

Provisionierung und Monitoring von Endgeräten

Mit EasySol 2.0 jetzt noch **schneller**
und noch **einfacher**.

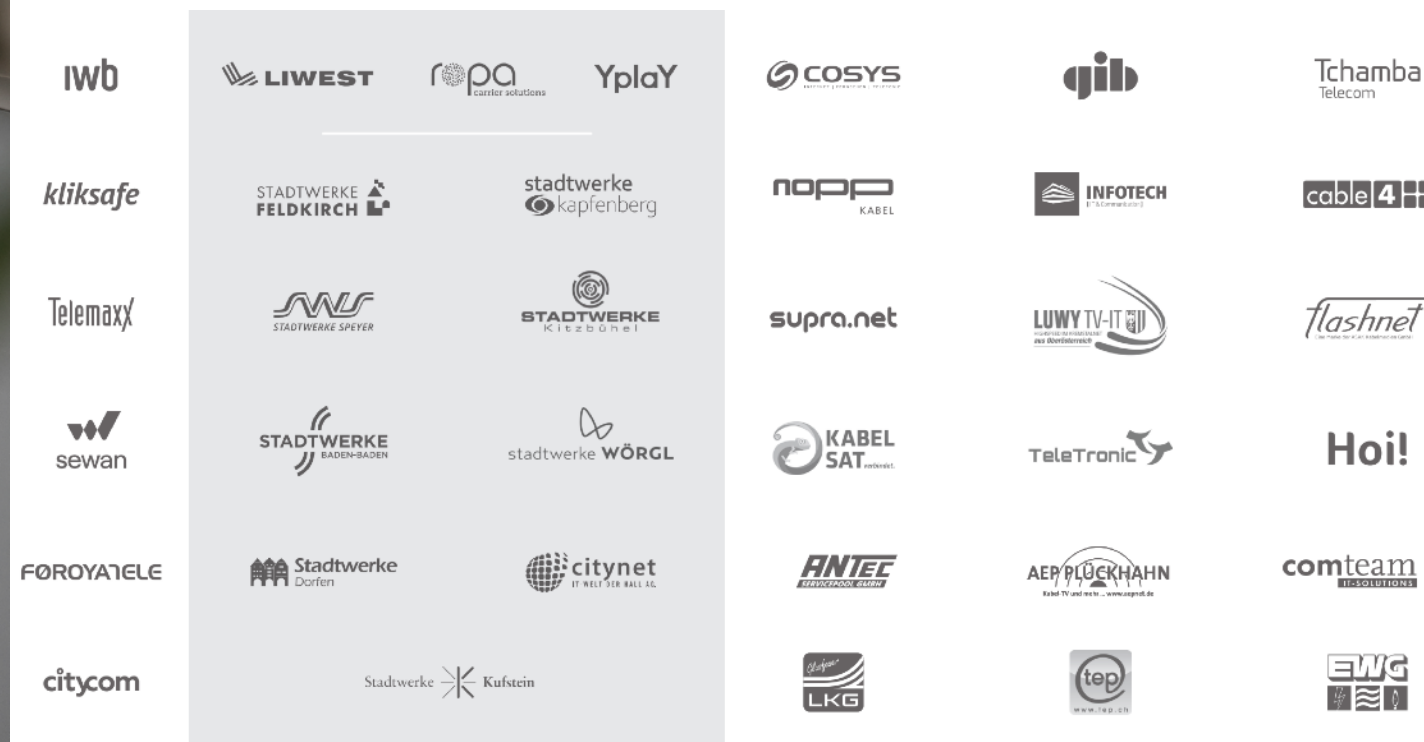


EasySol – wir automatisieren Netze und machen Ihre Daten sichtbar.

