

PRITON®

SOLUTIONS

From the leader in VoIP, Ethernet extension, and wireless router technologies

How to migrate voice services smoothly over Australia's NBN

For service providers in today's multi-vendor NBN-based communication landscape, the age-old challenge of achieving profitability comes with a new twist: service providers must offer smooth migration from the phasing out TDM/PSTN connections to an all-IP network while leveraging new Unified Communications (UC) technology to entice new business customers.

SmartNode Session Border Controllers

How to migrate voice services smoothly over NBN

Table of Contents

Introduction:.....3

Solution Overview4

Business Partnerships5

 Who owns the business customer.....5

 Vendor Loyalty and Market Share5

 Working Together.....5

Operational Challenges5

 Vendor Multiplication5

 Management Headaches and Liabilities.....6

 Problems with Direct SIP6

 Where is the Demarcation?.....6

The Solution: Patton Enterprise Session
Border Controller (eSBC).....6

How it Works: the Big Picture9

How it Works: Step by Step Provisioning Flow9

eSBC Feature Set12

Authored by

Martin Svozil

VP International Development
Patton Electronics Co.

Jagdeep Sekhon

Director TAC Australia
Patton Electronics Co.

Copyright © 2018,
Patton Electronics Company.
All rights reserved.

Printed in the USA.

Introduction

For service providers in today's multi-vendor NBN based communication landscape, the age-old challenge of achieving profitability comes with a new twist: service providers must offer smooth migration from the phasing out TDM/PSTN connections to an all-IP network while leveraging new Unified Communications (UC) technology to entice new business customers.

When migrating from existing network to SIP trunking services over NBN, a key challenge for the provider is the cost and complexity of ensuring interoperability with the existing hardware at customer site. The other challenge being the time taken to port services from existing service provider network to NBN based services. If a migration path exists for customers to delay or plan as per their needs to replace their hardware, it can turn from a challenge into a plus factor. The absence of such pathways erodes service profitability for providers and less attractive option for customers who start looking at options from myriad vendors which not only increase effort but also cost, testing and troubleshooting time. It ends up in a daunting task.

Based on 34 years of experience of helping service providers and customers to mitigate risks and reduce associated costs, Patton has come up with innovative ways to address this crucial challenge to migrate services to NBN with least effort. With smooth migration and future proof ideology in mind (while designing), this integrated, touchless automated provisioning solution can reduce the complexity of deployment as well as allow migration of services as and when required. Each subscriber can be remotely provisioned for every service (avoiding the dreaded costly truck roll) and ensure interoperability with existing hardware, other IP-PBX or UC platform on the market.

By introducing Patton devices into the existing network, a number of key challenges of service provider and customers are addressed:

- Competitive advantage in subscriber acquisition: customers can either keep their existing hardware and/or use their chosen IPPBX or UC system.
- The service provisioning even allows multiple systems to co-exist for customers such as EPABX, IP-PBX, Cloud based UC services etc.
- The services can be migrated in phases to allow sufficient time to port numbers from existing service providers to NBN based SIP trunks.
- Cost-savings: streamlined service provisioning and subscriber turn-up with no truck roll
- Ensured interoperability of network elements from multiple vendors. These elements may include soft switch, core/edge session border controllers (SBC), customer-premise SBC, PBX, phones, faxes, and so on.
- Ensured service quality and less downtime
- Simplified CPE management
- Clearly defined SIP service demarcation point
- Secure separation between carrier WAN and customer LAN
- Ensured interoperability of network elements from multiple vendors. These elements may include soft switch, core/edge session border controllers (SBC), customer-premise SBC, PBX, phones, faxes, and so on.
- Ensured service quality and less downtime
- Simplified CPE management
- Clearly defined SIP service demarcation point
- Secure separation between carrier WAN and customer LAN

