BLUEDOT

RELEASE 1.4.0

QuantumBNG

Quick Start — Bare-Metal Install

The get-it-running script for a first-time QuantumBNG install: from a fresh Ubuntu 24.04 box to a working BNG serving DHCP leases in about thirty minutes. Covers prerequisites, downloading and running the installer, the information to gather beforehand, every step of the first-run wizard, verifying that a subscriber onboards, and rotating the bootstrap admin key. The Operator Guide is the reference for everything after.

Document Type	BlueDot Quick Start
Component	QuantumBNG — controller, console & data plane
Release	v1.4.0
Audience	Operators installing QuantumBNG for the first time
Time Budget	~30 minutes
Prerequisites	Ubuntu 24.04 LTS · 4 cores · 8 GB RAM · DPDK NIC
Companion To	*QuantumBNG Operator Guide*
Classification	**BlueDot Proprietary**
Date	October 2026

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Audience: the operator installing QuantumBNG for the first time. **Time budget:** ~30 minutes from a fresh Ubuntu 24.04 box to a working BNG serving DHCP leases. **Assumes:** shell access to the box (SSH or console), root/sudo, a working management NIC on the LAN.

If you want the full manual instead — every panel, every setting, every operator task — see `user-guide.md`. This document is the "get it running" script; that one is the reference.

1. Prerequisites

Item	Minimum	Recommended
OS	Ubuntu 24.04 LTS	Ubuntu 24.04 LTS
Kernel	6.x	6.14+
CPU	4 cores	10+ cores (1 for main, 6 for VPP workers, 3 for OS/services)
RAM	8 GB	16 GB
Disk	20 GB free	40 GB free
NIC (management)	1× 1 Gbps, kernel driver	same
NIC (subscriber-facing)	1× DPDK-supported (Intel E810/E830, XL710)	same
Network	LAN access to the customer subnet + upstream router	same

About the kernel. Ubuntu 24.04.4 ships 6.8, which is the kernel this release is validated on, so a stock install is fine. Preflight warns below 6.14 because a few DPDK plugins fall back there; it does not refuse. If that fallback matters for your NIC, `linux-generic-hwe-24.04` provides 6.14. It is not required.

CPU pinning matters. If the box has isolated cores for VPP (`isolcpus=1-6` in `/proc/cmdline` — the recommended setup), the installer preserves whatever `corelist-workers` line matches those cores. If the box has no isolcpus, the installer falls back to a single-worker boot-safe config.

Don't run this on a shared / production box. The installer edits `/etc/vpp/startup.conf`, opens ports 8443/3000, installs docker.io if missing, and adds systemd units. Fine for a dedicated appliance; disruptive on a general-purpose server.

If you're evaluating in VirtualBox, three constraints: - **First-boot hang (fixed).** Evaluation images before 1.3.0-13 could hang intermittently on first boot. It was traced to an expedited RCU grace period that never completes under VirtualBox — one vCPU never reports quiescent to `synchronize_rcu_expedited()`, and `systemd-tmpfiles-setup-dev-early` is the first visible victim rather than the cause. The image now boots with `rcupdate.rcu_normal=1`, measured at 75 consecutive clean boots on 3 and 4 vCPU. The evaluation appliance ships with 3 vCPU; there is no need to reduce it. (Earlier guidance called this an SMP deadlock and advised ≤ 2 vCPUs — both the diagnosis and the advice were wrong.) - **docker-ce** in the host image will block install — the controller `.deb` depends on `docker.io` and the two conflict. Either use a base image without Docker preinstalled or `apt-get remove docker-ce docker-ce-cli containerd.io` first (preflight will detect this and abort with an actionable message). - **VirtualBox guests don't expose** `pdpe1gb` — the installer detects that and falls back to 2 MiB pages, reaching the same total in more of them. No action needed from you. - **Hugepages are sized to the box** (new in 1.3.0). The installer reserves 8 GiB on a machine with 12 GiB or more, and 2 GiB below that. Previously it reserved a flat 8 GiB regardless — which on an 8 GiB machine is the entire box, leaving nothing for the OS, VPP's control plane or the controller. - **The 8 GB minimum now actually works** (new in 1.3.0). Preflight used to floor-divide the memory it read, and because `MemTotal` excludes firmware reservation a genuine 8 GB machine reported 7 GB and was refused. If you previously had to run with `QT_SKIP_PREFLIGHT=1` on an 8 GB box, you no longer do.

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2. Download the installer

Grab the latest bundle from the release page:

```
VERSION=1.4.0-14
curl -LO https://github.com/Bluedot-Insight/quantumipoebng/releases/download/v${VERSION}/quantumipoebng_v$
{VERSION}.tar.gz
tar xzf quantumipoebng_v${VERSION}.tar.gz
cd quantumtouch-installer-${VERSION}
```

Optional — integrity check. Every release ships a `.sha256` sidecar. HTTPS already covers transit integrity, so this only guards against on-disk corruption after the download completes (rare):

```
curl -LO https://github.com/Bluedot-Insight/quantumipoebng/releases/download/v${VERSION}/quantumipoebng_v$
{VERSION}.tar.gz.sha256
sha256sum -c quantumipoebng_v${VERSION}.tar.gz.sha256   # prints OK
```

3. Run the installer

```
sudo ./install.sh
```

Roughly what happens in the ~3 minutes it runs:

Step	What it's doing
Preflight	Sanity-checks OS / kernel / CPU / mem / disk / docker / systemd / network. Refuses to proceed if something's wrong; add `QT_SKIP_PREFLIGHT=1` to force.
Upstream controller	Installs the pinned controller drop (VPP, controller, vpp-bridge).
VPP CPU config	Patches `/etc/vpp/startup.conf` — preserves your `corelist-workers` if the cores exist; otherwise stamps a single-worker boot-safe minimum.
Management plane	Installs the Flask webui + gunicorn on port 8443. Drops in a systemd override that raises gunicorn `--timeout` to 180s so long-running API calls (subscriber onboards, snapshot restores) don't get killed at gunicorn's 30s default.
Bootstrap admin key + first-run token	Mints a one-time admin API key + first-run setup wizard token.
Healthcheck	Confirms the controller reports `status=ok` with `vpp.connected=true`.
Banner	Prints the admin key + the first-run URL.

At the end you'll see something like:

```
================================================================
  QuantumTouch BNG installed (quantumtouch-installer 1.4.0-14)
================================================================

  Web UI:            https://192.168.86.33:8443/
  Controller API:    https://localhost:3000/v1/bng/health
  API reference:     https://localhost:3000/redoc.html

  ----------------------------------------------------------------
   BOOTSTRAP ADMIN KEY (shown ONCE — copy this now):

       quantum_8f232944a8cd2317f9cf270b5b857886

   Use for API calls until you mint a per-operator key:
     curl -H 'Authorization: Bearer quantum_...' \
          https://localhost:3000/v1/bng/health
  ----------------------------------------------------------------

  ----------------------------------------------------------------
   FIRST-RUN SETUP — open in a browser now:

       https://192.168.86.33:8443/bng/setup-wizard?token=bs_...
  ----------------------------------------------------------------
```

Copy the admin key and the setup URL now. The admin key is shown once and never printed again — losing it means recovering via `sudo /opt/bng-deploy/bin/reset-admin.sh`. The setup token can be recovered via `sudo /opt/bng-deploy/bin/show-bootstrap-token.sh` while no admin exists.

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4. Before you begin — information to gather

The setup wizard is 11 steps and it goes fastest when you have every answer ready before you start. Copy or print this checklist; each row is one wizard field:

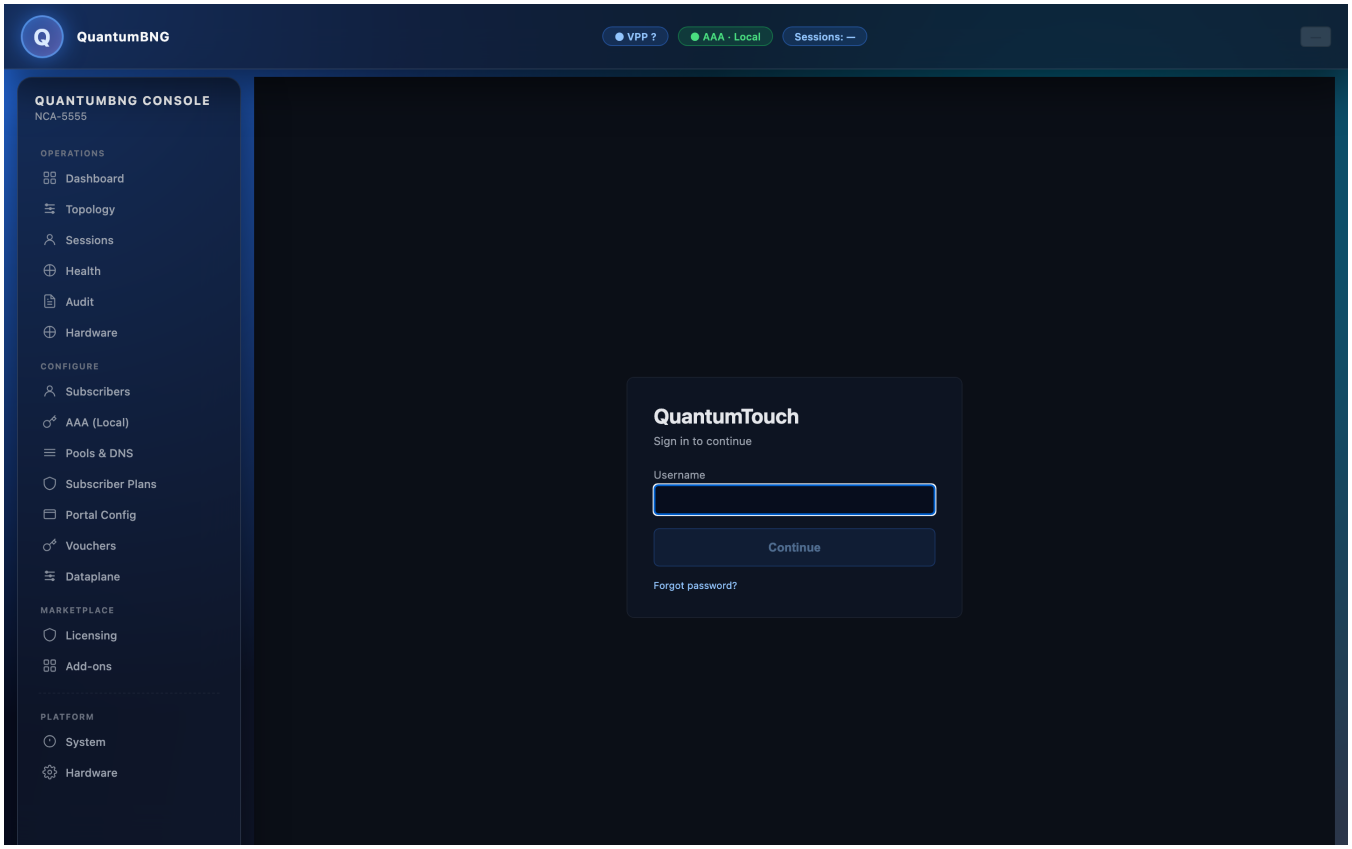
Info	Example	Where you find it
Hostname	`qtbng-1`	Your naming scheme
Timezone	`America/New_York`	`timedatectl list-timezones`
NTP server	`pool.ntp.org` or your corporate NTP	Ops team
Admin email	`netops@example.com`	Ops team
Which NICs are for subscribers / uplink / management	`0000:47:00.0` = access, `0000:47:00.1` = uplink	`lspci -d 8086:` on the box + your cable map
Number of VPP worker cores	`6` (recommended for a 10-core box)	Your `isolcpus=` kernel arg, or accept the wizard's default
Rate plan	Name `Bronze`, down 20/25 Mbps CIR/PIR, up 10/12 Mbps CIR/PIR	Product policy
DHCP pool CIDR + gateway	`100.64.0.0/24` gateway `100.64.0.1`	Network design
DNS servers to hand out	`8.8.8.8, 1.1.1.1` (or your resolvers)	Network design
Auth mode	`local` (single admin, all subs admitted), `radius` (external AAA), or `hybrid`	Deployment plan
RADIUS server + shared secret (if `radius` / `hybrid`)	`radius.corp:1812` + secret	AAA team
Captive portal URL (optional)	`http://192.168.86.33:8088/`	Skip unless you're running gated admission
TLS cert (optional)	`.pem` + `.key` file paths	Skip to use the auto-generated self-signed cert

Physical prep: - Both NICs cabled (management for the webui, subscriber-facing for actual traffic). - SSH access from your workstation to the box. - The bootstrap admin key and first-run URL from the install banner (Section 3) — the key is shown once.

5. First-run setup wizard

Open the setup URL from the install banner. You'll hit a self-signed cert warning — accept it (see `trust-the-cert.md` if you want a real cert).

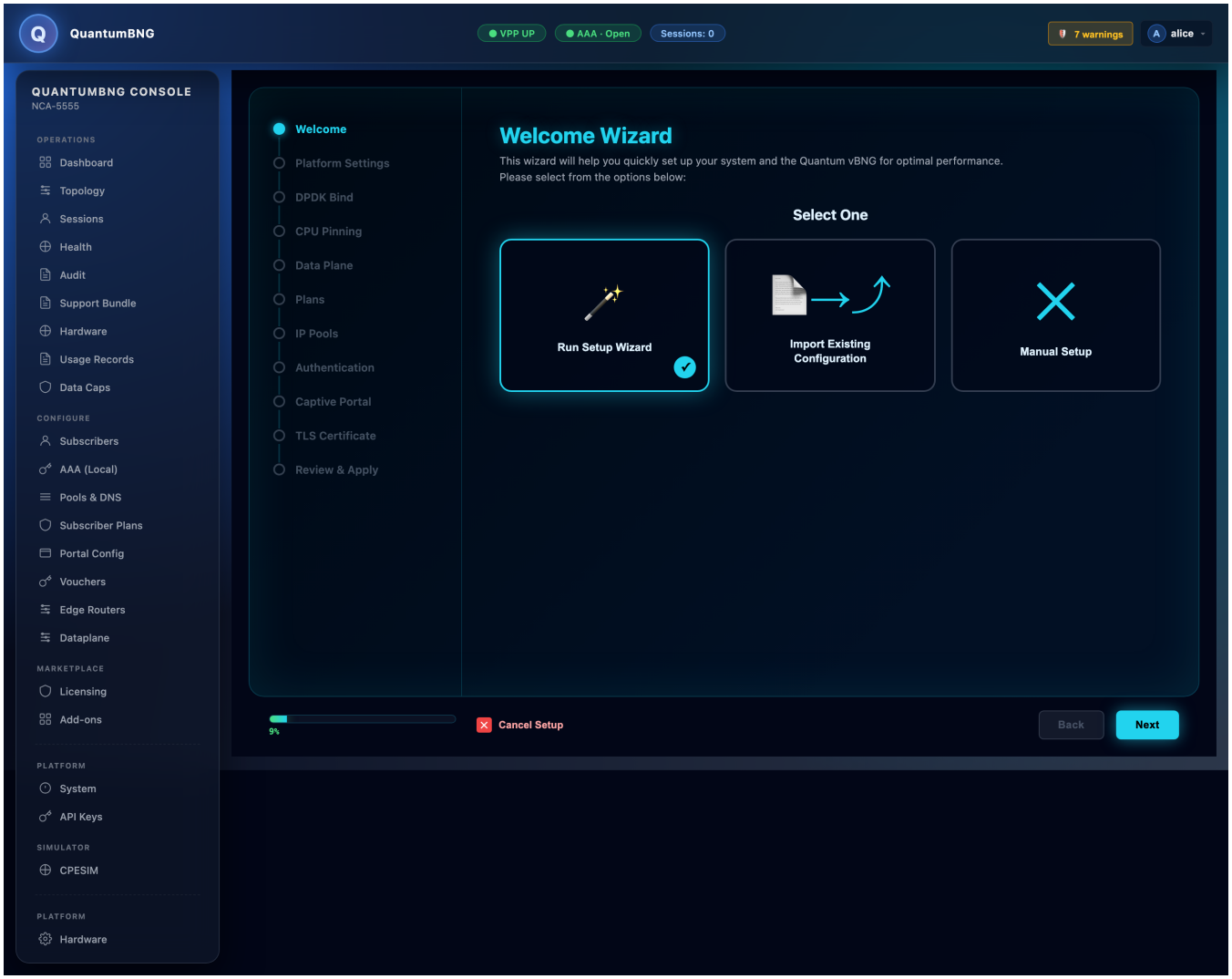
You'll land on the login page:



Log in as the bootstrap admin. The wizard's left rail shows all 11 steps; the progress bar at the bottom shows how much is left. The **Next** button is disabled until the current step's required fields are valid. You can close the tab mid-way and pick up where you left off — the wizard saves a draft locally.

