


## TIME TO RETHINK NETWORK MANAGEMENT

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Telecom network management has traditionally focused on polling mechanisms to provide snapshots of network events. As network data speeds and volumes accelerate, especially in mobile data networks, it is time to rethink how network management is performed and the solutions that are needed to scale with future demand. Network probes providing real-time data have been identified as a strategic component of a more customer centric approach to network management.

The background features a complex network of thin, light blue lines connecting small dots, set against a warm, abstract gradient of orange, yellow, and red. The lines form a dense, interconnected web that fills the entire frame. The colors transition from a deep orange at the bottom to a bright yellow at the top, with some darker red and black accents. The overall effect is one of dynamic energy and connectivity.

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**Telecom networks are under pressure, especially mobile data networks. Carriers are challenged like never before both technically and commercially. This situation is not new, just aggravated with no sign of relief in the future.**

The solution, many agree, is for carriers to adopt a more customer centric approach with focus on two key areas:

- Innovative product and service development
- End-to-end customer experience management

Network management thus becomes a central, strategic foundation for supporting a more customer centric approach. Significant work and progress has already been completed in establishing the necessary frameworks and solutions.

The key to success will be bringing all these solutions to bear at “the moment of truth” where the customer interacts with the product or service. The new challenge is achieving this at high speed in the face of exponentially increasing amounts of network data.

Network probes have been identified as a critical part of meeting this challenge. Strategic use of powerful passive and active probes at critical points in the network can provide the means for carriers to react quickly and adapt effectively to highly dynamic situations with built-in scalability and the ability to grow as the network grows.

## UNDERSTANDING THE NEW CHALLENGE

The challenges that telecom carriers are facing are not new. Carriers have known for some time that they could be relegated to the role of “pipe vendors” in an increasingly Internet dominated world. They are also aware of the potential for a “scissor effect” where costs increase in line with network traffic while revenues remain stagnant.

This is not news. What is disturbing is that the situation is becoming aggravated by the increase in speeds and exponential growth in data traffic, particularly mobile data,

as the innovation in Internet-based services and smarter devices is threatening to disintermediate telecom carriers. Cloud computing is also a trend that can threaten to sideline carriers as customers build relationships with cloud service providers who have the potential to become vital business partners for these customers.

But, this need not be the case. Telecom carriers have two critical assets:

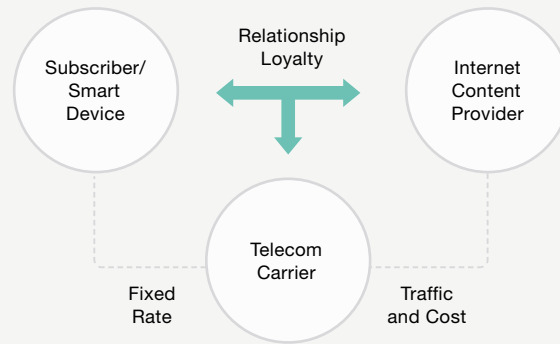
- the network infrastructure and expertise in operating and managing networks
- ownership of the vital last-mile connection to the subscriber

In this regard, it is difficult to ignore the role that carriers can play and this is the opportunity that carriers can pursue, namely operating and managing networks efficiently and using this capability to provide customer service better than any other organization could hope to match.

## ADOPTING A CUSTOMER CENTRIC APPROACH

Telecom carriers have traditionally been utilities providing a “take-it-or-leave-it” service. Before de-regulation, it was not uncommon to see waiting lists of several months for telephone installations. Even though carriers have moved on, customer perceptions can still be grounded in these earlier experiences. In such circumstances, it is not enough to provide the same customer service as in other industries; one has to significantly exceed expectations to change the prevailing perception.

In essence, carriers must make the transition from utilities to retailers with a customer centric focus. Most carriers now recognize this need and recognize that network management is a central part of this transition. Indeed, it could be the difference between becoming a central part of the customer’s value chain and being sidelined.



**FIGURE 1**  
Telecom carriers risk being sidelined with all the costs unless they can create value and loyalty in their relationships

### RETHINKING THE NETWORK MANAGEMENT CHALLENGE

Carriers are already accomplished network managers with significant investment in Operation Support System/ Business Support System (OSS/BSS) infrastructure. The Telemanagement Forum (TMForum) has successfully brought carriers, vendors and others together in defining business and technical frameworks that allow complicated multivendor network management solutions to be realized.