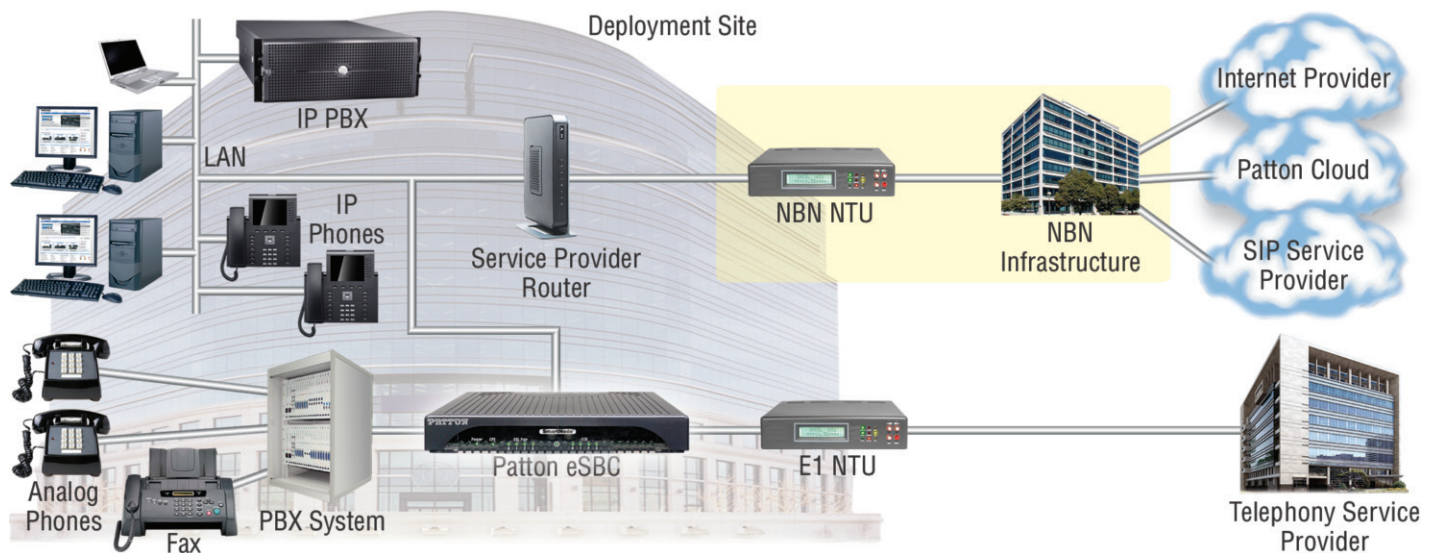
By enabling the service provider to manage, control, and troubleshoot the services all the way to the Patton device (service demarcation point), this solution eliminates risks and finger pointing, reduces debugging time, improves customer satisfaction and reduces churn—thus increasing higher average revenue per user (ARPU) and profits. Customers can enjoy uninterrupted services with no change in user experience as they move to NBN.

How to migrate voice services smoothly over NBN

Solution Overview

Service providers leverage the layer 2 IP network of NBN to provide services to the subscriber. It can be only voice or data and voice services to the subscriber over the NBN network as FTTN, FTTC, FTTB, FTTP or FTTH. NBN provide the connection box with Ethernet termination at premise or residential property. In case, the service provider provides their own router for data services, the Patton

device connect to the IP router. When the Patton device is responsible for both data and voice services, it connects directly to the NBN connection box on to one of the data (UNI-D) port of NBN connection box. On the other hand, Patton device also connects and serve the existing telephony connection. The overall picture when Patton device serves a business establishment is as shown below:



Here, the Patton device can do a number of tasks:

- To keep the existing telephony provider connected with the legacy hardware until the old telephony connections are phased out
- Provide a SIP trunk connection to the SIP service provider over the NBN
- Provide a SIP connection to the IP-phones and/or IP-PBX and can act as REGISTRAR
- Normalize the SIP traffic and route it to SIP trunk and/or existing telephony network
- It can also replace the service provider router in most of the cases and provide IP services like Internet Access to LAN, DHCP/DNS services, firewall and so on and act as a true service demarcation point
- It also perform QoS traffic-shaping for assured voice quality and WAN optimization
- It acts as a testing and protocol analysis point on the subscriber premises
- It can provide a fallback path over 3G/4G/LTE network in case the primary connectivity over NBN is not available
- These services can be selectively provisioned from Service Provider cloud or via Patton Cloud with almost zero site intervention where end-customer may control a part of configuration using split configuration feature

Business Partnerships

Who owns the business customer?

It depends on the answers to the following questions:

Q: Is the customer loyal to a certain IP-PBX vendor?

In this case, the service provider would have to support and interoperate with the customer's preferred vendor in order to win their business.

Q: Is the business bound in a carrier or service-provider contract?

If so, the carrier's interoperability capabilities may limit the business customer's choice of CPE elements: IP-PBX, UC platform, VoIP Gateway or SBC. The suppliers of those products may require carrier certification before they could sell to such customers.

Q: Is the business committed to a certain UC platform, such as Microsoft Lync or Lotus Sametime?

That decision may define or limit their choice of phones, access-router, ITSP, etc, to those that are Lync or Sametime certified.

Vendor Loyalty and Market Share

Each player in the business communication market (namely service providers, software vendors, hardware vendors) works hard to win customer loyalty and market share. Everyone is defensive and protective of his or her hard-won slice of the pie, whatever its size.