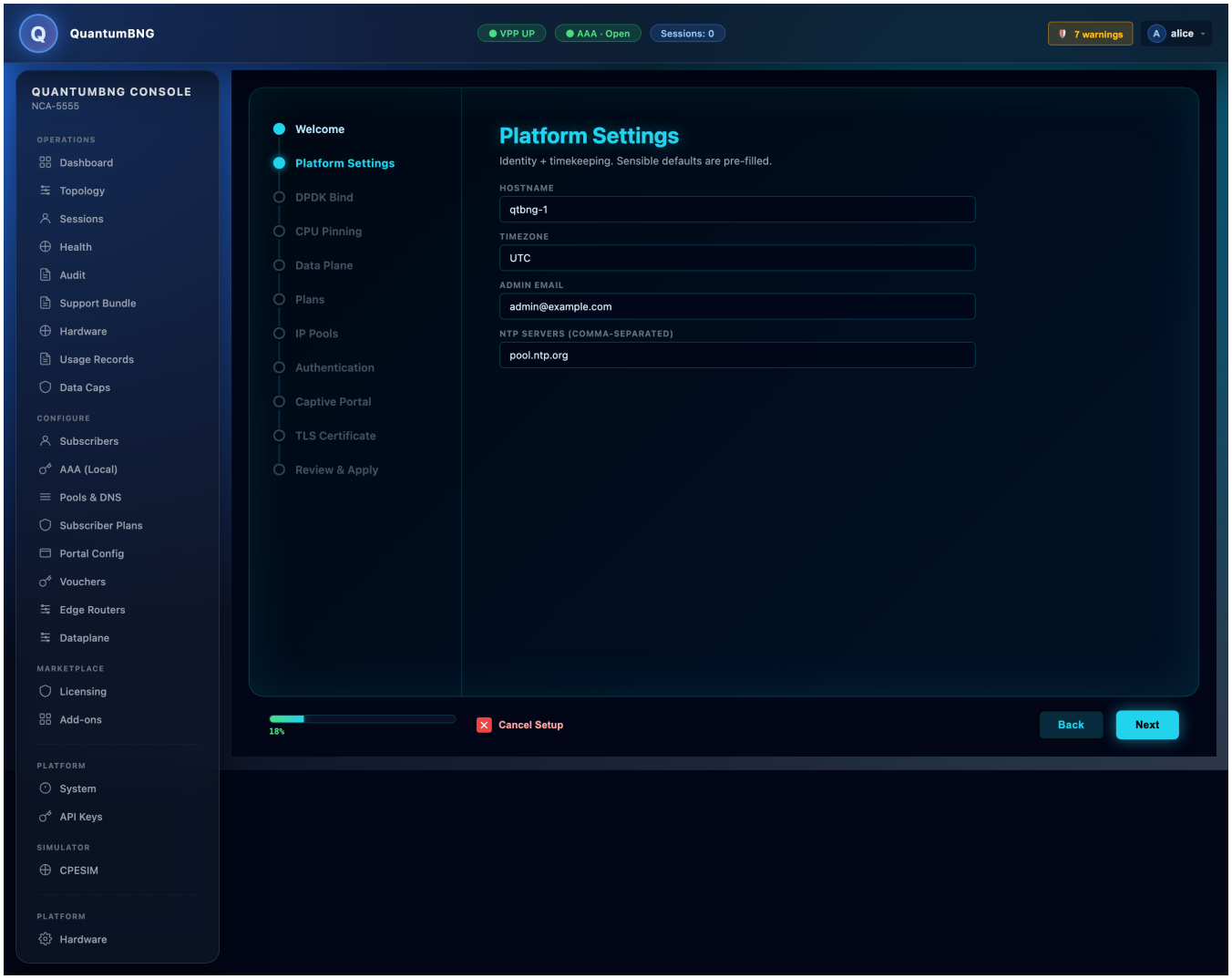
Step 1 — Welcome

Pick which mode to run: **Run Setup Wizard** (guided, recommended for first install), **Import Existing Configuration** (restore a previously-saved wizard JSON), or **Manual Setup** (skip the wizard and configure from the individual pages).



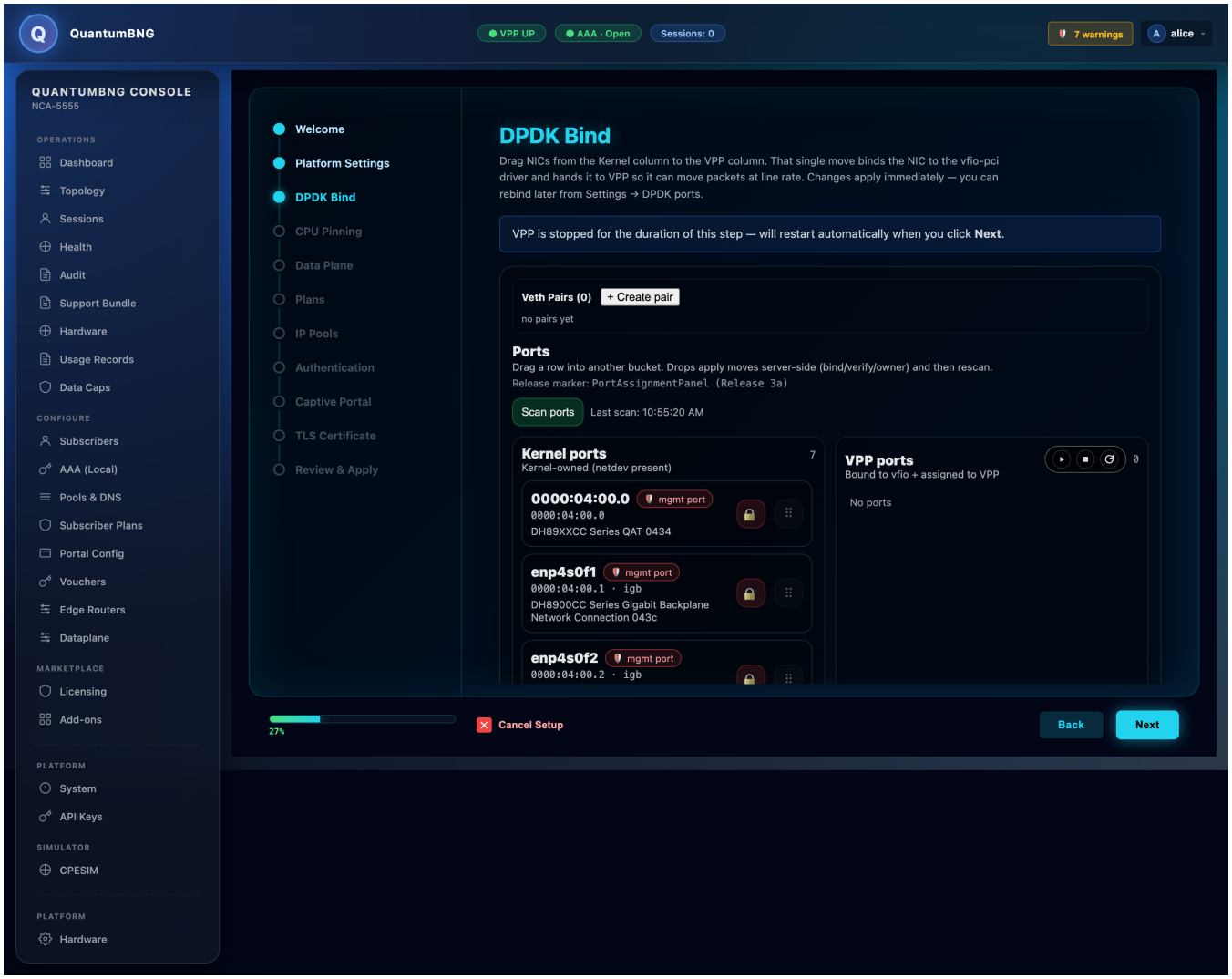
Step 2 — Platform Settings

Hostname, timezone, NTP server, admin email. This is what the box will identify itself as in reports, log lines, and outgoing NTP client requests.