2017
Gründung

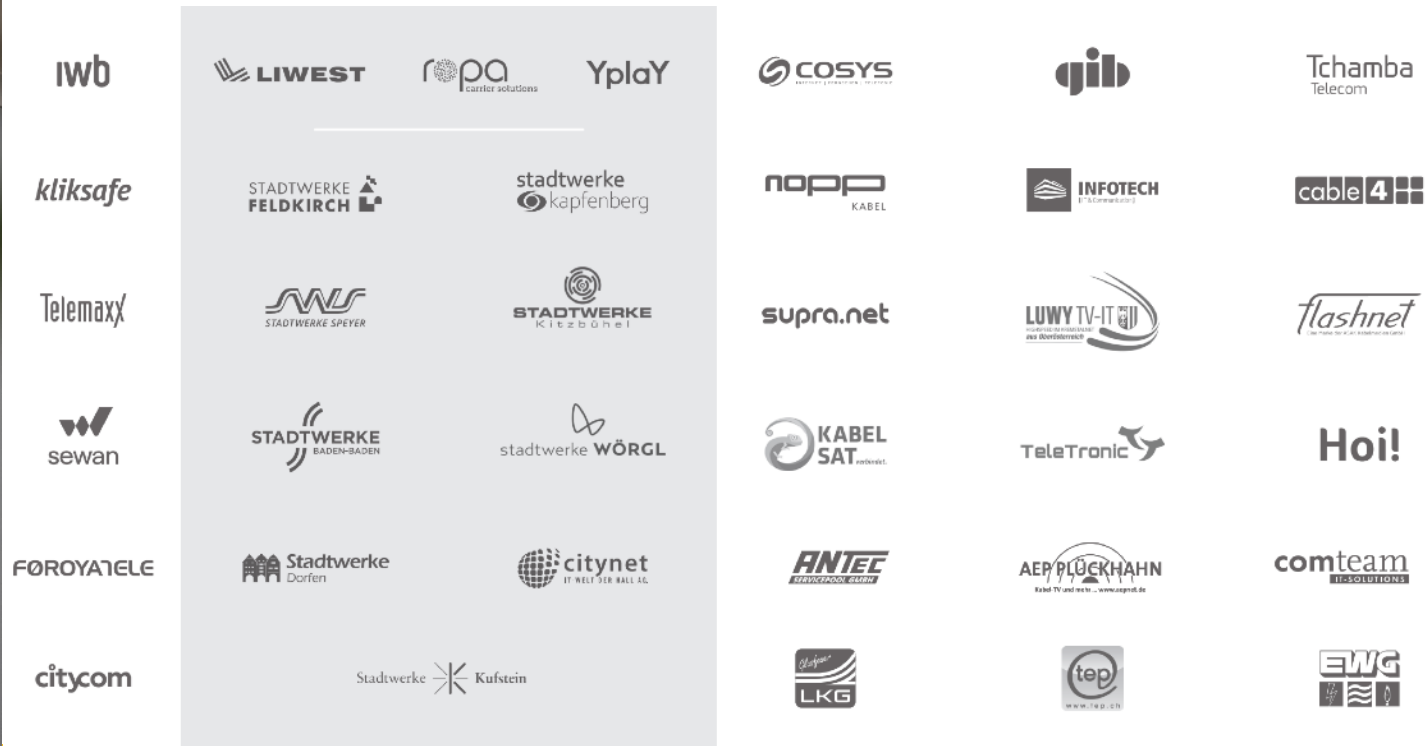
> 100
Netzbetreiber

12
Länder

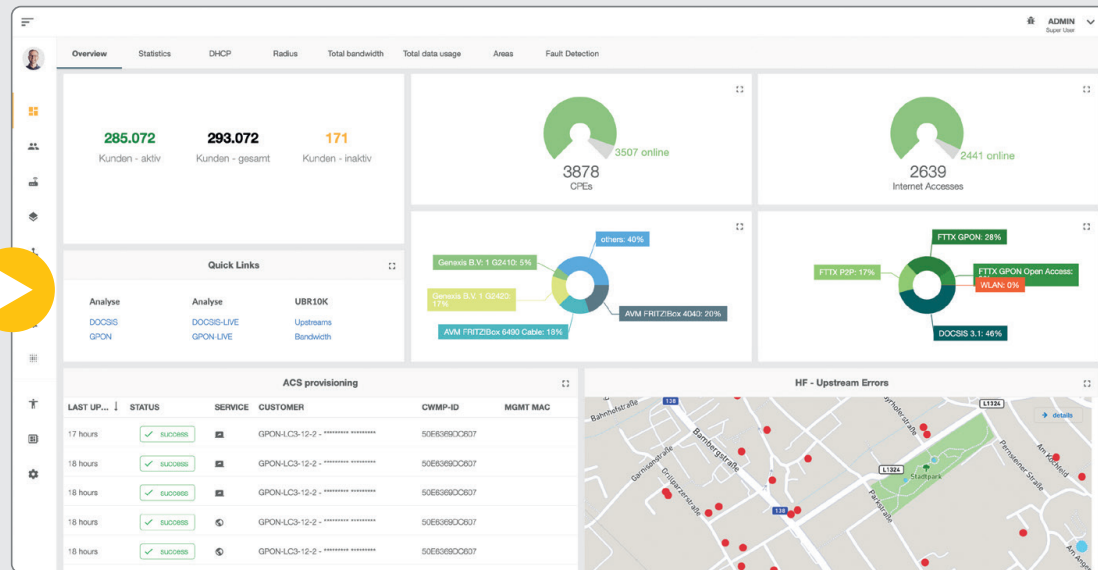




Robert Wurm



