Improve Your Quality of Service Provisioning with Automated Network Resource Management

How network resource management automation can improve service profitability, customer satisfaction and operational efficiency

Innovative resource network management can reduce stranded assets, enhance service activation processes, improve customer loyalty and ultimately boost revenues.

This white paper addresses why network resource management tools are an ideal approach in today's economic environment to:

- Boost service revenues
- Reduce stranded assets
- Improve customer satisfaction through enhanced capacity planning and reduced repair intervals
- Evolve your network by integrating new solutions into existing platforms

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Introduction

In today's economic climate, enhancing the management and use of your network resources will not only pay huge dividends but help you improve provisioning processes that will ultimately enhance customer satisfaction and help reduce churn. Carriers continue to focus on four key areas to improve their financial footing and improve day-to-day operations. They are:

1) Boosting revenue through faster activation of services.
2) Reducing stranded assets through synchronization of the network with inventory databases (also known as Resource Management).
3) Improving customer satisfaction via cross-domain sectionalization (fault and network performance).
4) Evolving the network by integrating new solutions into existing platforms.

All four of these key areas are affected by the carriers' resource management strategies, so it is important that any new network resource solutions also address these issues.

One North American long distance service provider best described their transition to network resource automation as "With our previous system, as we used it, the data got dirtier. With our (new) automated system, if used constantly and correctly, the accuracy of the data only improves. The software will not allow incorrect information to get into the database."

When planning operational efficiency improvement strategies, it is important to consider the concepts within this document before reviewing the multitude of network management systems arriving on the market today, for not all are created equal.

Flow-Through Provisioning

There is a great deal of debate around flow-through provisioning of services. There are some who consider the ultimate goal of provisioning to be when 100% of the service provisioning interval is automated, with no human intervention apart from the initial "push of a button." However, this view distracts one from the key issues that need be addressed. The impact of automating particular transactions will not always justify the investment, and there are many instances where manual intervention – the human confirmation of a service order, for example – is desired. Experience shows that automation projects often fail to achieve their target, because the data available to support the provisioning process is inaccurate. Flow-through provisioning is only as good as the accuracy of the network resource data. If a carrier has 100% flow-through, but the network resources remain inaccurate, there will be a very large percentage of fallout and manual rework necessary. The cost savings of unnecessary re-keying of customer information, synchronization of resource data and the synergy of linking the appropriate systems together prove to be the real value of flow-through.

Resource Versus Inventory

Historically the function used to track and manage the physical assets of a network has

been referred to as an inventory database or repository. Today, it is more commonly referred to as resource management. The two great challenges and opportunities in this area lie at opposite ends of the spectrum. The first is managing intangible resources, such as IP addresses, subnets and VPN domains. While they do not exist physically, they make up a carrier's primary revenue-generating assets. The second is managing the class of assets that are vital to networking, but will never be able to report their own status – namely, fiber patch panels, DSX, MDF, FDF and patch cords. A complete solution includes the management of physical and logical assets that can be detected and accounted for electronically, as well as physical assets that can only be properly tracked and managed with the support of technicians.

Logical Versus Physical Connectivity

It's important to distinguish between logical and physical connections, as the majority of today's inventory management systems today can only track physical assets. Logical connectivity and resources have become a large part of assignable and recoverable network assets. Additionally, knowing the physical connectivity alone doesn't give any indication of available capacity. Service providers are no longer able to perform accurate end-to-end capacity management because their inventory systems do not manage their equipment with an end-to-end view. Instead, their systems manage the inventory on an entity view. That is, if a 3/1 DCS is defined as an entity, its capacity is managed without regard for the network capacity that its DS1s or DS3s provide within the network architecture. .As a result, it is extremely challenging for a service provider to identify the true end-to-end capacity available to them at any time.

Peer Systems And Interfaces

In the last five years, the industry has changed its opinion on inventory management databases. Today, referred to as Resource Management (to reflect the growing importance of logical assets in addition to physical ones), the resource manager is simply a central database for a variety of resource classes surrounded by a series of open interfaces to receive and distribute the database contents. While the information stored by the database varies widely, it generally falls into one of three categories: services, physical, and logical entities. Examples of physical resources include network elements, circuit packs, ports; logical resources include IP addresses, virtual circuits, end-to-end paths. Services can group all the entities needed for an end-to-end service – a 10/100 Ethernet connection for example – as well as parameters typically defined by a customer service agreement. These might include tariff information, security parameters, and guaranteed availability conditions. A wide variety of peer OSS systems deposit or request information from a resource manager's API. At the core, its purpose is to provide an accurate and synchronized view of the network, reduce data entry and improve reporting, views and file transfers to peer users.