Working Together

The Patton solution for NBN offers a way for the various players to share business customers by working together. Rather than carriers competing against IP-PBX vendors and/or UC suppliers for a given customer, the Patton SBC provides ensured interoperability so the suppliers can approach the customer together with a joint solution. Patton provides the glue to cement such win-win business partnerships. At the same time, the solution fits well into customer financial planning as and when they want to invest.

Operational Challenges

The Patton migration and automated provisioning solution is fully capable of supporting touchless provisioning for hosted PBX services but the solution presented in this guide is not a hosted-PBX environment. The service-provider

business model presented here allows SMB customers the flexibility to choose and use any IP-based PBX or Unified Communication software and hardware they prefer. On the other hand, service provider will deliver voice (SIP-trunking) and optionally data (internet) service to the customer-premise over NBN. In order to implement such a business model, numerous operational challenges must be resolved.

Vendor Multiplication

There are dozens of vendors with PBX products in the field. Similarly, a few very large vendors offer dozens of products. Vendors vary widely in how they implement certain details of the SIP "standard." Variations may include terminal registration behavior, number presentation, added or omitted features, authentication procedures, and others. It is not an easy task for service provider to formally create interoperability with every vendor.

In many cases, the provider will use an edge SBC to normalize and secure the interface to application servers. However, since such edge SBCs reside within the core network, they cannot be easily configured to support the dozens or hundreds of different device profiles.

Management Headaches and Liabilities

Managing a service delivered to a customer-selected (and owned) PBX also presents some issues:

Control: The devices at customer premise are installed, configured and managed by the customer IT staff. the service provider cannot configure or manage the customer side of the service connection.

Set-Up: Without an automated-provisioning process, setting up and activating the customer side of the network connections like SIP trunk, E1/BRI connection will likely be inconsistent and error-prone.

Troubleshooting: The access network between the subscriber's IP PBX or UC system and the carrier's edge SBC is often complex, comprising many such elements as routers, firewalls, modems, and so on. Identifying the source of a problem along this path is often time consuming and costly.

Problems with Direct SIP

Directly connecting a SIP trunk to a customer's SIP based devices involves a number of difficulties for the carrier:

How to migrate voice services smoothly over NBN

Divergent Customer Profiles: The SBC within the carrier WAN would have to be configured with a different SIP profile for every SIP device in the field. The enormous scale and operational complexity of such a task is prohibitive.

Lost Opportunities: A substantial segment of the subscriber market—businesses with PBX products that are not interoperable or validated with service provider’s network would be eliminated.

Where is the Demarcation?

With the SIP trunk terminating at the customer SIP devices, the voice service demarcation is not clearly defined. Such lack of clarity leads to confusion and potential disputes about who is legally responsible if problems arise in the customer LAN that impair or disrupt SIP traffic flow thus degrading performance of the provided service.

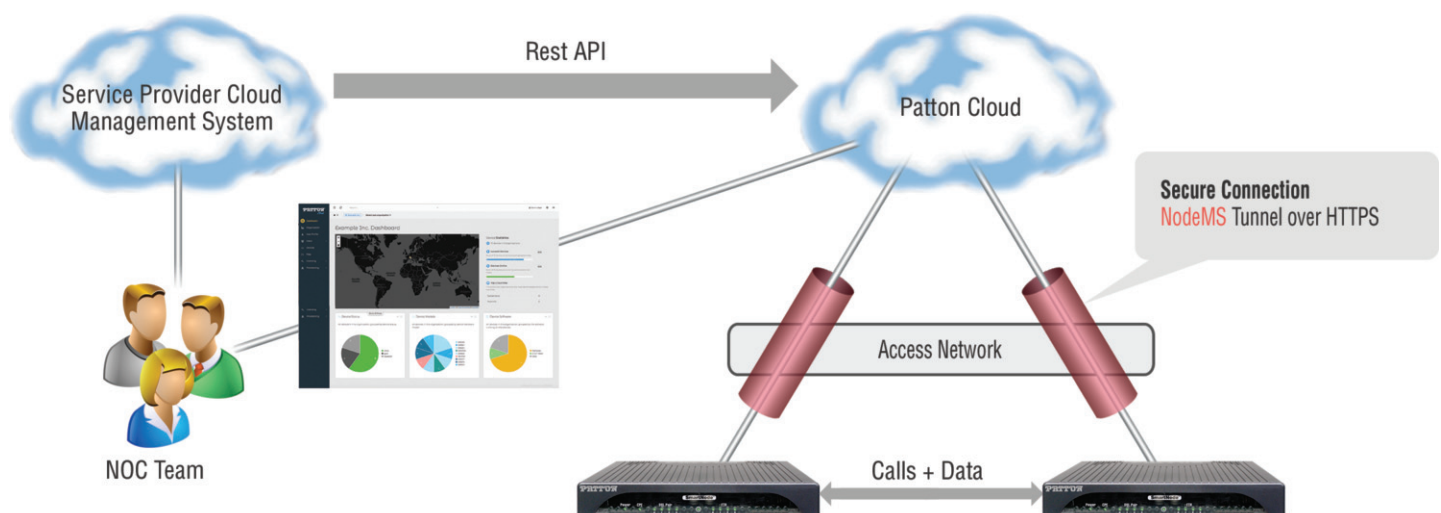
The Solution: Patton Enterprise Session Border Controller (eSBC)