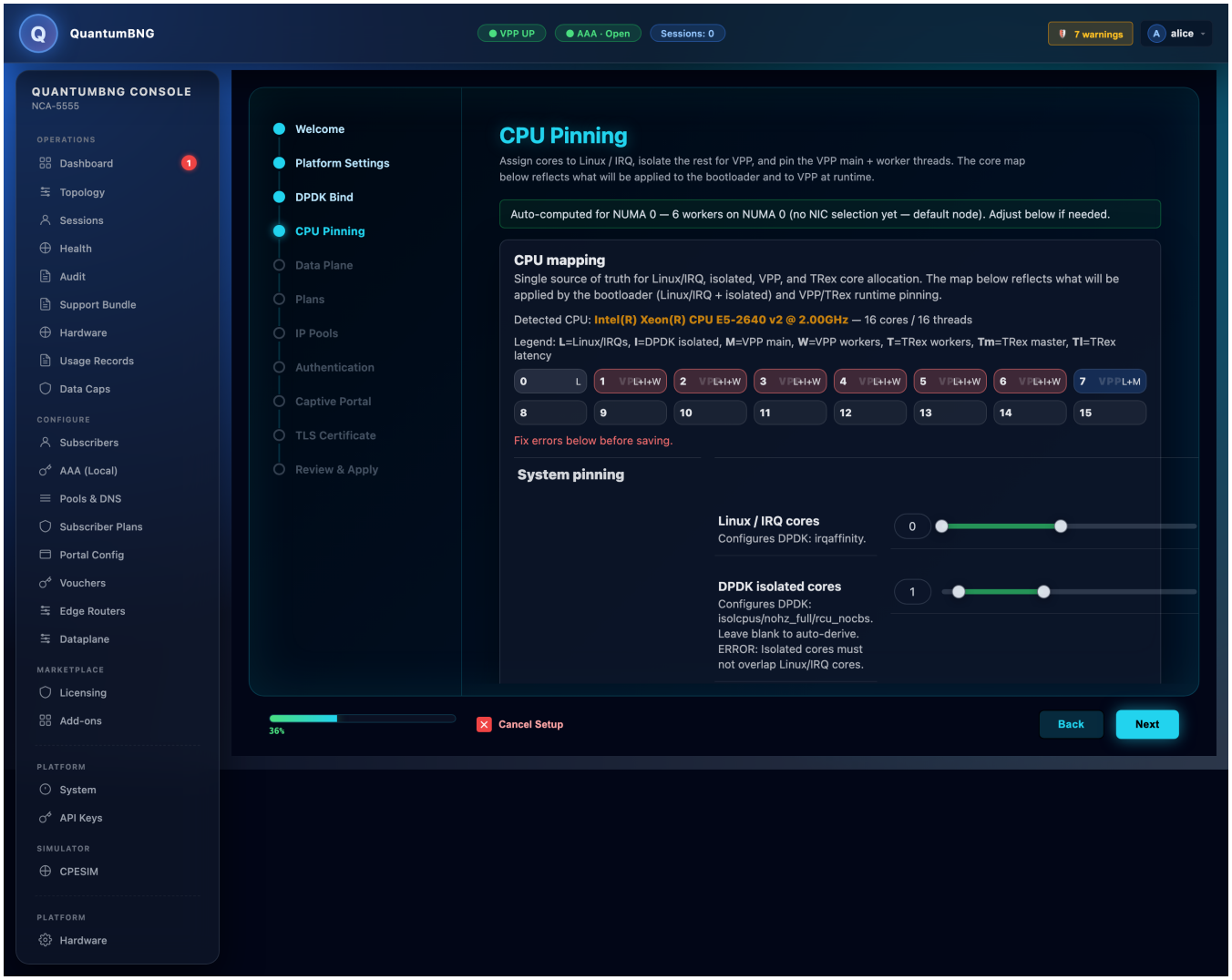
Step 3 — DPDK Bind

Drag NICs from the **Kernel ports** column to the **VPP ports** column. That single move binds the NIC to the `vfio-pci` driver and hands it to VPP so it can move packets at line rate. Keep your management NIC on the kernel side (it stays reachable). Only NICs on the VPP side become selectable in step 5.



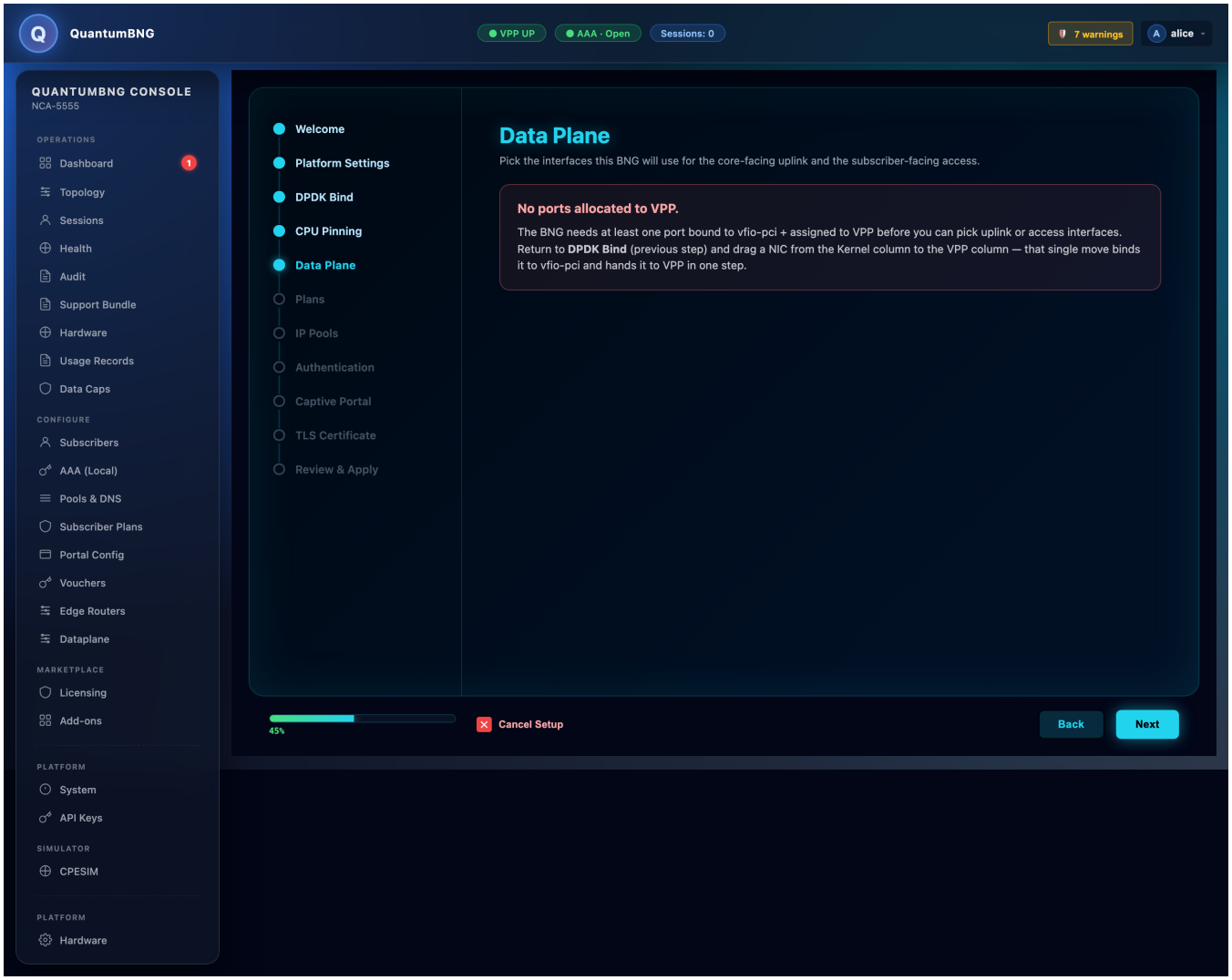
Step 4 — CPU Pinning

Choose how many cores are VPP workers and which physical CPUs they pin to. If you booted the kernel with `isolcpus=`, the wizard suggests those cores. Recommended: accept the default unless you know you want something different.



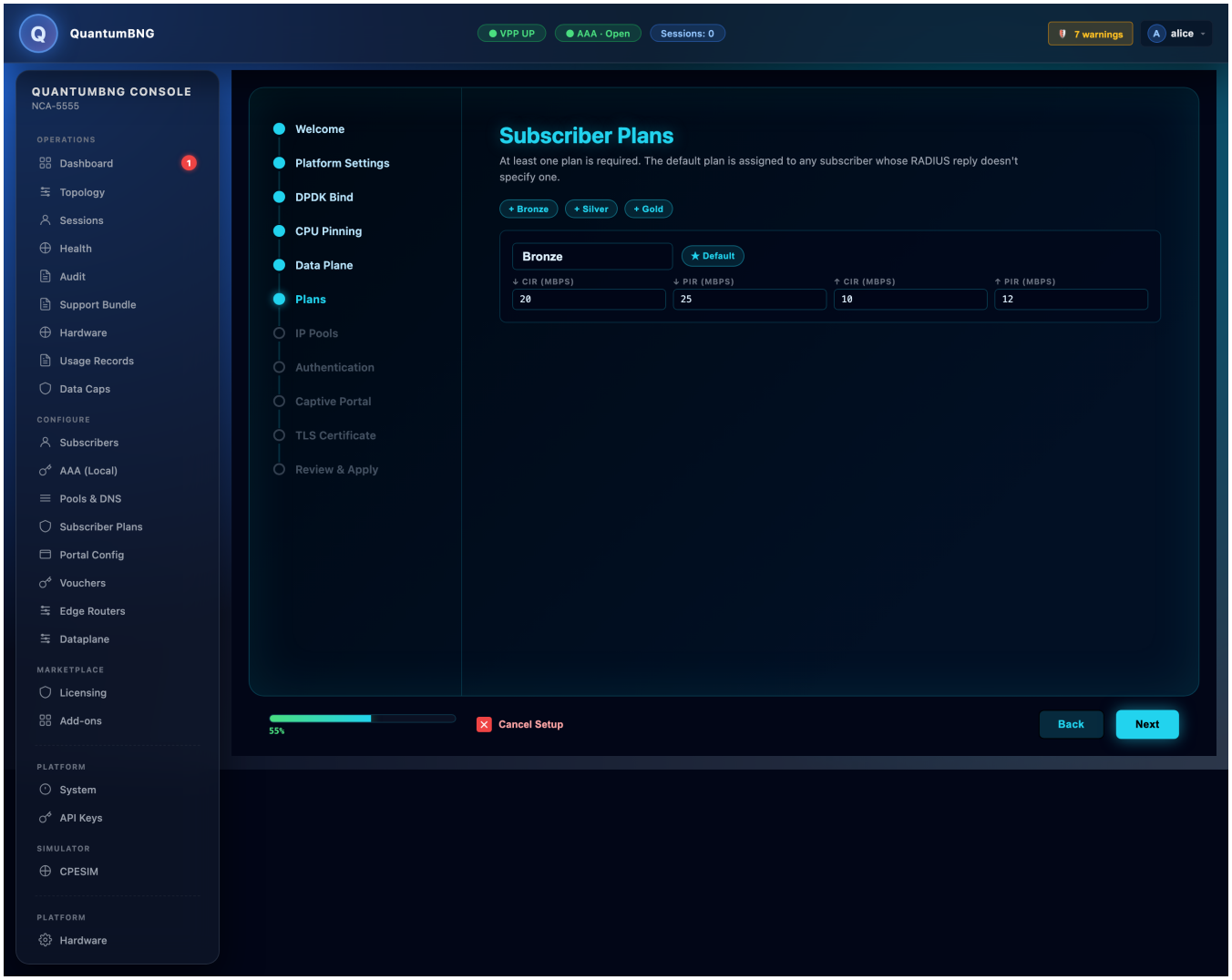
Step 5 — Data Plane

Pick one VPP interface as **Uplink** (WAN, toward your edge router) and one as **Access** (subscriber, toward the CPEs). The dropdowns only list interfaces you bound to DPDK in step 3.