Flow-Back

Flow-back is a feedback mechanism to keep the network in synch with the central repository. It is a method by which new equipment installed in the network can report its current state, discrepancies can be flagged, and the data can be organized and catalogued in the central repository for dissemination and use within a carrier's back

office. Diagram 1 below shows the steps involved in flow-back, beginning from the network element and ending at the central resource repository.

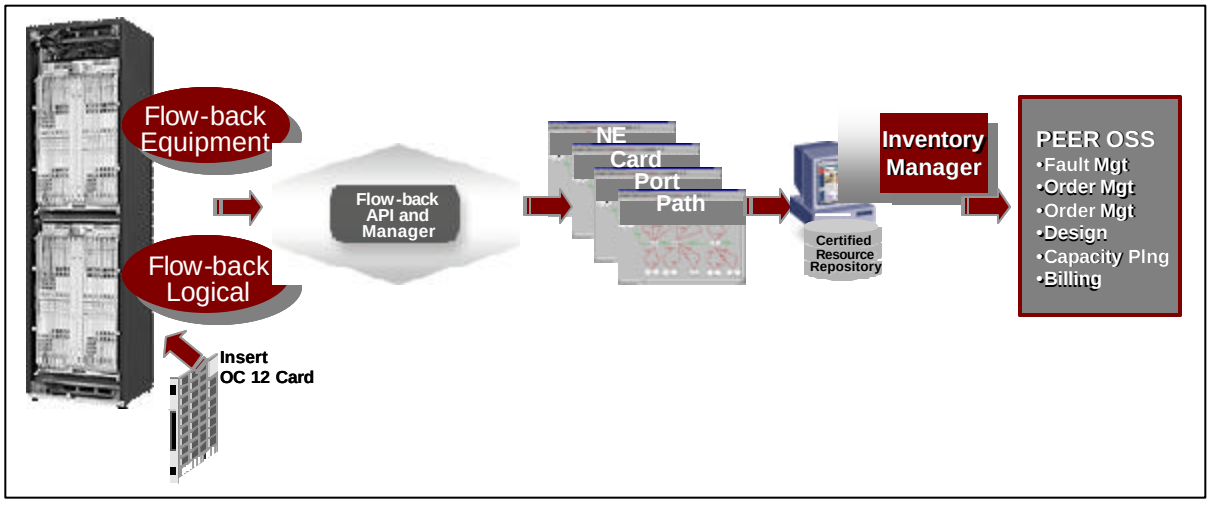
Resource Manager Value Proposition

To understand the resource manager's value to a service provider, you must first look at why current legacy systems are no longer sufficient. First, new network elements and services cannot be modeled and supported by legacy inventory systems in a timely and capital efficient manner. Second, inventory systems are not driven by network data and do not maintain an accurate view of the network. These two realities lead to longer service introduction intervals, increased stranded capacity, increased dispatches and longer mean time to repair (MTTR) periods. This means lower ROI, higher cost of goods sold, lower quality of service, increased customer turnover and missed business opportunities.

Checklist of Benefits and Characteristics

A resource manager coupled with flow-back (Diagram 1) is a solution for any service provider with a next-generation telecommunication network that needs to speed up service activation and reduce the cost of maintaining that network. The key is knowing what resources are available and how they are being used. As communications networks become more complex it becomes increasingly important to have a simple, flexible and consistent way to manage and maintain how networks are configured. The following paragraphs introduce necessary functionality and characteristics as well as key benefits that should be a part of any new resource management system.

Diagram 1: Steps involved in flow-back



Centralized and Accurate Repository for Logical and Physical Assets

There is a great deal of value created when a single centralized repository can take an accurate inventory of entire networks and make the data available in a useful format across a service provider's entire operational systems environment. A complete solution

includes the management of both physical equipment and logical assets, that can be detected and accounted for automatically, as well as physical assets, such as fiber patch panels, distribution frames and patch cords, that can only be properly tracked and managed with the manual entries from technicians. It is fundamental that flow-back, or a similar feedback mechanism, is in place to correct and maintain accurate data.

