Automated IP router provisioning with NSP

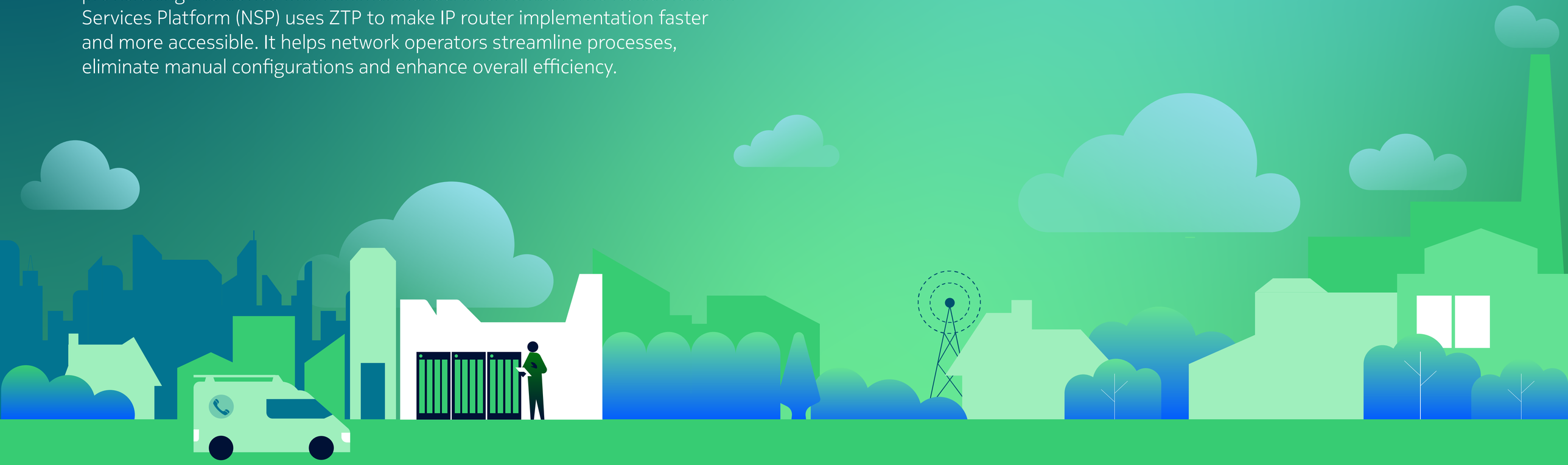
Accelerate infrastructure deployment and eliminate human errors

True Zero Touch Provisioning powered by NSP

Deploying IP routers to many locations can be extremely expensive. Sending skilled personnel to each site to perform installations is a cost-prohibitive approach that does not scale.

Zero Touch Provisioning (ZTP), as defined by IETF, automatically configures an IP router by getting the required information from the network and provisioning the device with minimal manual intervention. The Nokia Network Services Platform (NSP) uses ZTP to make IP router implementation faster and more accessible. It helps network operators streamline processes, eliminate manual configurations and enhance overall efficiency.

With automated router provisioning, or true ZTP, powered by NSP, network operators can **provision IP routers four times faster** than they can with the traditional approach.



Provisioning IP routers the traditional way

The traditional approach to new router deployment requires a skilled field engineer to perform the installation and basic configuration on site. A central team monitors the process and handles advanced configuration and validation.

It typically takes at least **four hours** to manually provision a new IP router. However, it's easy for operations staff to make errors when they configure a router on site using a command line interface (CLI) or remotely using tools that require manual inputs. Each error adds extra time to the process and may require additional truck rolls. This drives costs higher.

The **field engineer** executes the following steps on site:

1. Power up the router.
2. Set the IP address of the router.
3. Load the software image onto the router.
4. Reboot the router to activate the image.
5. Configure the router so it can be discovered by the remote management system.

The **central team** can now visualize the new router and perform the following steps:

1. Check the configuration and status of the new router.
2. Clean up the provisioning and initial configuration files.
3. Trigger further configurations to make the router part of the network infrastructure and ensure that it is ready for service provisioning.