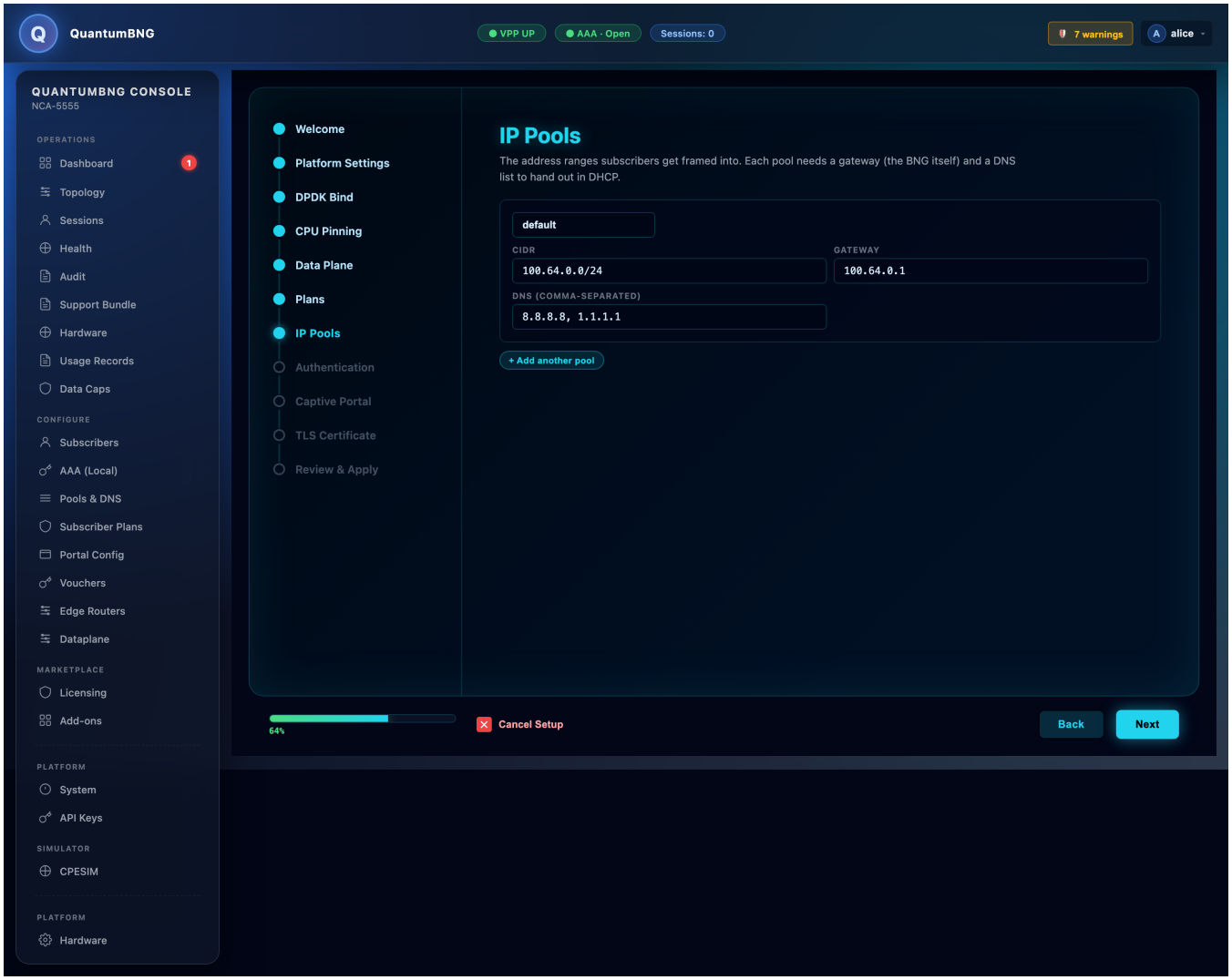
Step 6 — Plans

Define at least one rate plan. Each plan has committed (CIR) and peak (PIR) rates in both directions, all in kbps. Mark one plan as **default** — that's what a subscriber gets if AAA doesn't hand back an explicit plan name.



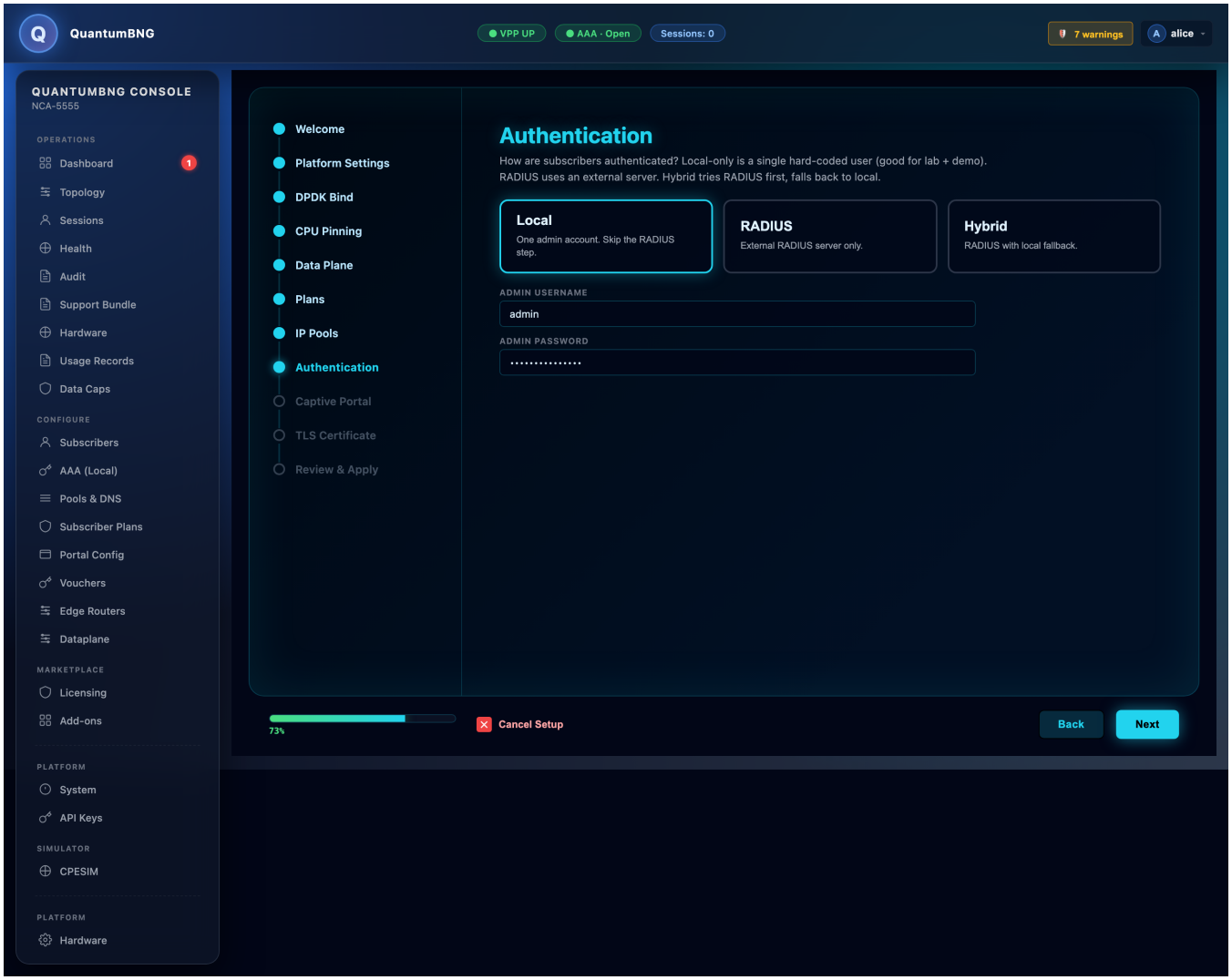
Step 7 — IP Pools

Define at least one DHCP pool. Each pool needs a **CIDR** (range), a **Gateway** (the BNG's own IP inside that range — usually `.1`), and a comma-separated **DNS** list to hand out as DHCP Option 6. Add more pools if you need per-plan or per-VLAN separation.