Accurate Network Models

The resource repository contains both physical and logical inventory of the network. Coupled with design capabilities and a workflow manager, it allows a service provider to answer "does my network have the resources available to service a customer's request". It is important that new services and equipment be modeled quickly and cost-effectively. It is also important that the system can do this accurately and completely. Despite today's increasingly complex networks it is possible to accurately model a network with the following six objects: site; equipment; cable; path; segment; customer. The customer object is very valuable as it allows a carrier to trace a network asset or network alarm back to the end customer. And understanding a service's logical path can address a number of challenges that carriers face today. Similarly, a single carrier rarely can serve end-to-end services, so it is vital for a service provider to include off-net segments provided by third-party and partner carriers.

Open, Flexible Interfaces And Development Toolkits

Due to the large variety of OSS systems that peer with a resource management system as well as the vast number of different equipment vendors and network elements that the resource management system must recognize and support, open and flexible interfaces are critical. And since it is not possible for every interface and element to be supported out of the box, in addition to open APIs, a software development kit (SDK) needs be provided for customer and third-party developers to quickly add support for new applications, services, and equipment.

Surround Strategy for Integration with existing Environment

Contents of telecommunications networks span many different vendors and as many generations of equipment. Additionally no new system can be expected to provide 100% backward compatibility and coverage of services. And while carriers expect to continue receiving a return from previous investments, existing inventory systems only model older technology and it is development intensive to get them to model newer technology. Therefore it is important that there is a strategy for encapsulating older systems and integrating newer ones. A gateway between these two domains can coordinate overall service delivery, help gradually phase out old equipment, and offer the benefits of integrating newer network technology.

Ease of Data Entry

Flow-back allows for the automatic and accurate view of intelligent network element resource data. Today however, intelligent NEs will not typically make up 100% of the equipment in a network. This remainder is made up of passive elements such as MDFs, fiber patch panels and cables that are found throughout a carrier's network and require

manual entry. The resource system must support the data entry and management of both intelligent and passive network elements. In addition to automatic flow-back this includes manual keying as well as batch loading for bulk work orders, network overhauls and company mergers.

Ease of Use and Integration to Operations Processes

We've demonstrated how new technology can improve carriers' day-to-day operations, but this alone will not eliminate current challenges. A carrier must also address the procedures that drive behavior inside the business. Overhauling existing manual and mechanized processes, updating the metrics and reward systems to increase the importance of maintaining a clean network, are also important. The best way to avoid data entry short cuts which lead to network inventory inaccuracies is to create a simple, and easy-to-use resource system.

Value of Reports

For technicians and engineers the useful information produced by the system takes on many forms. This could be IT utilization reports, WORD documents, CLRs, rackdraws, and GIS maps. It is important that the standard reports that resource management system provides, has a variety of "windows" into the information stored in the database, as well as the flexibility to create customer reports.

Business Value

The benefits identified above should translate into faster introduction of new services, reduced daily provisioning cycle times, reduced number of held orders, reduced MTTR, staff productivity gains, reduced stranded capacity and true asset management. In business terms the results are faster revenue recognition, maximized use of capital, increased return on assets, reduced operational cost, and increased customer satisfaction. As an example, if the average mid-sized carrier has a billion dollars invested in equipment and its inventory is out of synch by 30% then that means there is 300 million dollars of lost CapEx that will have to be replaced.

Lucent Navis® iOperations Software for Automated Inventory Management

Lucent Technologies offers an innovative software tool, *Navis®* Resource Manager, that enables service providers to automate inventory management, discover resources and reconcile networks. The software automatically delivers an accurate, synchronized view of network data, including logical assets in addition to physical ones, and makes this data available to the service provider's operations environment through and an open interface platform using XML and other standard APIs. A variety of multi-vendor and multi-technology devices, including wireless, optical and IP are supported with extensibility to support new services.

