

NetCracker Service Provisioning & Activation

Fulfillment Challenge for Converged Services

As Communications Service Providers (CSPs) shift their primary focus from internal cost-cutting to the introduction and delivery of new services, they need to overhaul their provisioning and activation capabilities. Currently, their fulfillment software and processes are not optimized to quickly create, deliver, and manage these new, converged services.

Due to the existence of legacy systems and hybrid networks, the creation and delivery of converged services has become more challenging. It requires the quick and efficient management of multiple and separate fulfillment flows. These flows involve myriad technology silos and/or multiple network/IT systems.

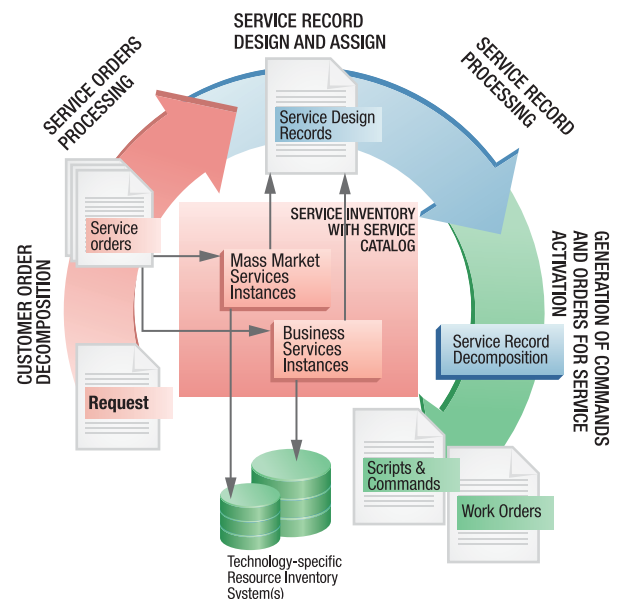
A typical converged service is, in fact, a complex orchestration of numerous network resources, IT systems, and related servers, all brought together in real time by the back office.

When service fulfillment is attempted in a non-automated, non-centralized manner, the complexity of the process severely limits a CSP's ability to deliver and assure new services and bundles.

To address this complex service fulfillment and management challenge for a converged network, it is critical to have a central repository of all customer services—as-designed and as-built. This centralized approach of bringing information together from different technology silos and presenting it as a Service Catalog is a critical element in an automated solution. It allows the building of reusable service components which can be quickly combined to create new service bundles.

Another important step is to establish efficient and automated processes that can pull together all the elements necessary to deliver a service from the underlying and often siloed networks and systems. This capability must orchestrate the delivery processes, configure the necessary elements, and yet be sufficiently flexible and agile to accommodate any new service that could come about in the near future.

NetCracker's Service Provisioning & Activation module delivers precisely these capabilities. When integrated with a comprehensive service inventory, it enables CSPs to automate and optimize service delivery for converged offerings within a very short time frame.



NetCracker Service Provisioning & Activation

NetCracker's Service Provisioning & Activation module supports the entire fulfillment process from the initial order, to order decomposition, service instance design, resource assignment, service record decomposition, service turn-on, and finally upstream notification.

Service Provisioning & Activation is based on Net-

Cracker's deep experience streamlining service delivery combined with current industry standards like the TMF's enhanced Telecom Operations Map (eTOM).

The Service Provisioning & Activation module has two core components: Service Design Automation and Service Activation. Both are driven by techno-

logical rules derived from equipment vendor specifications and practical implementation projects: from naked DSL delivery automation to complex VPN service design and activation. The following is a sample of supported technologies:

- xDSL
- FTTx
- Transport (SDH, SONET, PDH)

- Mobile 2G, 2.5G, 3G (fixed network for BTS, BSC, MSC)
- ATM, Frame Relay, X.25
- Cable Networks
- IP routes, IP-MPLS TE
- VPNs
- VoIP, SIP
- Video Services
- Triple and Quadruple Play Offers