Provisionierung und Monitoring



EasyProvisioning

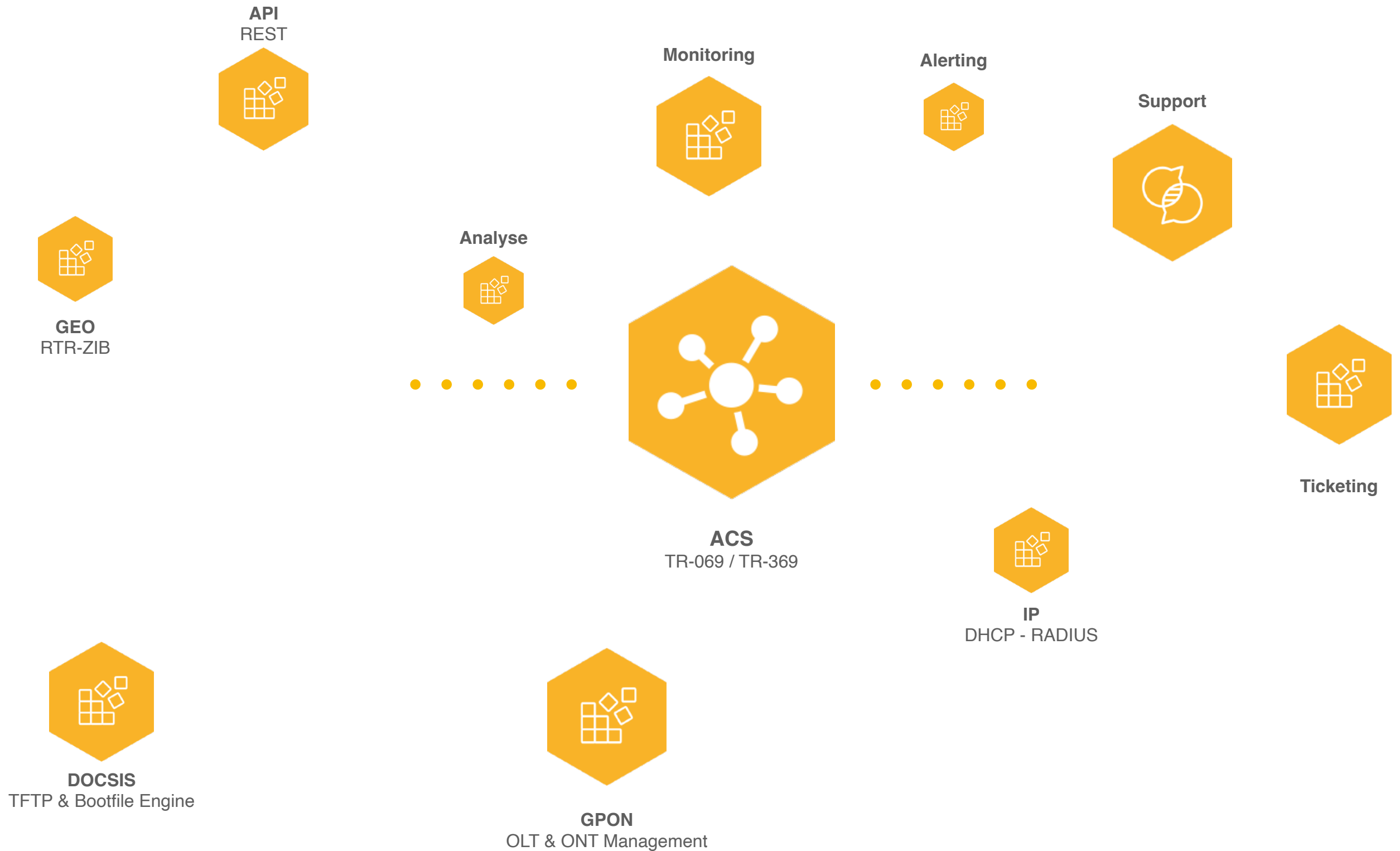
Provider Management Software



EasyInsights

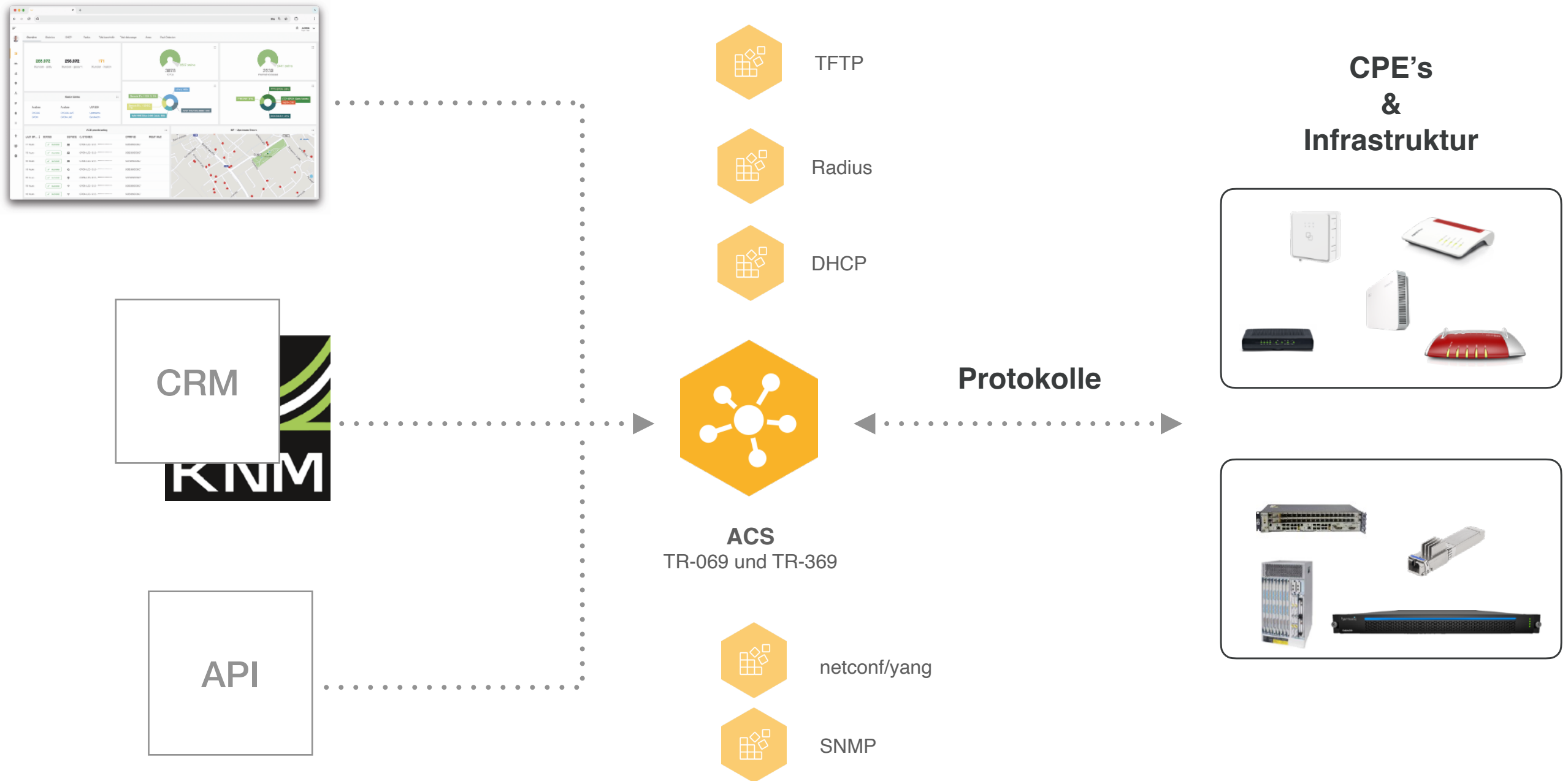