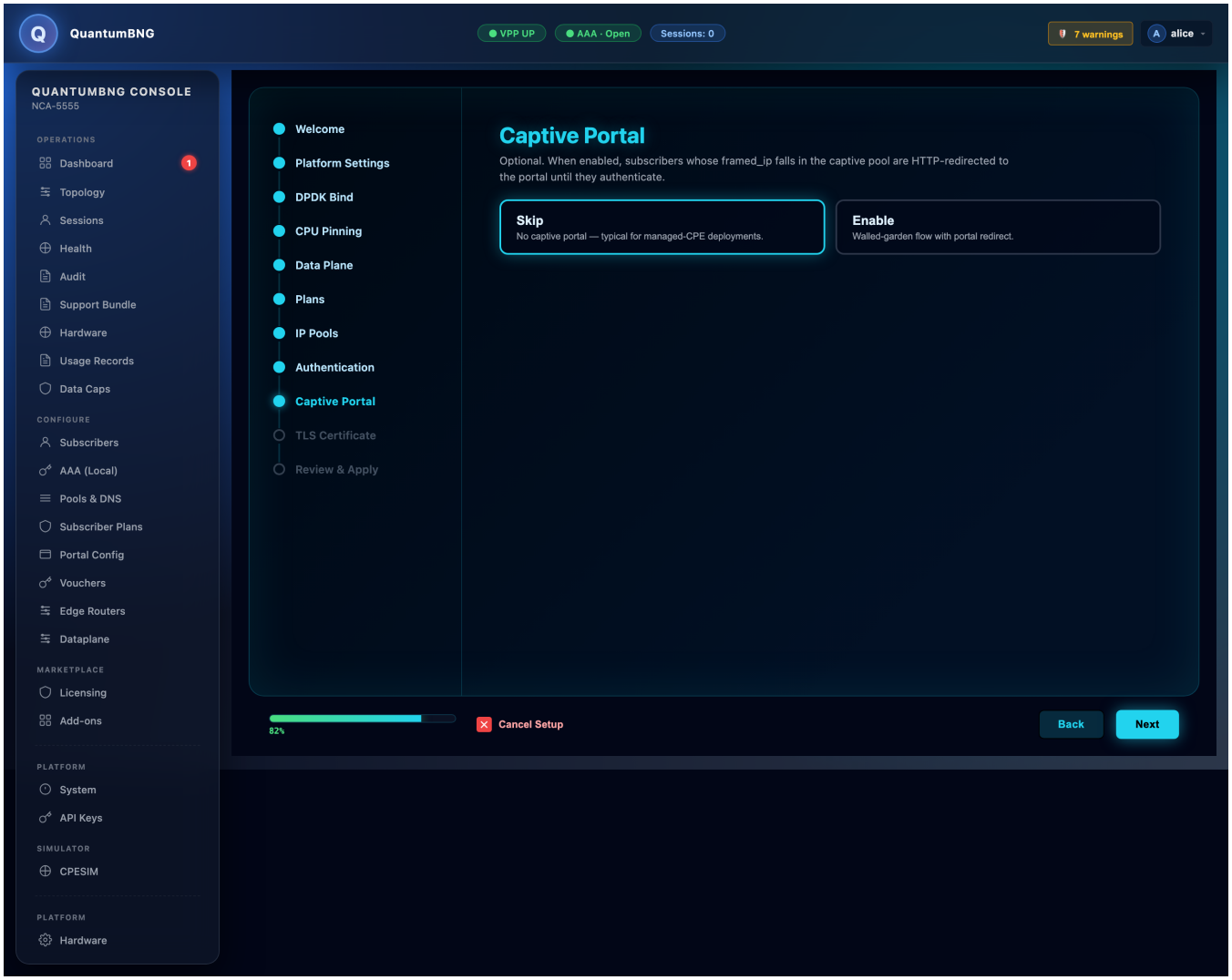
Step 8 — Authentication

Pick **Local** (one admin account, all subscribers auto-admitted — fine for a lab or single-site demo), **RADIUS** (external RADIUS server only), or **Hybrid** (RADIUS with local fallback). If you pick RADIUS or Hybrid, the wizard inserts an extra RADIUS-server step here (host, port, shared secret) before continuing. Under Local, fill in the admin username and password you'll log in with going forward.



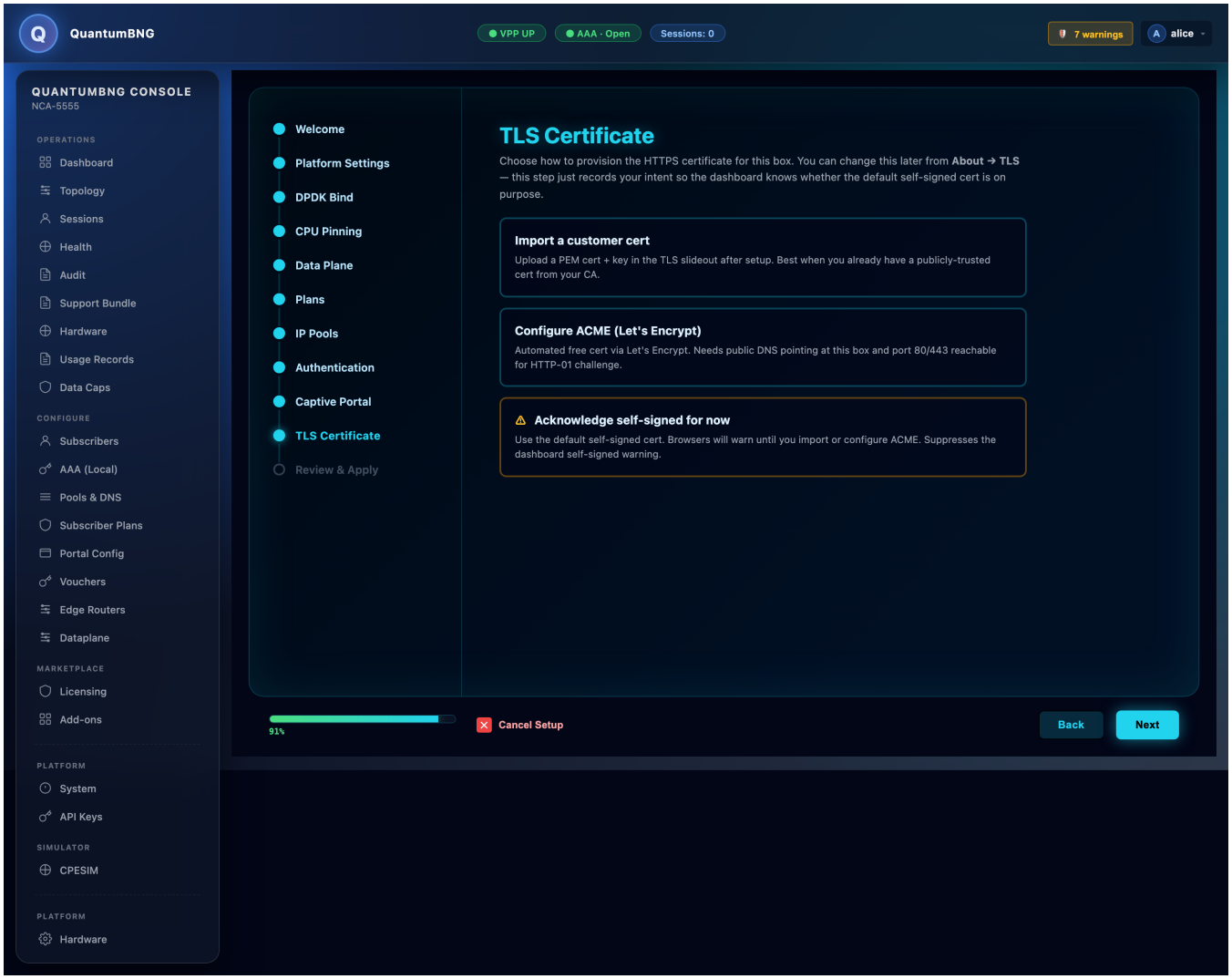
Step 9 — Captive Portal (optional)

Enable this only if you're running gated admission — i.e., unauthenticated subscribers should land on a captive portal before getting Internet. Provide the portal IP and a separate CIDR for captive-state sessions. Skip if you're running open admission.