Nevertheless, the one area that has been overlooked is data collection. This is, in part, due to the historical focus on connection-oriented networking technologies such as PDH, SONET/SDH, ATM and now OTN, which provide rich network management overhead information in their networking protocols and lend themselves well to the traditional CMIP and SNMP polling mechanisms that have been the foundation of network management for decades.

Unfortunately, Ethernet and IP protocols do not provide the same network management support and do not lend themselves well to this approach. Ethernet and IP protocols are essentially connection-less, bursty and dynamic. To manage them, it is not enough to know what happened a second ago as the situation could have changed drastically since then. In the space of a second, up to 30 million packets per second can pass through a 10 Gbps port.

Carriers have already recognized this and have been using network probes to monitor critical Ethernet/IP connections in real time as a supplement to information provided by traditional network nodes and interfaces. The positive experience with the use of probes is now driving recognition that probes can become a strategic cornerstone of future network management initiatives.

### SUPPORTING A CUSTOMER CENTRIC APPROACH

The TMForum has recognized the strategic value of probes as part of their Managing Customer Experience (MCE) initiative for end-to-end customer experience management. A similar conclusion has been drawn by the IP Network monitoring for QoS Intelligent Support (IPNQSIS) project, which is part of the European CELTIC-Plus program. In both cases, network probes have been identified as critical to providing insight into how the network is performing and how the customer is experiencing the service.

Two types of probes are identified:

- Passive probes for off-line network performance monitoring and analysis, sometimes combined with deep packet inspection capabilities
- Active probes for traffic injection used for simulation of user behavior, but also network emulation

Common for both is the ability to provide a real-time view of what is happening in the network, as it happens, a capability that opens a wide range of possibilities for carriers.

### MEETING THE MOMENT OF TRUTH

Jan Carlson, the former head of Scandinavian Airlines (SAS) famously defined the term “the moment of truth”. It is the moment when the customer meets the product or service you are offering and all of the hard work in the backroom is judged in the front room by the only judge that matters: the customer. From a carrier perspective, this is the moment when the subscriber interacts with the service the carrier is offering. It is the subscriber’s quality of experience, which will determine the value of all the investment in OSS/BSS infrastructure, not to mention network infrastructure that the carrier has made.

Using probes as data collectors supplying real-time information to the OSS/BSS systems allows the carrier to react immediately both to issues in the network but also opportunities. With probes we can determine who the customer is, what kind of application they are using, when are they using it and how well the service is performing. This vital information not only supports end-to-end customer experience management allowing better support and service, but it also provides the information to design services and product offerings that can provide superior value for the customer.

For example, if a customer is primarily using their smart-phone to access social media, then it is possible to offer a package to this customer that would provide priority connectivity for social media. This can be extended to include certain days of the week, at certain times of the day or in certain locations. Policy solutions already exist to support these product rule definitions and enforcement.

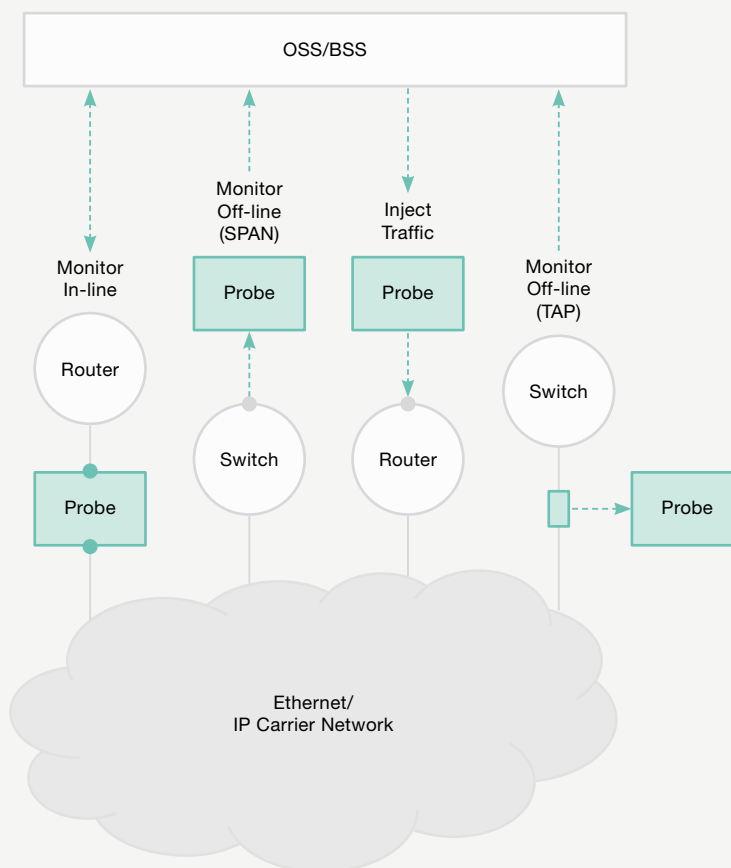
Thus, probes can not only help in improving end-to-end customer experience, but also help in defining new innovative products that provide more value for customers, building a stronger relationship with customers and redefining the role of the carrier as viewed by customers.