As the name indicates, this capability automates the Design and Assign processes. This automation is vital to minimize provisioning times and costs. It ensures that skilled personnel do not perform redundant, manual operations. The Service Design Automation capability enables the most effective allocation of resources to create and deliver a service. In doing so, it relies on comprehensive inventory data, often provided by the NetCracker Resource Inventory module, and the execution of the following essential functions:

- Tracking in-house and vendor documentation-based design recommendations for each service component
- Ensuring that QoS requirements are enforced during the Design and Assign process
- Ensuring that capacity management policies are enforced during the Design and Assign process
- Handling the assignment of service-enabling IT system resources in the same fashion as network resources
- Producing detailed circuit layout records (CLRs) that can be further processed for service delivery and activation

The Service Design Automation component includes the Provisioning Wizard and Auto-Routing Engine. The Provisioning Wizard provides design support for automated and semi-automated Design & Assign processes for services with well-defined service structures like Triple Play over xDSL or FTTx. The Auto-Routing Engine simplifies route searches for single or cross-domain networks, and ranks routes according to cost, length, delay, and other parameters. Auto-routing is usually used for transport link design in SDH/SONET and PDH, WDM/DWDM, and others.

Service Design Automation

Provisioning Wizard

The Provisioning Wizard applies service order details to the selected service template to determine customer location, serving areas, available COs, and POPs. Provisioning rules, configured on service template and network connectivity, and tracked in Resource Inventory, allow the Provisioning Wizard to filter out resources that are available for selection, and then select them automatically or delegate the operation to the user.

The Provisioning Wizard's main features are its ability to:

- Handle multiple service types
- Perform “what if” analyses
- Detect infrastructure oversights (e.g., missing cable connections)
- Remove complexity from circuit design while allowing authorized users to retain complete control of the design-making process
- Maintain consistency and ensure corporate networking standards while delegating assignments

The Provisioning Wizard brings more simplicity to IT resource assignment for Value-Added Service (VAS) Design and Assign processes. Complex relationships between software platforms and server clusters—such as SMS server clusters, Video on Demand servers, and any other content providing the system with the network and the services—are handled as a single provisioning rule template for each VAS in respect to capacity utilization and QoS.

Thanks to the template approach, the design and assign for the service back end is fully automated for existing and future services. Once rules are defined and service enabling resources are present

in inventory, the Provisioning Wizard will apply a particular template for each service component present in the order.

Auto-Routing Engine

The NetCracker Auto-Routing Engine uses configurable route-finding algorithms to identify optimal network and protection paths. Path search optimization criteria can be any combination of parameters with weighting factors. Auto-routing supports searches for routes with the least cost, shortest length, minimum number of cross-connects, and minimal signal losses, and ranks candidates against each other. Auto-routing can find routes between path elements even if they are not explicitly connected.

The parameters of the route-finding algorithm are user definable and include:

- Source and destination points of service
- Infrastructure type (what objects can be used for a segment and element of a route); inclusion and exclusion object sets (which allow for the selection of an individual object and defining rules based on data fields)
- Weight functions for ranking routes. The weight value is based on the data field values of objects selected for a route. The weighting function can handle multiple parameters with different factor values. For example, parameters for the weight function can be length, price, losses, air and underground distances, etc.
- Nested routing profiles for the automated searching of routes inside technology-specific domains, for automated searching of protection routes
- The discovery of elements by using automated route searches or service types

Rich visualization capabilities allow the candidate path and available resources for it to be displayed on the documented network topology.

Service Provisioning Framework

The NetCracker Service Provisioning Framework component provides complex service provisioning as well as comprehensive service order orchestration and escalation management. Functions include service dependency management, service order lifecycle management, as well as error handling.

Service Activation

The service activation component provides for service design decomposition and produces correct sets of commands to activate, de-activate, or test the physical and logical components that comprise the service. It includes the following components:

- Activation Script Templates
- Scripting Engine
- Task Scheduler
- Roll-Back Support
- Activation Adapters

Activation Script Templates

The Activation Script Templates store activation scripts and associated parameters and enable users to browse, add, modify, or delete them. Service Level scripts enable the service order to be decomposed and contain commands to activate the service. Unit Level scripts execute the activation commands on the network.