Provider Analytics Software

Provisionierung und Monitoring



Provisionierung

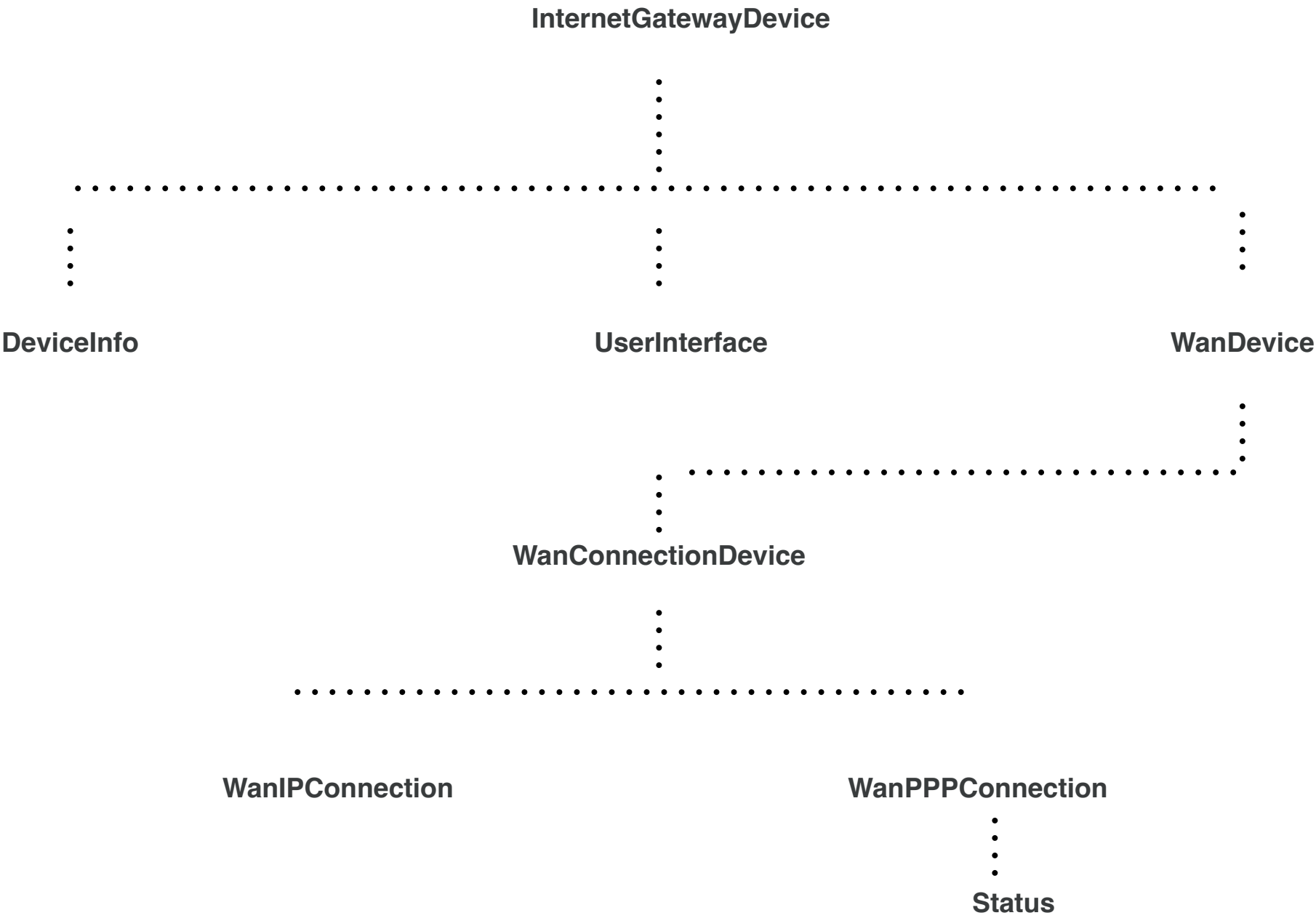
Provisionierung



TR-069

TR-098