Upon deployment, *Navis®* Resource Manager is configured to be the database of record for all resource information: physical, logical, IP. With the aid of resource flows, it

receives ongoing updates on physical status and logical connections from network elements to maintain an up-to-date accurate view of resources. Its innovative state-of-the-art data flow design contains features that facilitates zero-touch activation, reduces provisioning fallout and provides topology to fault management systems to support accurate cross-domain root-cause analysis for reduced repair intervals.

Lucent *Navis*® Resource Manager is field proven to provide extremely high resource data accuracy which helps lower operational expenses for provisioning and service assurance as well as reduce capacity investment requirements by fully utilizing network assets.

Greenfield Versus Embedded/Existing Networks

While it is possible to identify and recover lost network assets in today's present mode of operation (PMO) in order to re-deploy them as new revenue generating services – every service provider has facilities and equipment recovery groups that do just this to identify and reclaim lost network assets – the risks of doing this are quite high. Research* shows that most networks today are running 25% to 45% out of synch from their inventory databases. However, a company with a PMO solution cannot recover all the misplaced and unaccounted network assets regardless of the time and personnel it throws at this problem. At best, many recovery teams can only need to keep the current level of inaccuracies from getting worse.

The primary business of a facilities-based carrier is connecting new service, and assuring the quality of existing service. This reality will always takes precedence if over the recovery of a network resource, there is any doubt as to whether it belongs to a live service. It is far worse to cause a service outage while recovering an asset thought to be out of service, than it is to leave a stranded asset in place, complicating the network and not providing any revenue.

Just the thought of an error that brings down a financial institution or other large customer's service for 10 minutes is enough to realize that asset recovery today must be a very conservative and well organized process. The result of a mistake, leading to credits issued to the customer, bad publicity for the carrier, and reprimands for the technician far outweigh the incremental revenue the recovered asset could ever bring in. Because of this risk, recovery efforts should not be overly aggressive.

Even in the case of a flawless recovery, the time and money spent needed to ensure (across various databases and domains) that a port or cross-connect that is no longer active, can easily outweigh any future value the port as a recovered resource could ever generate. The conclusion is that only the "lowest hanging fruit" – the simplest, easiest and best documented assets – can be recovered in today's PMO.

The solution is a system that reduces network inaccuracies and simplifies the time and effort needed to find and reclaim lost network assets. This is especially true for established carriers with a great amount of legacy equipment. The way to break the cycle of inaccurate resource data is to put in place a system that can support and track all new equipment going forward and properly integrate with a carrier's existing capital investment in back-office systems and network equipment. In this way, new equipment is maintained synchronized with 95% or better accuracy, while over time – as customers change and upgrade their existing services – the current network inaccuracies are taken offline.

The real value in a resource management system occurs when its data is shared with peer applications. XML files containing information on equipment, services and logical resources, lead to a vast improvement in operations. Rack views for a network engineer turning up capacity, for a work order, trails and termination point reports for technicians closing trouble tickets, and sub-network data shared with a fault management system to facilitate the cross-domain root-cause analysis, and a view into available capacity across a multi-carrier segment to facilitate a complex circuit design, are all examples where an accurate network database pays dividends to the operations environment.

Conclusion

In today's competitive environment, Service Providers must maintain accurate records of all network resources. Without a resource management system, carriers must resort to a collection of manual initiatives including email, spreadsheets, databases and proprietary systems that individually can only give an accurate view for a subset of the network. In this type of resource management environment, service design and service maintenance is slow, error prone and expensive. When Service Providers can capture network resource data, create an accurate physical and logical representation, and make this data available throughout a service provider's operations system environment. This results in faster revenue recognition, maximized use of capital, increased return on assets, reduced operational cost, and increased customer satisfaction.

Lucent Technologies Navis® iOperations Software Portfolio

Lucent Technologies *Navis*® iOperations Software provides a comprehensive portfolio of network and operations software including provisioning, engineering, assurance and revenue recovery solutions, built on extensive programmable multi-vendor, multi-service, multi-technology platforms. Lucent award winning network management solutions support the migration to service intelligent operations, enabling advanced, on-demand service offerings -- all while improving efficiencies, significantly reducing operating expenses and delivering the Quality of Service that customers demand.

For more information, contact your Lucent Technologies sales representative or call 1-888-426-2252 or visit the Lucent Technologies web site at www.lucent.com/oss.

* RHK March 2002 OSS Global Forecast report.

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