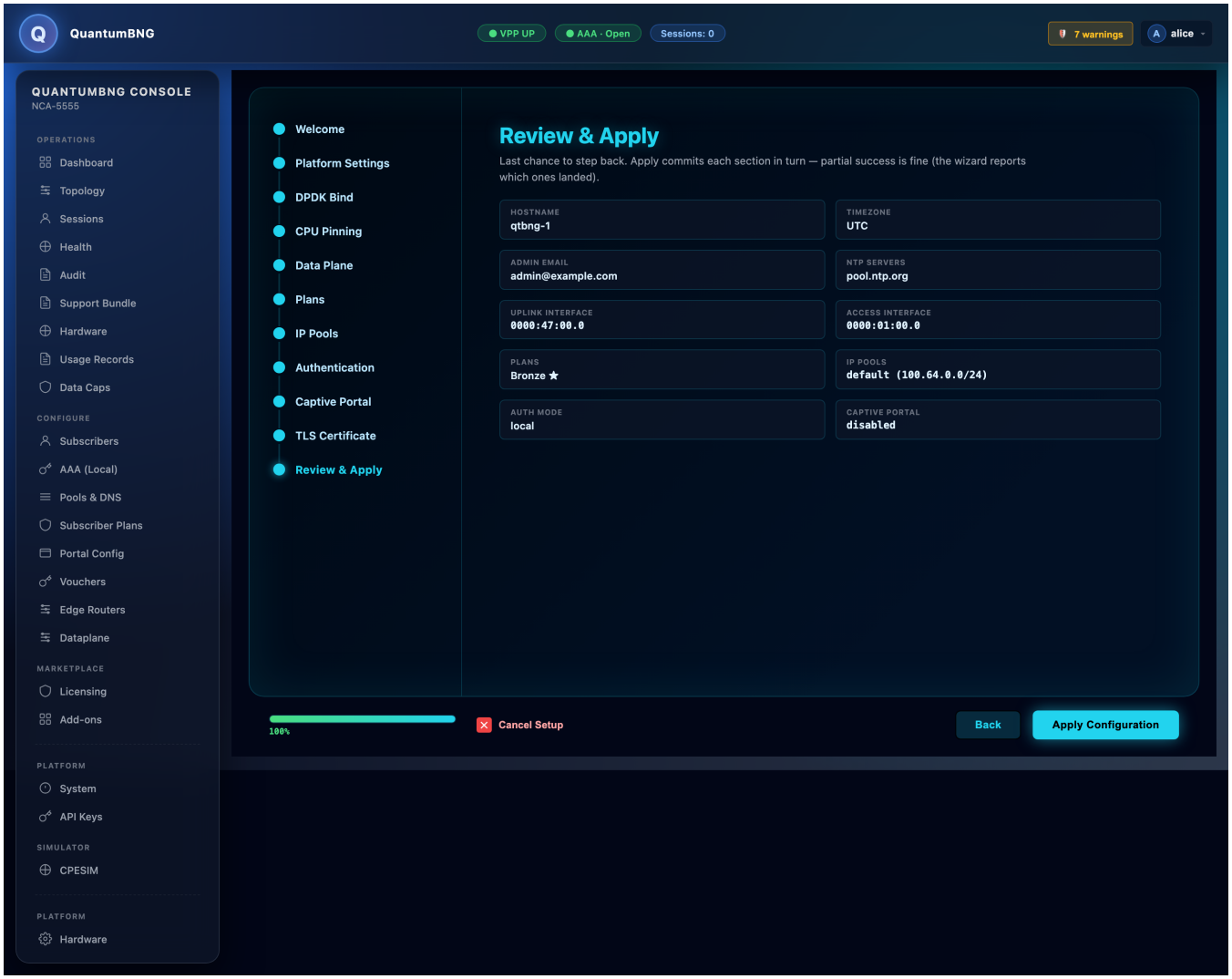
Step 10 — TLS Certificate

The webui is served over HTTPS on port 8443. The install already generated a self-signed cert; upload a real cert here if you have one, or leave it as-is and address it later via `letsencrypt-on-bng.md`.

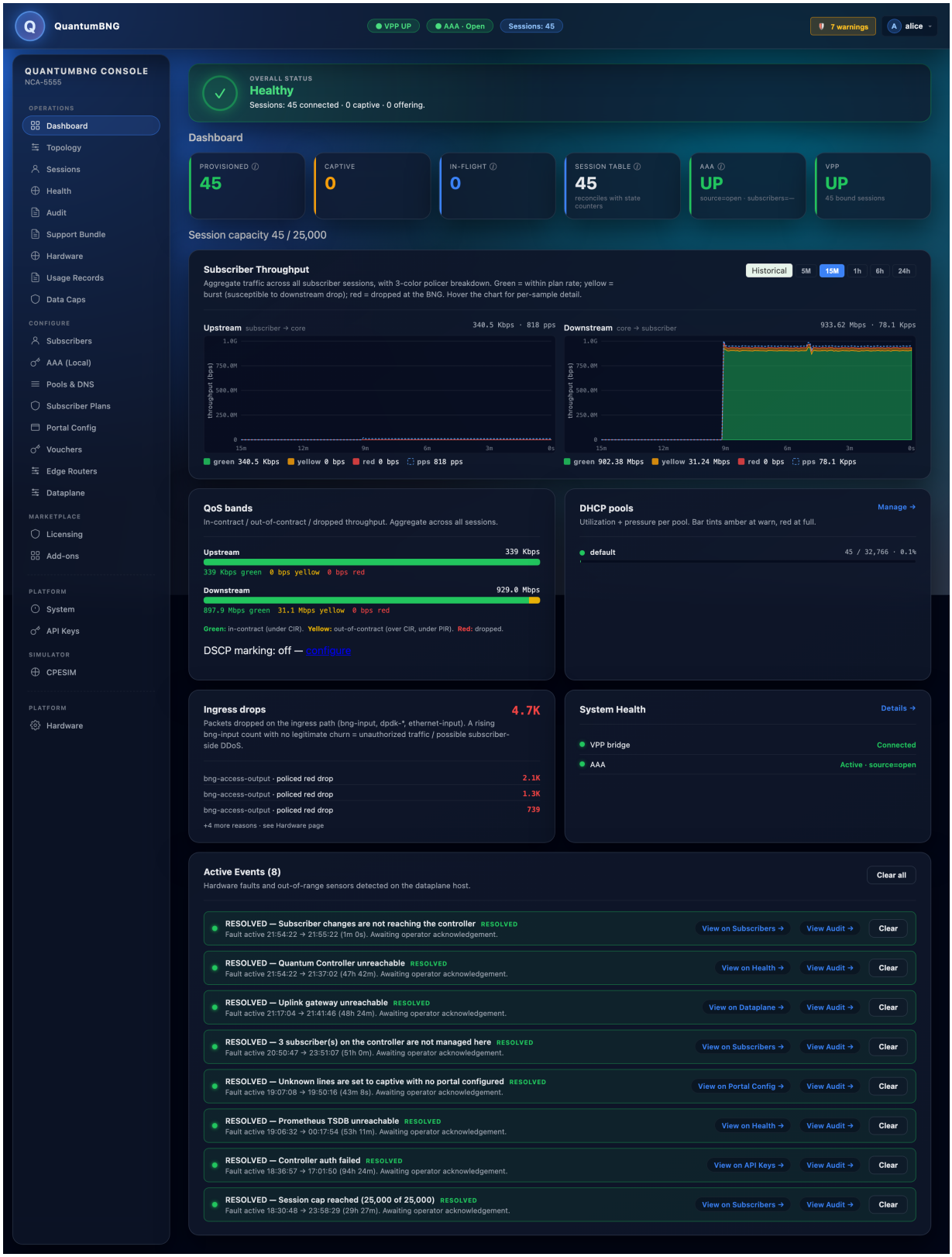


Step 11 — Review & Apply

Full summary of everything the wizard is about to commit. Read each row — this is the last chance to step back. Click **Apply Configuration** and the wizard commits each section in turn; partial success is fine (the wizard reports which sections landed and which didn't).



After the wizard, you're on the main dashboard:



The header pills (**VPP** / **AAA** / **Sessions**) are your live health snapshot. If VPP is `UP`, AAA is `Local · gated` (or `open`), and Sessions is a number (even zero), the box is ready to serve subscribers.

6. Verify a subscriber onboards

Plug a real DHCP client into the subscriber-facing port (a laptop, another test router). Watch the **Sessions** panel:



Within a few seconds you should see a new row: framed IP, MAC, plan, session state `CONNECTED`. If you see it, DHCP → AAA → session install is end-to-end working. Ship the box.