Patton has experience of testing, verifying and deploying SmartNode VoIP CPE for service providers in Australia and around the globe. There are large numbers of SIP devices in the market that can interoperate with Patton eSBC. The solution presented here employs an Enterprise Session Border Controller (eSBC) range of products from Patton Electronics. Deploying the SmartNode eSBC at each customer site provides the following solutions and value-added benefits:

Standardized Customer Interface: SmartNode eSBC have been tested with most of the available soft switch ven-

dors and Patton works closely with service providers to ensure that the service provider requirements are addressed. Employing the SmartNode eSBC for each customer ensures a reliable and interoperable carrier-facing SIP interface with predictable, uniform characteristics and behaviors. The single, unified eSBC interface greatly simplifies service provisioning. The carrier need not test and trouble-shoot the vast number of IP PBX products with the service. Since Patton maintains its own interoperability program, the eSBC provides a customer-facing SIP interface, which Patton has tested and validated with a large and growing list of IP PBX vendors. The eSBC’s SIP-normalization function resolves any discrepancies between the soft switch and the customer PBX implementations of the SIP standard.

Patton Cloud Connectivity (aka Online EMS): Patton cloud is device management solution and service providers can use this Patton in-house developed cloud platform for service provisioning, control and monitoring of eSBC devices. It facilitates the deployment and operation of Patton devices and offer device monitoring (such as service alerts), configuration backup and restore, device profiling, multi-tenanting (managing reseller and partner devices), floating licensing model, remote support, remote command-line-interface (CLI), remote device UI and other plethora of features. The device connects over a secure HTTPS tunnel to the Patton Cloud. The REST API provides an interface to service providers to connect with their cloud management system or CRM. The service provider NOC and Patton support is then able to connect and support customer over the Web UI of Patton Cloud. Currently, there is no upfront investment and is modelled into pay as you go (PAYG).



Floating Licenses: Patton cloud offer floating feature and the service provider can buy licenses in bulk and then distribute from the Patton cloud as and when required and create pools for their multi-tier tenants (reseller and partners). The licenses leasing has a single unit granularity with option to set high watermark.

Automated SIP Survivability (*Patent Pending*): This innovative feature requires no configuration but minor re-wiring and is a self-learning algorithm. It can detect network anomaly toward the service provider network and take corrective actions. Like defining fallback strategies in case of WAN failure and allow local calls and emergency calls when service provider network is not reachable. It uses the secondary WAN interface (USB dongle) or fallback PSTN network to keep the network connected with outside world. It also keep on monitoring the failed links and recover traffic to normal mode when the outage is over.

ISDN Smart Relays: SmartNode Products come with a smart relay feature. At customer site, the existing E1 or BRI line plugs into one port and from the second port, the device connects to customer hardware (PBX). It relays the traffic even in eSBC shutdown state. On powering up, the relay disconnects and device starts controlling each line individually and configuration can control the call routes.

Touchless Automated Provisioning: SmartNode Products come with redirection service feature. When the device first powers up, it contacts the redirection server over the Internet to find, download and activate the correct configuration file – either from the service provider's configuration server or from Patton Cloud. Patton's re-direction service enables zero touch deployment with automated SIP-trunk service provisioning on SmartNode products.

Secure, Remote Management: The connection with the remote provisioning servers is over secure industry standard HTTPS protocol. This means service providers can securely provision the subscriber side of the SIP trunk from within their cloud or CRM. The SmartNode configuration, firmware and wizard deliver over the public network to the eSBC at the customer site. Login credentials are encrypted

according to Digest Access Authentication (RFC 2617), protecting the remote CPE against any unauthorized access.

QoS and Traffic Management: The SmartNode eSBC employs upstream QoS combined with Patton's advanced downstream QoS to ensure optimum voice quality within the customer LAN. SmartNode voice and data traffic management capabilities combined with CODEC transcoding enable WAN optimization on the SIP trunk.

