

# Automated PDU Provisioning and Configuration

## The Challenges

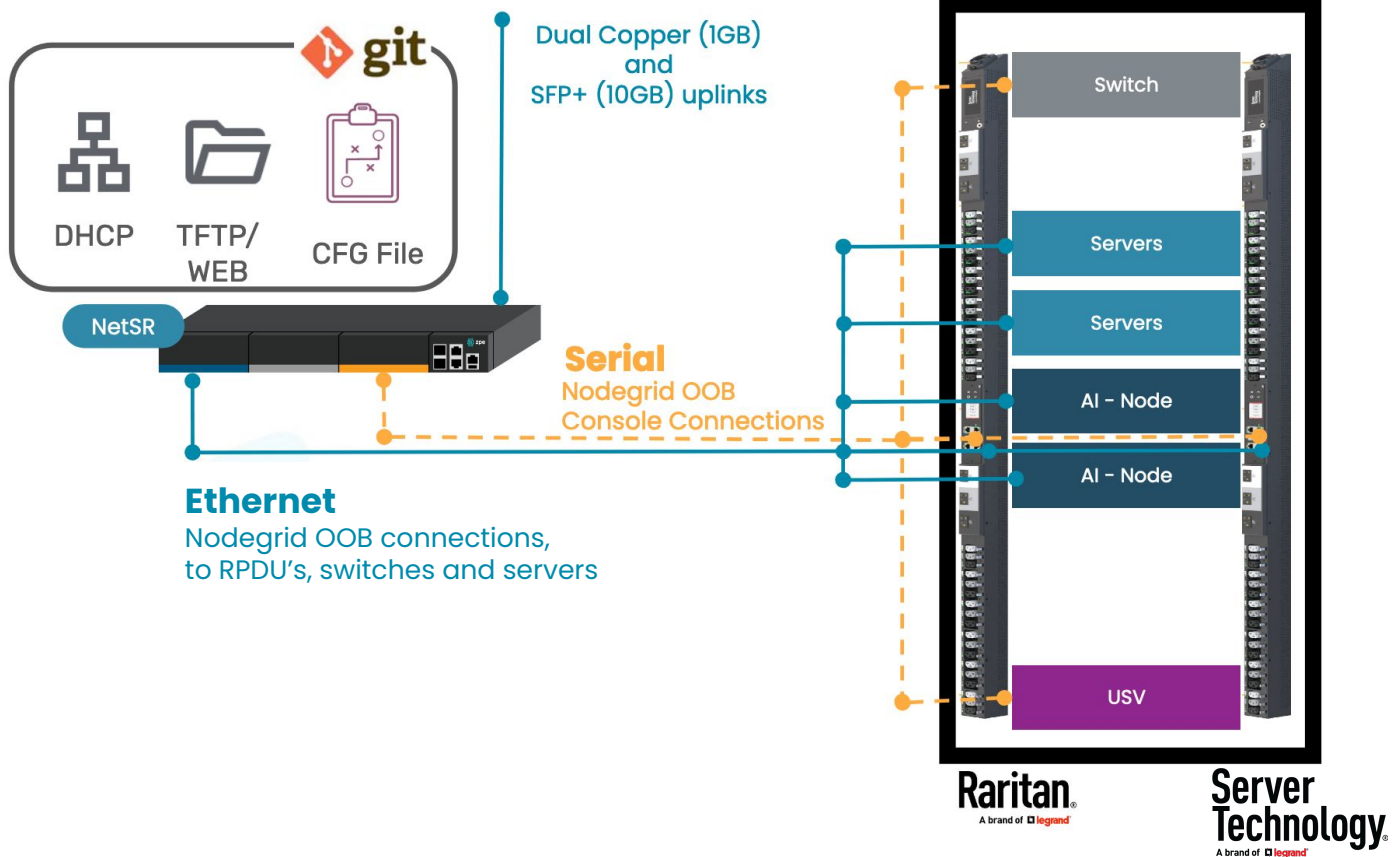
Rack Power Distribution Units (RPDUs) are a critical part of data center infrastructure. However, it's still common practice to manually configure RPDUs via their command-line interface. This is inefficient, especially at scale, and leads to three challenges:

1. Skilled engineers must be on-site to perform configuration tasks
2. RPDUs must be configured individually, which consumes valuable time
3. Manually configuring RPDUs risks inconsistencies and human error, which can lead to costly failures or compliance issues

## ZPE Systems' Solution

**ZPE Systems' Nodegrid platform integrates seamlessly with ServerTech and Raritan RPDUs.** The Nodegrid platform enables teams to automate deployment and centralized management of RPDUs, by using a combination of zero touch provisioning and out-of-band remote access. This overcomes the challenges and delivers three key advantages:

1. Out-of-band access allows engineers to perform configuration and troubleshooting tasks remotely using their web browser
2. Zero touch provisioning automatically configures all RPDUs upon boot-up, which saves hours of work
3. Automating configurations and firmware management removes human intervention, which prevents failures and non-compliance



# Implementation and Integration

## ServerTech and Raritan Bulk Configuration & ZTP Process

Zero touch provisioning automates the entire provisioning and configuration process for RPDUs, allowing IT teams to set up multiple devices with minimal manual intervention. This is particularly valuable in large-scale data centers, where manual configuration can lead to errors and downtime.

Below, we outline how ZTP is applied to ServerTech and Raritan RPDUs to automate configuration and firmware upgrades. This uses a combination of DHCP (for automatic IP address assignment) and TFTP/HTTPS servers (for configuration and firmware file management), which are integrated into ZPE Systems' Nodegrid appliances.

Here's a step-by-step outline of the process:

- Create Configuration Files:** Create configuration files tailored to the specific model and firmware version of the RPDUs in use. These files typically include:
  - `fwupdate.cfg` : Required for firmware upgrades.
  - `config.txt` : Holds device-specific configurations.
  - `devices.csv` : An optional file to manage bulk configurations.
- Configure TFTP/HTTPS Server:** The configuration and firmware files can be easily uploaded to the Nodegrid Datastore directory, which acts as a root directory for the integrated TFTP/HTTPS server.
- Configure DHCP Server:** Configure Nodegrid's DHCP server to point to the `fwupdate.cfg` file on the TFTP/HTTPS server.
- Apply Configuration:** When the RPDUs perform a DHCP renewal, they will reach out to the DHCP server, which will direct them to the TFTP/HTTPS server. Once connected, the RPU fetches the `fwupdate.cfg` file and performs the necessary configurations or firmware updates. The server can also trigger different configuration options based on vendor-class-identifier settings in the DHCP options.
- Magic Cookie for Repeated Configurations:** The ZTP process includes a `magic cookie`, a unique identifier stored on the device that prevents repeated execution of the same configuration tasks. If a mismatch between the stored cookie and the new configuration cookie is detected, the device knows to pull fresh configurations, ensuring that updates are only applied when needed.
- Integration with ZPE Nodegrid:** ZPE's Net SR platform provides a highly configurable and scalable environment for managing RPDUs, enabling bulk firmware upgrades, configuration management, and device provisioning from a single platform. The Net SR handles the heavy lifting by integrating the ZTP workflows and managing the DHCP/TFTP/HTTPS services. This eliminates the need for extra external components, allowing administrators to efficiently leverage existing infrastructure.

## Key Benefits

- **Save Time:** Multiple RPDUs can be configured and updated simultaneously, saving hours of manual work.
- **Eliminate Errors:** Automated configuration reduces the risk of human error during provisioning, ensuring devices are configured correctly the first time
- **Save Money:** ZPE Systems' Nodegrid SR appliance family eliminates the need for extra servers or networking equipment, saving capex and allowing teams to take full advantage of their existing infrastructure.
- **Deploy with Ease:** The centralized configuration file system means changes to the network setup, user permissions, or RPDU settings can be easily updated and applied across devices.
- **Scale Any Environment:** Support for both IPv4 and IPv6, and the ability to handle complex configuration tasks, make this the ideal solution to accommodate expanding data centers.



**Contact ZPE Systems today** to learn how Nodegrid can make your ServerTech and Raritan RPDU management simple, automated, and scalable.

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