<https://cwmp-data-models.broadband-forum.org/tr-098-1-8-0.html>



TR-069

GetValuesOperation

params

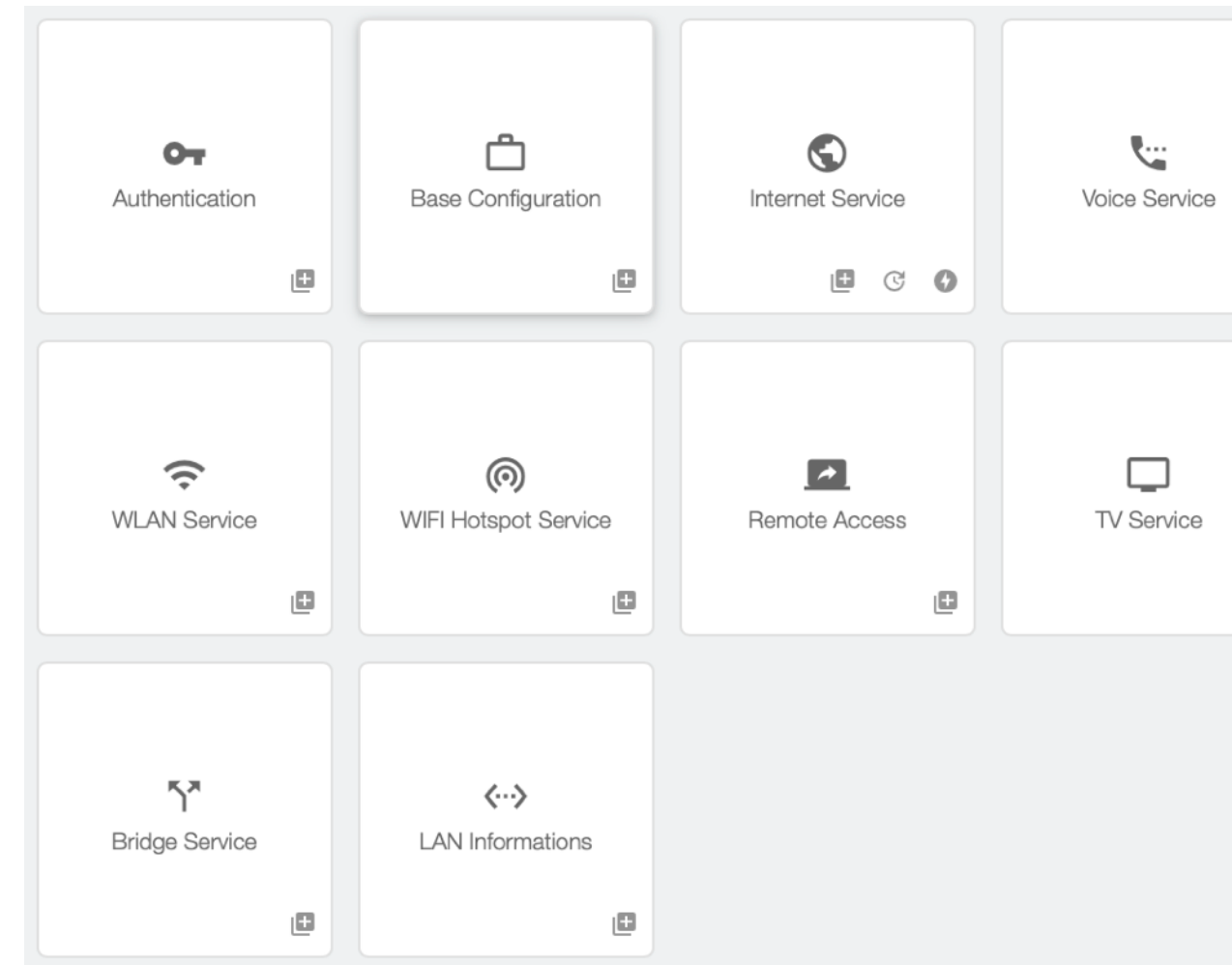
InternetGatewayDevice.