Split Management Domain: SmartNode provides a valuable feature called "Split Management Domain" that separates the customer-facing configuration from the carrier-facing configuration. This feature allows the service provider to manage the WAN-facing configuration while only the customer (and/or the integration partner that provides installation services) can manage the LAN facing configuration. The carrier-provider can segregate and define parameters which customer/installer can control and which parameters are accessible only to the service-provider. Split Management Domain also addresses security concerns on both sides of the service demarcation point. The customer LAN-facing configuration is protected against unwanted access over the WAN while the provider WAN-facing configuration is protected from (perhaps inadvertent) meddling from the subscriber.

So the SmartNode eSBC standardizes the trunk side of the configuration, enables automated provisioning via Redirection Services, monitoring via Patton cloud together with the service provider provisioning servers, while providing for management of the LAN side of the configuration by the customer or installation partners.

Lost Opportunities: A substantial segment of the subscriber market—businesses with PBX products that are not interoperable or validated with service provider's network would be eliminated.

Where is the Demarcation?

With the SIP trunk terminating at the customer SIP devices, the voice service demarcation is not clearly defined. Such lack of clarity leads to confusion and potential disputes about who is legally responsible if problems arise in the customer LAN that impair or disrupt SIP traffic flow thus degrading performance of the provided service.

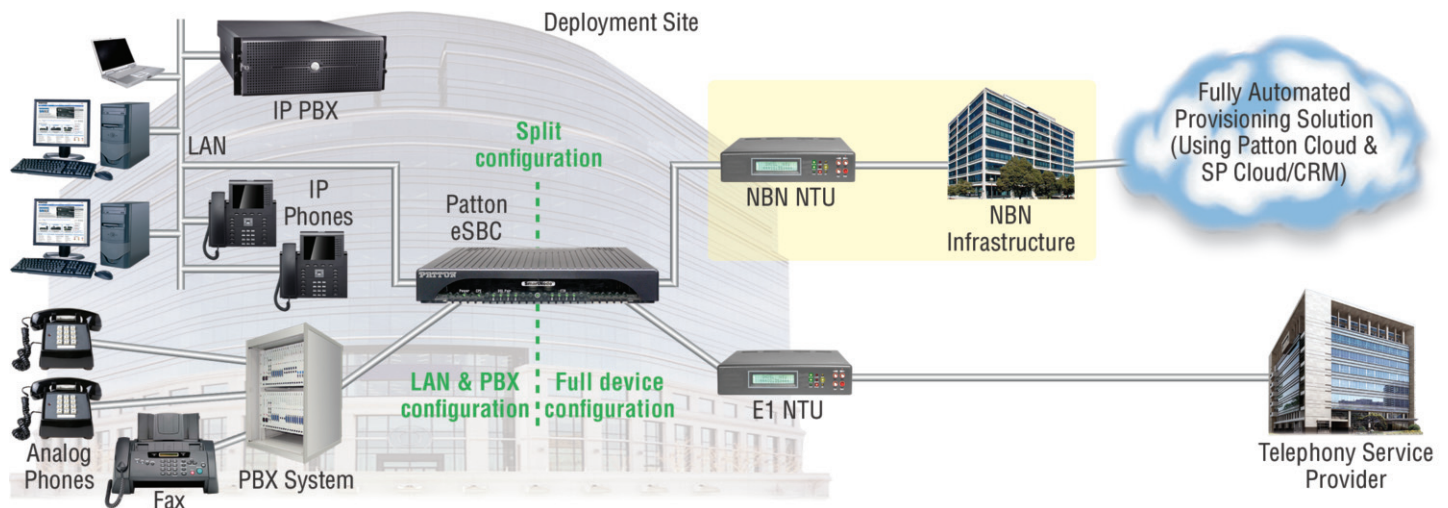
How to migrate voice services smoothly over NBN

How it Works: the Big Picture

service enables zero touch deployment with automated SIP-trunk service provisioning on SmartNode products.