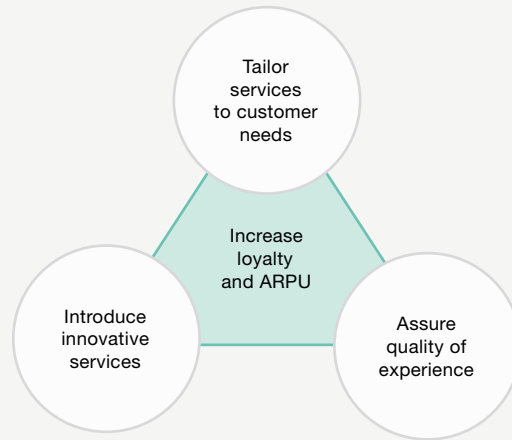
**BUILDING IN FLEXIBILITY AND SCALABILITY**

For probe vendors and network appliance vendors this provides an opportunity to support carriers with products that have now been recognized as a strategic imperative. The value that probes bring clearly addresses the challenges that carriers have been facing.

The key is ensuring that your probe or network appliance is capable of rising to the task and fulfilling this promise. Flexibility and scalability are therefore vital to success. Ensuring that your products have the flexibility to adapt to the carrier’s needs and network environment with respect

**FIGURE 2**  
Network probes now a strategic component for providing real-time network management





**FIGURE 3**  
Increasing loyalty and ARPU through innovative services and quality of experience

to network speed, network loads and application mix will be important requiring an architecture that can be configured to match these requirements with respect to the number of CPU cores and memory capacity needed for processing, the need for capture-to-disk, the number and mix of ports and speeds required etc.

It is also important to think in terms of scalability from the beginning, as certain networks, such as mobile data networks, are expecting explosive growth in data traffic. How will the solution grow from 1G to 10G and beyond?

Napatech accelerators for network management and security applications are designed for commercial off-the-shelf servers. They provide the same features and support from from 1G to 100G accessed via a single Application Programming Interface (API). This enables network appliance designers to develop and test application software once, safe in the knowledge that it will perform in the same way no matter the hardware configuration.

Napatech provides the unique capability to merge traffic from multiple ports on multiple accelerators into a single analysis stream thus completely abstracting the hardware configuration from the application software programmer. No matter the number or type of ports configured, the programmer will only see one “virtual accelerator” with many ports.

In addition, Napatech provides extensive statistics for each port that can provide essential information for deep-dive analysis of root-cause issues. Transfer of statistics from multiple ports is time synchronized to allow accurate correlation with time-stamped packet data.

Napatech also provides accelerators that are Network Equipment Building System (NEBS) certified, which have been tested with leading NEBS standard server vendors to ensure a high-reliability hardware platform for telecom network appliance development.

#### **OPENING THE SOLUTION TO MEET FUTURE CHALLENGES**

By building in flexibility and scalability into the design, network appliance vendors now have a powerful, high-speed platform capable of capturing data with zero packet loss at speeds up to 100 Gbps as well as transmitting data at full line-rate for active probe implementations.

The analysis stream provided by the probe can be shared amongst several management applications. This can be achieved by transmitting or exporting this data onwards, but it is also possible to co-locate the applications or part of the applications on the probe itself.

Napatech provides the powerful capability to share captured data between multiple applications without the need for costly replication. Multiple applications running on multiple cores can be executed on the same physical server with Napatech software ensuring that each application can access the same data stream as it is captured.