result

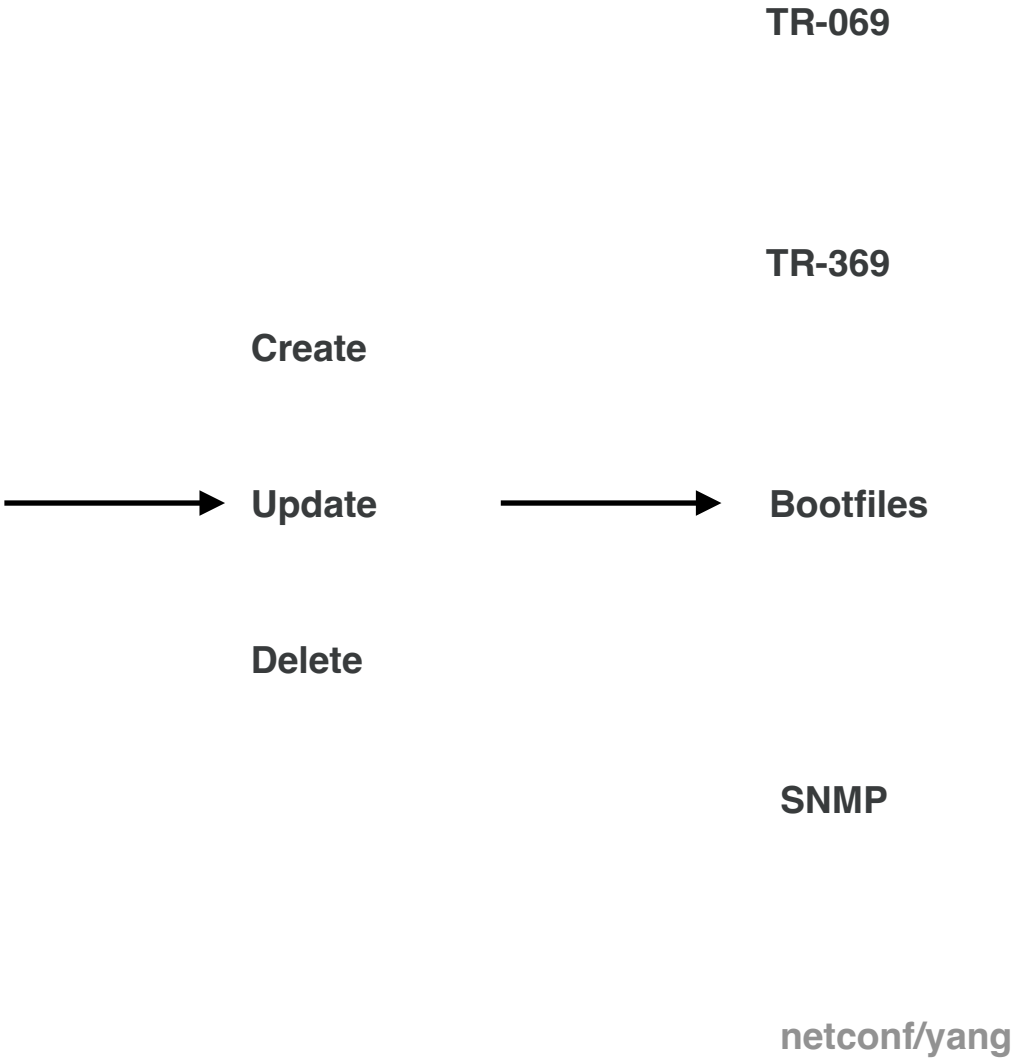
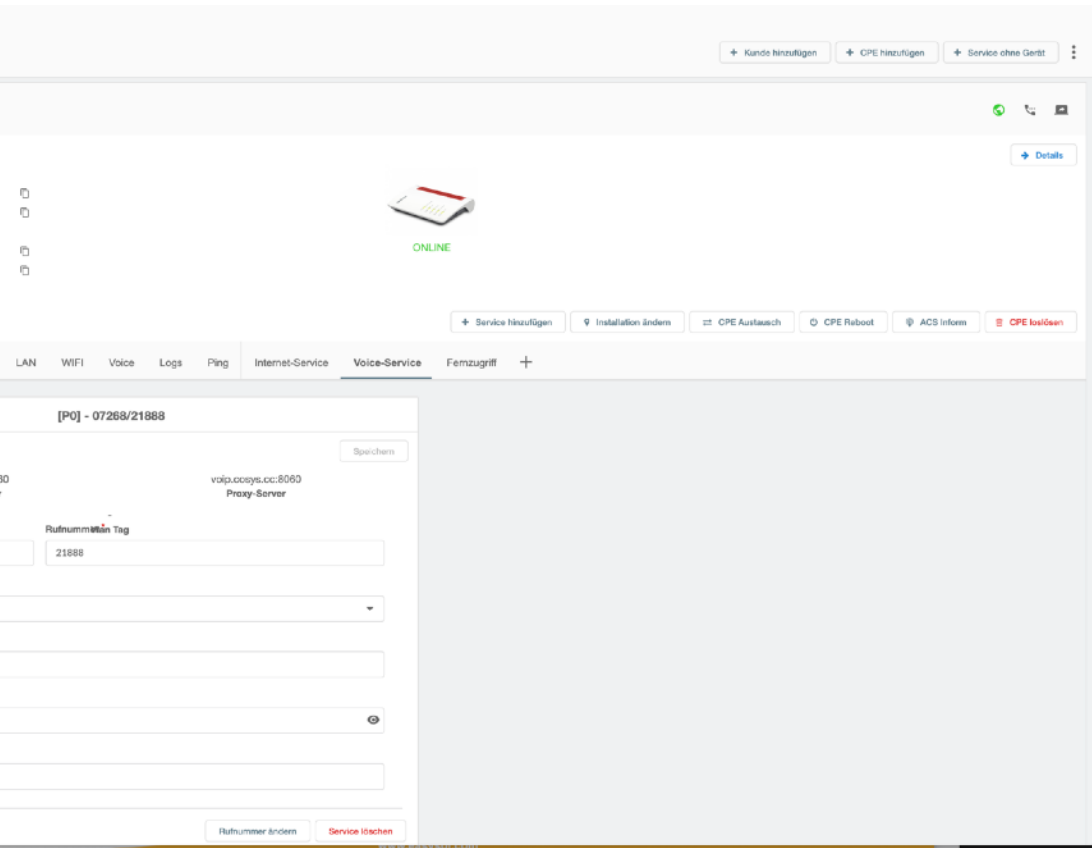
```
{
  "parameters": [
    {
      "acs_key": "InternetGatewayDevice.UserInterface.RemoteAccess.Enable",
      "value": "1",
      "type": "boolean"
    },
    {
      "acs_key": "InternetGatewayDevice.UserInterface.RemoteAccess.Port",
      "value": "443",
      "type": "unsignedInt"
    },
    {
      "acs_key": "InternetGatewayDevice.User.1.Enable",
      "value": "1",
      "type": "boolean"
    },
    {
      "acs_key": "InternetGatewayDevice.User.1.RemoteAccessCapable",
      "value": "1",
      "type": "boolean"
    },
    {
      "acs_key": "InternetGatewayDevice.User.1.Username",
      "value": "TR069-9cd177b5",
      "type": "string"
    },
    {
      "acs_key": "InternetGatewayDevice.User.1.Password",
      "value": "",
      "type": "string"
    }
  ]
}
```