Automated, fast and error-free provisioning with NSP – 1

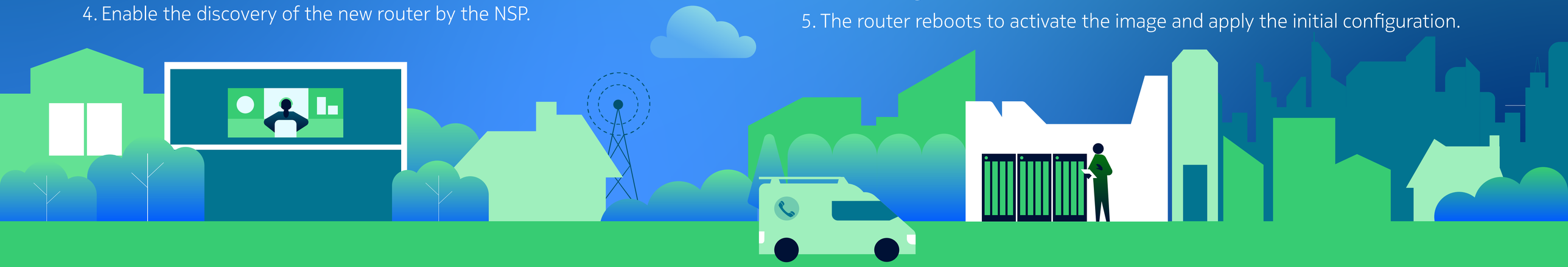
The NSP automates router provisioning so that new routers can be brought up remotely and automatically from the network operations center (NOC). The only manual steps that need to be performed on site are to connect the new router to an upstream router that will act as the DHCP server or relay, and then power it up. No technical skills are required for these steps.

The **operator in the NOC** executes the **pre-commissioning phase** by using the NSP with predefined intent-based provisioning and configuration templates and automation workflows to perform the following steps:

1. Validate, or precheck, new router-specific data, including name, type, uplink ports, interfaces, IP addresses and protocol configuration.
2. Configure the DHCP server and the upstream router.
3. Generate the provisioning and initial configuration files and upload these files to a server.
4. Enable the discovery of the new router by the NSP.

The **on-site technician** powers up the router, which triggers automation that executes the steps of the **commissioning phase**:

1. The router connects to the DHCP server to get a temporary IP address.
2. The router sends a DHCP discovery message on available interfaces.
3. The DHCP server specifies a temporary IP address, along with the location of the files to be downloaded.
4. The router downloads the provisioning file, the software image and the initial configuration file.
5. The router reboots to activate the image and apply the initial configuration.



Automated, fast and error-free provisioning with NSP – 2

The **operator in the NOC** can now discover the new router on the NSP and move to the **finalization phase**, which consists of the following steps:

1. Clean up the upstream router and the DHCP server.
2. Clean up the provisioning and initial configuration files.
3. Trigger further network infrastructure configuration and ensure that the router is ready for service provisioning.

The execution of all these steps takes about **one hour**. This is **four times faster** than the traditional way.

Benefits

- **Reduce time to revenue** by provisioning new IP routers four times faster than the traditional approach.
- **Increase profits** with automated processes that reduce human errors, unexpected troubleshooting and truck rolls.
- **Lower cost** with automation that eliminates the need to send skilled personnel to use sophisticated toolkits to configure IP routers on site.

Case study

du offers fixed line, mobile telephony, internet and digital television services across the United Arab Emirates. It also provides carrier services, a data hub, internet exchange facilities and satellite service for broadcasters.

Challenges

- du needed a faster way to provision the 1,000-plus new routers (mostly cell site gateways) it deploys every year.
- The company was relying on costly and error-prone manual configurations.
- du needed to provision more efficiently in sensitive sites that require special authorization or are available for short time periods.

Solution

- The NSP enables ZTP for Nokia devices (SAR, IXR) in a multivendor network where new Nokia routers may need to connect to third-party routers.
- The solution supports multiple deployment scenarios (e.g., V-shape, U-shape, single home) with bulk integration.
- The NSP automates initial configuration and network infrastructure configuration.

Customer benefits

- The NSP has enabled du to accelerate infrastructure deployment and shorten the integration window.
- True ZTP has enabled du to eliminate configuration problems caused by human errors.
- Reliable automation has helped du reduce the number and duration of site visits.

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