This transforms the probe into a universal data collector for multiple network management applications increasing the value of the probe even further.

### DISCOVER THE POWER OF NAPATECH

Napatech accelerators are designed to handle the maximum theoretical throughput of data for a given port speed.

Napatech offers a range of accelerators supporting speeds from 10 Mbps to 100 Gbps. A single, common Application Programming Interface (API) allows application software to be developed once and used with a broad range of Napatech accelerators. This allows combinations of different accelerators with different port speeds to be installed in the same server. Additional features include:

- Napatech accelerators can identify, filter and distribute flows to up to 32 CPU cores
- Data merging functionality allows flows from different ports on different accelerators to be merged for analysis
- Data sharing functionality allows multiple applications to access the same data at the same time
- All of this can be performed with very low server CPU load

### CHOOSE THE MARKET LEADER

Napatech is the market leading provider of accelerators for network management and security applications. Napatech provides global sales and support from local offices in all major continents, which is included in the price of the accelerator. This means that our highly experienced support resources are available for design and integration support, as well as field support without extra charge.

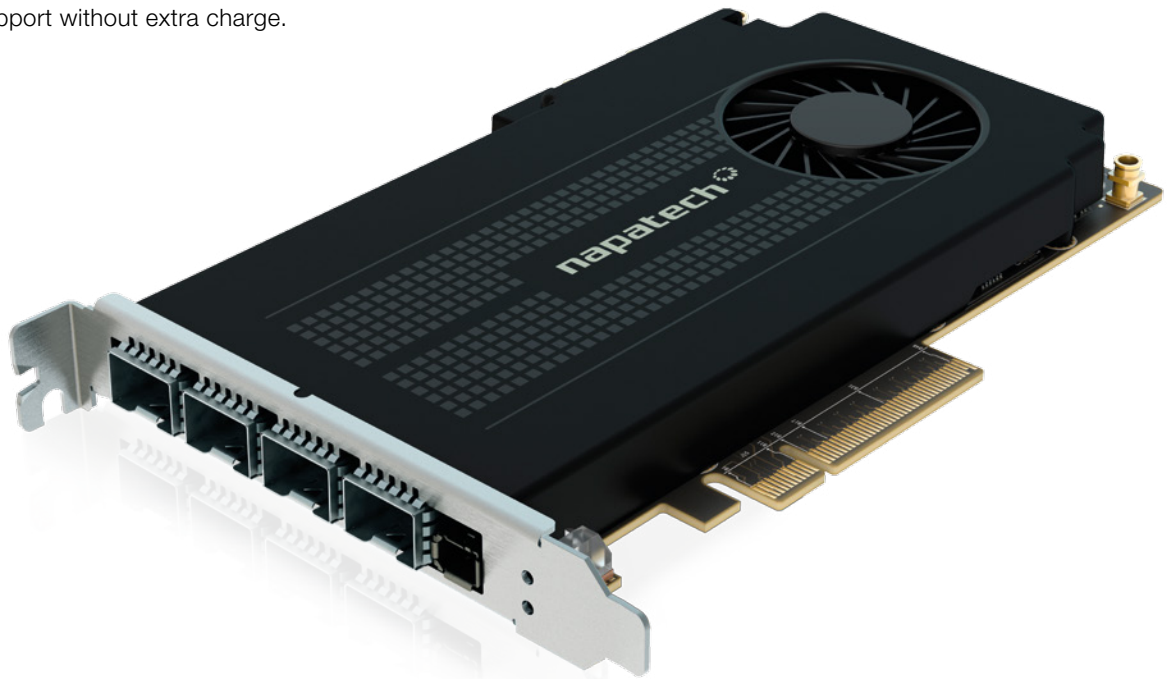
Napatech accelerators are manufactured to the highest standards by outsourced manufacturers in Switzerland and the USA supporting all major certifications including NEBS for telecom applications.

### COMPANY PROFILE

Napatech is the world leader in accelerating network management and security applications. As data volume and complexity grow, the performance of these applications needs to stay ahead of the speed of networks in order to do their jobs. We make this possible, for even the most demanding financial, telecom, corporate and government networks.

Now and in the future, we enable our customers' applications to run faster than the networks they need to manage and protect.

### Napatech. FASTER THAN THE FUTURE



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