Secure, Remote Management: The connection with the remote provisioning servers is over secure industry standard HTTPS protocol. This means service providers can securely provision the subscriber side of the SIP trunk from

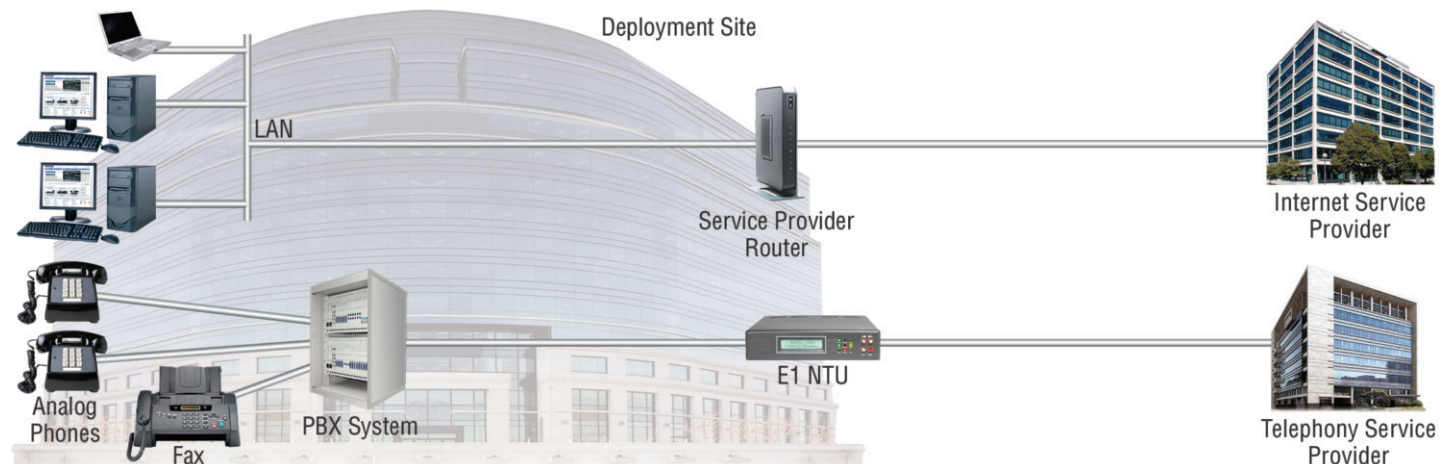
within their cloud or CRM. The SmartNode configuration, firmware and wizard deliver over the public network to the eSBC at the customer site. Login credentials are encrypted according to Digest Access Authentication (RFC 2617), protecting the remote CPE against any unauthorized access.



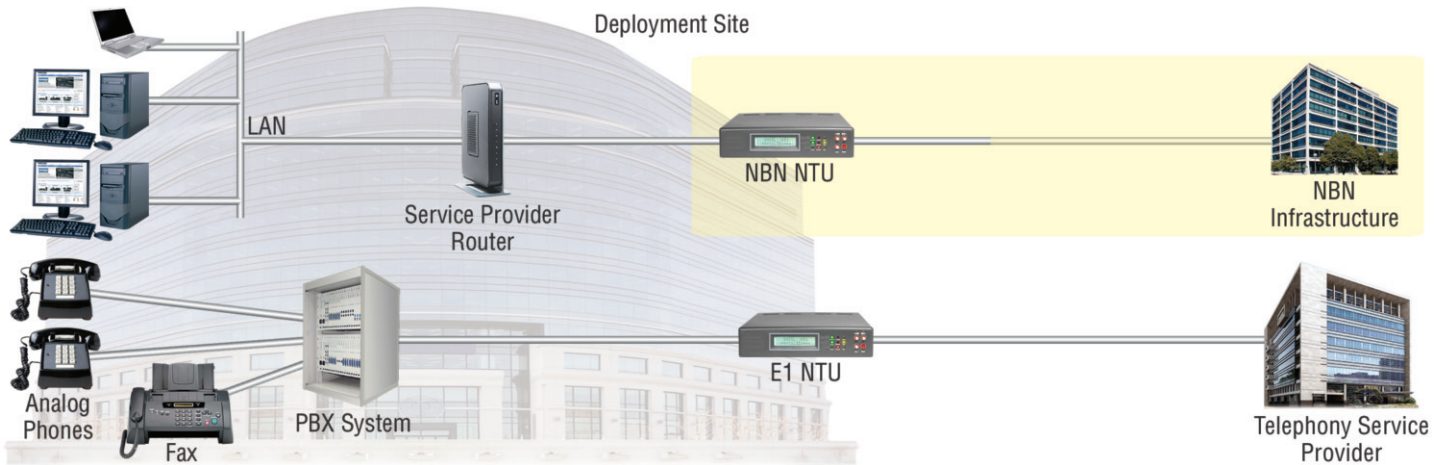
How it Works: Step by Step Provisioning Flow

A typical customer setup involving E1 ISDN line is discussed below. The process is similar in case of ISDN-10,

ISDN-20, ISDN-30 or Basic Rate Interface (BRI) lines. The customer setup before NBN is introduced is as below:

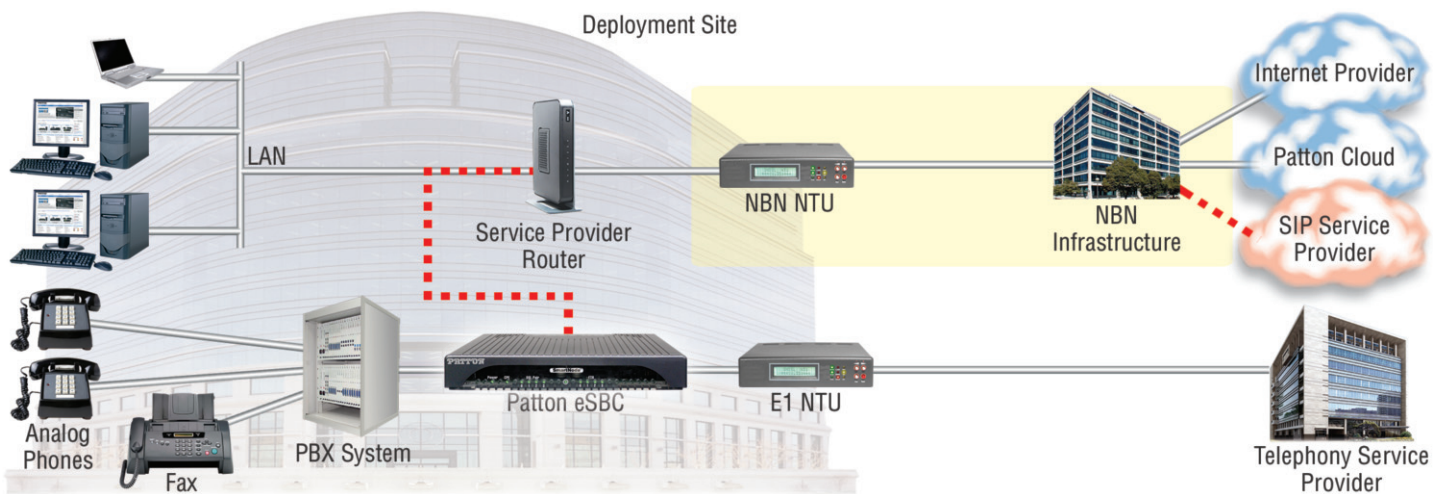


With introduction of NBN, the service provider router talks over the NBN layer-II IP network.



Service provider introduces Patton eSBC into this site and it sits between the telephony network and PBX system. The device also connects to internet over the existing LAN at deployment site. It is now able to automatically contact service provider provisioning framework and configure accordingly. Customer or the site engineer

responsibility is limited to layman work i.e. appropriately cabling the unit and powering it up. In case, the customer sense any issue with the communication, they can simply power off the unit until service provider support is reached. The communication will work as if the unit is not present.



In addition to the PBX setup, the customer can now:

- Customer can start making outgoing calls through the SIP trunk and the incoming calls can still come through the E1 trunk
- Apply for porting numbers to SIP trunk (E1 communication will keep on working as it is)
- Introduce the IP-PBX and soft-phones

- Decide on using the PBX systems or decommission it whenever deemed suitable

On the other hand, service provider can now:

- Monitor the calls going through the E1 lines and make sure the SIP trunk configuration matches the desired number range (as most of the time, the customers are not aware of how number mapping and DID's are configured)

How to migrate voice services smoothly over NBN

In addition to the PBX setup, the customer can now:

- Customer can start making outgoing calls through the SIP trunk and the incoming calls can still come through the E1 trunk
- Apply for porting numbers to SIP trunk (E1 communication will keep on working as it is)
- Introduce the IP-PBX and soft-phones
- Decide on using the PBX systems or decommission it whenever deemed suitable

On the other hand, service provider can now:

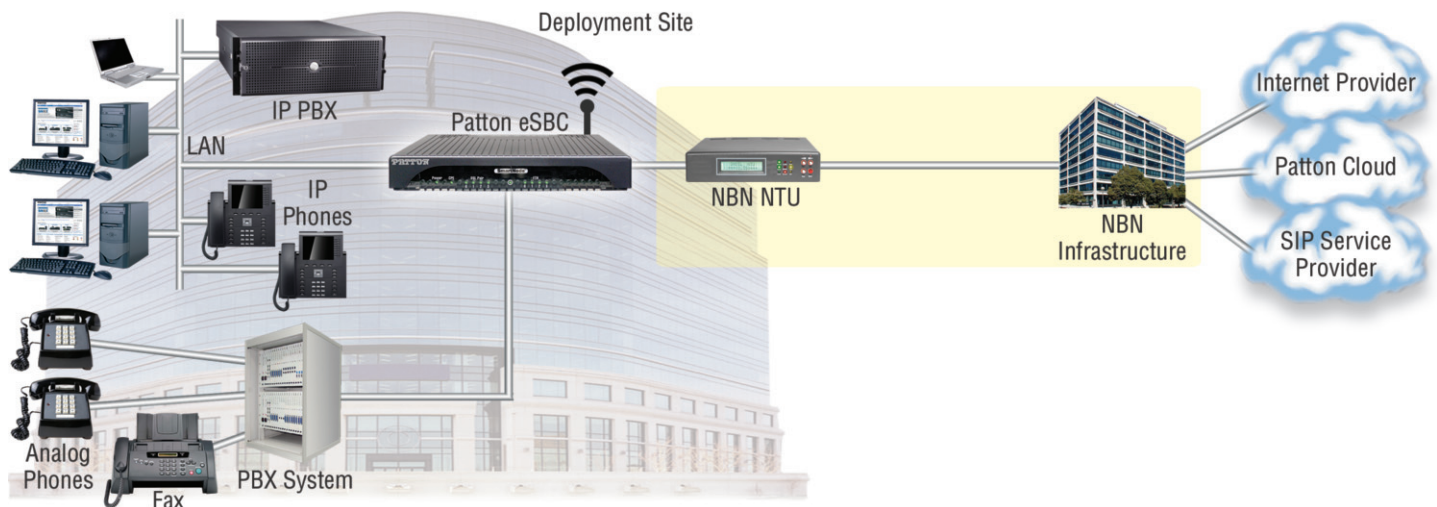
- Monitor the calls going through the E1 lines and make sure the SIP trunk configuration matches the desired number range (as most of the time, the customers are not aware of how number mapping and DID's are configured)

- Monitor the SIP trunk network to ensure that when porting is complete, the QoS is set accordingly and there are no bandwidth issues
- Test incoming and outgoing calls through a provisioned SIP trunk until number porting is complete to get a peace of mind by setting things in advance

In addition, the customer and service provider can mutually decide to:

- Use Patton eSBC IP-routing functionality to replace the service provider router
- Use fallback strategies such as 4G/LTE dongle

The final network (future proof) scenario looks as below:



eSBC Feature Set

Patton eSBC is a feature rich product and the product gets smarter with every software release, which is available free-of-cost and easily downloadable from the Patton website or direct installation through Patton Cloud. Some of the main features are as mentioned below:

- ISDN Relays (BRI/PRI)
- Factory designed pin-out for easy connection (no need of ISDN cross-cables)

- Session Border Capabilities
 - SIP Normalization and network compatibility
 - Service Demarcation
 - Network topology hiding
 - Security against voice fraud
 - SIP flooding & Trusted peers
 - Secure SIP (TLS/SRTP) & Inbound digest Authentication

-
- Guarantee voice quality, QoS and bandwidth management
 - Voice Survivability
 - Voice Transcoding
 - Internet Access Device
 - IP Router
 - Access Control Lists (Stateful Firewall)
 - DHCP Server/client, DNS
 - DDOS Prevention
 - Network Survivability (USB Dongle – 3G/4G/LTE)
 - Automated SIP Survivability (self-learning algorithms)
 - XML based Web Wizard GUI
 - Zero Touch Provisioning
 - Redirection Services
 - Floating License model
 - Patton Cloud
 - Device on-boarding
 - Provisioning profilesv
 - Configuration and firmware management
 - Central licensing
 - API to connect to Service provider CRM
 - System health monitoring
 - Advanced access through remote CLI and device GUI
 - Online problem reporting
 - HTTPS based connectivity with devices – no additional firewall configuration at customer side
 - Multi-tenant operation
 - Virtual Session Border Controller (coming soon)
 - Free periodic firmware upgrades (bug fixes and new features)

www.patton.com

Patton Electronics Co.

7622 Rickenbacker Drive
Gaithersburg, Maryland 20879
USA

Phone **+1 301 975 1000**
Fax **+1 301 869 9293**
E-mail **sales@patton.com**

Patton-Inalp Networks AG

Meriedweg 7
CH-3172 Niederwangen
Switzerland
Phone **+41 (31) 985 25 25**
Fax **+41 (31) 985 25 26**
E-mail **sales@inalp.com**

Patton Hungary Zrt

Gábor Dénes utca 4.
Infopark Building C, Budapest H-1117
Hungary
Phone **+36 1 439 4840**
Fax **+36 1 439 4844**
E-mail **ce@patton.com**



PATTON[®]
Let's Connect![™]