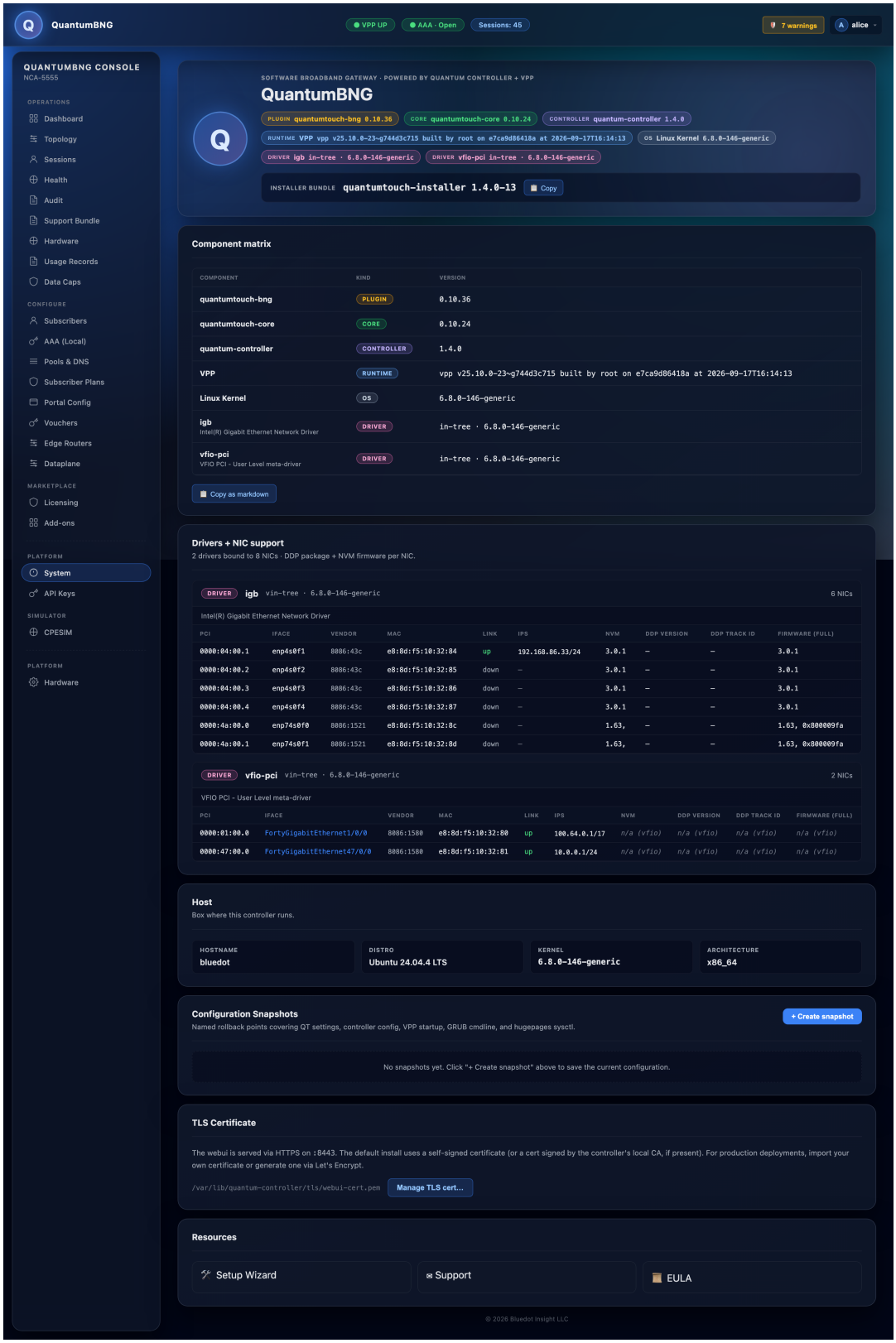
If the client gets no IP:

Check	Command
Was the DISCOVER received?	`sudo vppctl show int host-<access-interface>` — RX packets should climb.
Did the controller see it?	`sudo journalctl -u quantum-controller -f` — look for `onDiscover`.
Is the punt socket alive?	`sudo vppctl show errors` — `ip4-udp-punt-socket Socket TX` errors mean vpp-bridge lost the socket; `sudo systemctl restart vpp-bridge` fixes it.
Is the pool exhausted?	Dashboard → **DHCP pools** panel. If bar is red, add capacity via Pools & DNS.

More detail in the troubleshooting section of the user guide.

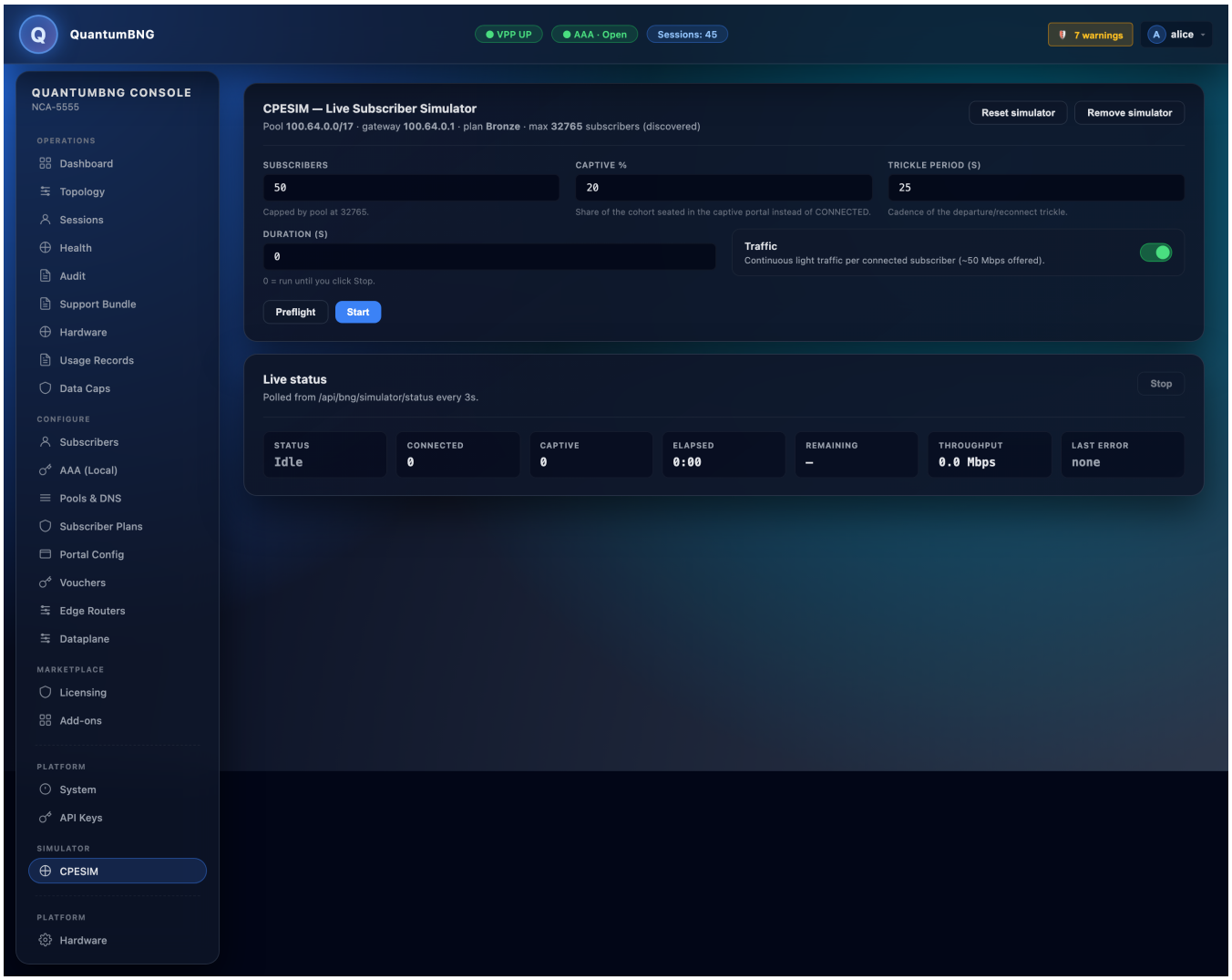
7. Optional — install CPESIM for a demo without real subscribers

If you want to see the dashboard populated (traffic charts, session counts, QoS bands) without wiring real hardware, install the CPESIM plugin from the **About** → **Toybox** panel:



Click **Install** on the CPESIM row. The install takes ~30 seconds (downloads the tarball, verifies SHA, unpacks to `/opt/bng-demo`, registers the systemd unit).

Then go to **CPESIM** in the left nav:



Click **Start**. Within ~60 seconds you'll have 50 simulated subscribers (10 in the captive portal) generating real DHCP + HTTP video traffic through your BNG. The dashboard's throughput chart and QoS bands will populate.

Click **Stop** when done. Click **Reset simulator** (admin-only button) if the engine ever gets stuck.

---

8. Rotate the bootstrap admin key

Once you've minted per-operator API keys via the webui (**Settings** → **API Keys**), rotate the bootstrap key so it can't be reused:

```
sudo /opt/bng-deploy/bin/rotate-controller-key.sh
```

This mints a fresh internal key for the management plane to talk to the controller and invalidates the old bootstrap key. Any operator-minted key stays valid.

9. Next steps

- **Raise capacity beyond the free tier.** A new install runs at the free tier's 1,000-session cap. If you have bought capacity, activate your licence from the console's Licensing page — see *Licensing* in the user guide.
- **Read the user guide** for the per-panel walkthrough, common operator tasks (add plan, change rate, disable subscriber, backup/restore), and troubleshooting.
- **Bookmark the API docs** — `https://<box-ip>:3000/redoc.html` on the box (behind the same self-signed cert).
- **Set up backups** — `/opt/bng-deploy/bin/qt-auth-backup.sh` writes an encrypted bundle of users + keys + config. Schedule it in cron.
- **Wire real TLS** — see `letsencrypt-on-bng.md` for the ACME flow.
- **Set up monitoring** — Prometheus scrapes `/metrics` on port 8443 with the scrape key at `/opt/quantumtouch/etc/scrape-token`. Rotate with `sudo /opt/bng-deploy/bin/qt-scrape-token-rotate`.

Uninstall

Fully removes bng-deploy + the controller container + all state under `/opt/bng-deploy`, `/var/lib/quantum-controller`, `/opt/quantumtouch`:

```
sudo /tmp/quantumtouch-installer-1.4.0-14/uninstall.sh
```

Docker, systemd, and the kernel are not touched — this is a package uninstall, not a system wipe.