Services

- **Abstraktion**
- **Abläufe (ACS-Workflows)**
- **Flexibel**



ACS-Workflow Engine



ACS-Workflow Engine

The screenshot displays the ACS-Workflow Engine web interface. The browser address bar shows the URL: `localhost:4200/customers/customer-tab/d9e6cd10-15dd-4cae-b5ee-2ec172fe1529/dashboard`. The user is logged in as **ADMIN** (Super User).

The interface is divided into several sections:

- Header:** Includes a navigation menu on the left and a user profile on the right.
- Customer Information:** Shows the customer ID **208065** and a status of **ONLINE**. It also displays a list of services, including **FC-OAN-SpeedConnect**.
- Service Configuration:** The **Internet-Service** tab is active, showing the **FC_0300_0100** service. It includes fields for **DHCP_SHARED_NETWORK**, **FC-OAN-SpeedConnect**, and **IP-Adresse**. The **Reservierung** (Reservation) section is also visible, with a **Reservierungs Modus** dropdown set to **Option 82** and a **Reservierungs Identifier** field containing a long alphanumeric string.
- Right Sidebar:** Contains a list of **ACS-Workflows** with status indicators (e.g., **SUCCESS**) and action buttons (e.g., **Aktion: update**, **Aktion: create**).

ACS-Workflow Engine

The screenshot displays the ACS-Workflow Engine web interface. The browser address bar shows the URL: `localhost:4200/devices/device-tab/4d0d8113-73f9-4cc9-88dc-2d96eb3683c5/tasks/workflows`. The user is logged in as **ADMIN Super User**.

