhering to industry standards facilitates a cost-effective evolution of the entire BOSS infrastructure, by enabling rich out-of-the-box functionality and ensuring interoperability between components sourced from different vendors. Because leading industry standards initiatives, such as OSS/J and the TeleManagement Forum, are continually undergoing change, you need to seek out OSS vendors that are active participants in their development.

The OSS/J initiative promotes a set of standards-based APIs that lower the costs and risks of integrating various BOSS components into the business. From an inventory point of view, an extensive library of standards-based APIs is key to automating the exchange of network and service information with other systems in the BOSS architecture. The TeleManagement Forum promotes the shared information/data (SID) model for next-generation services.

Leverage Productized Solution Modules

Productized solution modules are optional software add-ons that provide prebuilt out-of-the-box support for specific families of services and/or technologies—such as IP, multiprotocol label switching (MPLS), DSL, or Voice over IP (VoIP). They enable you to quickly, cost-effectively, and seamlessly evolve the inventory OSS to handle emerging business needs.

When all BOSS components adhere to a common information model, you can optimize business processes and enable a service-oriented architecture (SOA) that is fully adaptable to the evolving needs of the business.

Productized solution modules provide ultimate flexibility and agility in a multitechnology environment.
Productized solution modules not only reduce time to market and time to revenue but are also key to lowering the total cost of ownership of the overall solution. Solution modules allow you to cut costs by selecting only those capabilities that meet our unique business requirements.

**Take an Evolutionary Approach**

One of the biggest challenges facing service providers is how to cost-effectively transition from legacy OSS systems to a strategic network and service inventory platform without disrupting service or jeopardizing financial performance. The complete evolution to a strategic back office can take years.

To reduce the risk involved in this process and protect existing investments, the COTS network and service inventory OSS must support a staged approach. In particular, it must interoperate with existing legacy OSS assets, including legacy inventory systems, while supporting the evolution to a centralized inventory for all network and service resources. To do this, it must support a federated data approach. It must also enable an efficient and accurate process for gradually migrating data from legacy systems to the new common network and service repository, allowing you to transition a limited number of services, technologies, domains, or OSS functions at a time.

**CONCLUSION**

By implementing a strategic inventory management platform and sound inventory management practices, you can leverage innovation and drive value throughout the entire service delivery process. Unlike custom-built inventory systems that have limited capabilities and lack flexibility, Oracle’s communications inventory management solutions are key enablers for back-office automation.

By offering a wide range of productized benefits and a strategic platform for network and service evolution, these solutions create competitive advantage, by automating core operations, simplifying back-office complexity, and engineering the service delivery model to meet specific customer satisfaction and business objectives. These capabilities bring all aspects of the business—the network, the customer, and the back office—together into a highly effective and efficient operating environment.