Scripting Engine

The Scripting Engine iteratively processes Activation scripts for each managed device and applies a set of validation rules to each script individually as well as to the whole set of scripts. The Scripting Engine produces activation tasks that are further handled by the Task Scheduler and the Roll-Back Engine.

Task Scheduler

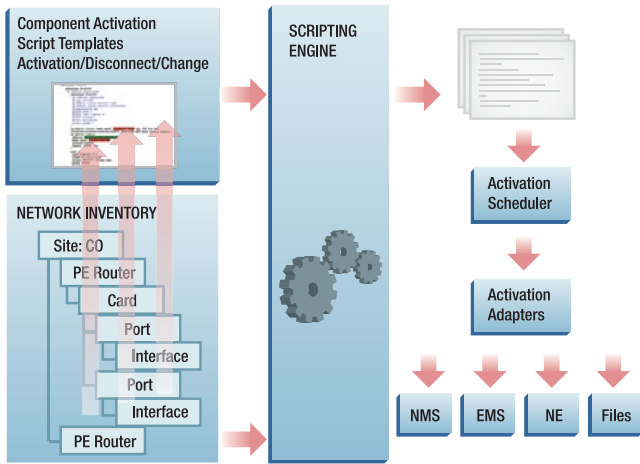
The Task Scheduler provides for the timely execution of tasks according to their rank or priority and allows the task execution order to be managed. Task Scheduler minimizes the time required to activate a service and increases infrastructure utilization.

Task Scheduler also allows for the management of off-peak periods against each NMS/EMS, NE, and IT server and can schedule activation load during non-peak times.

Task Scheduler also allows all activation activities for one element to be grouped in one activation session to minimize the overhead associated with session establishment and disconnects.

Activation Adapters

The actual interaction with the network equipment and server operating systems is performed via the Activation Adapters. The Activation Adapters provide unified access mechanisms that facilitate the



part of an end-to-end process).

The flexible workflow-based automation of the Service Activation component enables new processes to be introduced easily and rapidly and also allows existing processes to be modified.

The seamless integration with other NetCracker modules including Resource Inventory, Service Inventory, and Design & Planning provides a solution for the whole system.

transmission of activation commands via network management protocols such as SNMP, TL1, CLI, Telnet, SSH, and FTP.

The activation script itself is transmitted in a transactional manner with a set of user-definable transaction management rules. Transaction management allows scripts to be handled according to their execution time/order/priority. It also logs transmission results—success or failure—and handles rejected scripts by placing them in queues for further review.

Likewise, the Service Activation component enables the definition of customer-specific activation models as well as deactivation and testing scripts that can be invoked manually or automatically (as

Roll-Back Support

Unexpected problems can occur during the provisioning process due to service complexity and a wide range of systems being involved in the process. While not all problems are critical, a roll-back function is important to reverse critical problems. The Roll-Back Support component minimizes the time and effort required to reverse activation settings or suspend the process and reschedule unsuccessful operations.

Service activation progress is tracked in the activation log assigned to each delivered service and processed by the system. Unsuccessful and re-scheduled activation activities are highlighted and escalated if necessary.

Benefits of NetCracker Service Provisioning & Activation

- ▮ Flexibility and openness create competitive advantages by accelerating the rollout of new services.
- ▮ A high level of process automation increases provisioning success rates and cuts operating costs.
- ▮ The combination of service design and service activation in one module enables zero-touch provisioning, which is essential for profitability.
- ▮ Idle assets are minimized, and network utilization is enhanced to reduce the cost of ownership.
- ▮ Streamlined service delivery ensures against provisioning delays, activation outages, and the subsequent SLA violations that result in customer churn.
- ▮ Using extensibility based on configuration rather than redevelopment and reintegration reduces TCO and minimizes the time required to roll out new products.
- ▮ The Service Provisioning & Activation module is pre-integrated with other components of the NetCracker OSS suite because of the shared OSS platform provided by NetCracker Framework.
- ▮ The wide range of open APIs allows for seamless integration with enterprise-wide workflow management systems and CRM.