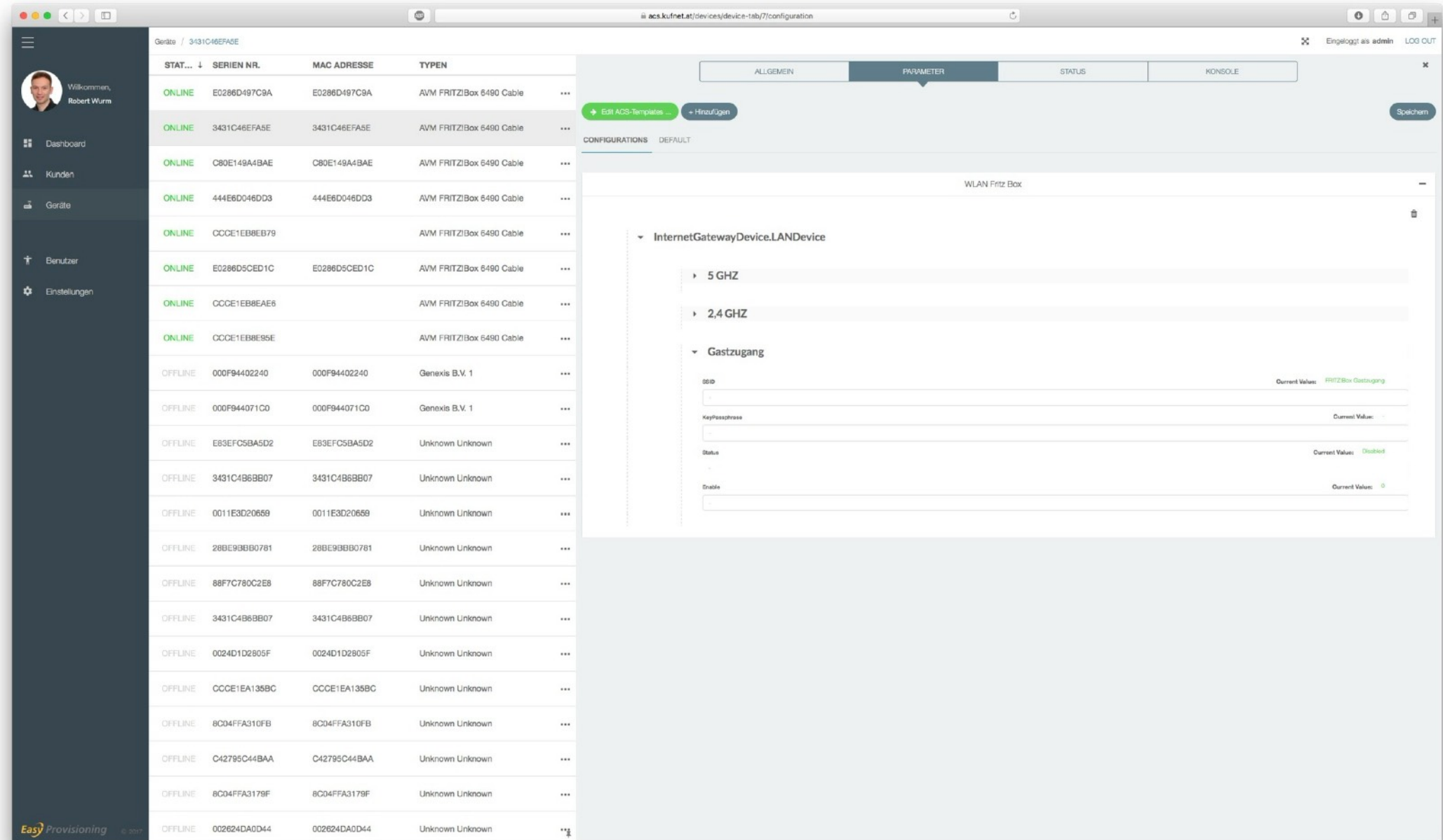
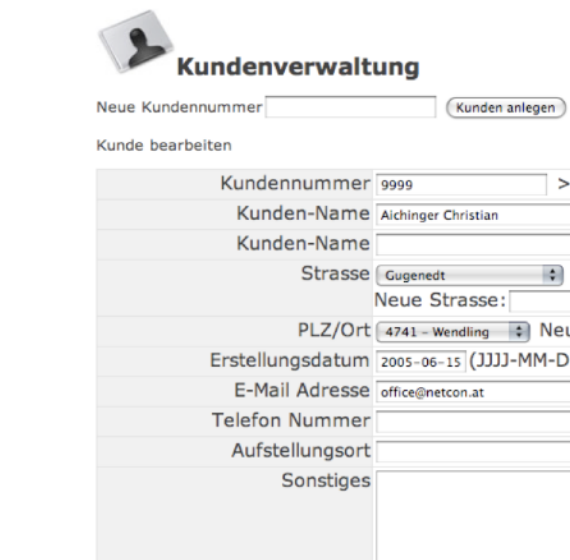
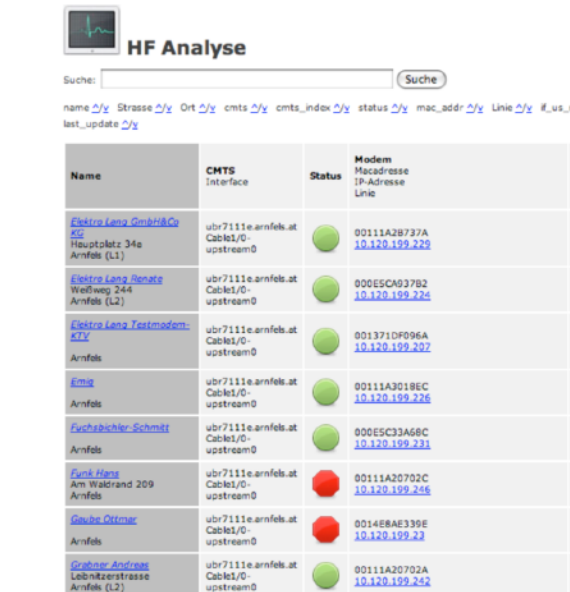
The interface shows a sidebar with navigation icons and a main content area. The main content area is titled **B4FC7D9D9C32 - AVM FRITZ!Box 4050 - *******. Below the title, there are tabs for **Allgemein**, **Tasks**, **Analyse**, **Diagnose**, **ACS-Baum**, **Logs**, **Bootfile**, and **Alarme**. The **Tasks** tab is selected.

Under the **Tasks** tab, there are sub-tabs for **TR069-Operationen**, **ACS-Workflows**, and **Infrastruktur Operationen**. The **ACS-Workflows** sub-tab is selected.

The workflow configuration is displayed in a vertical sequence of steps:

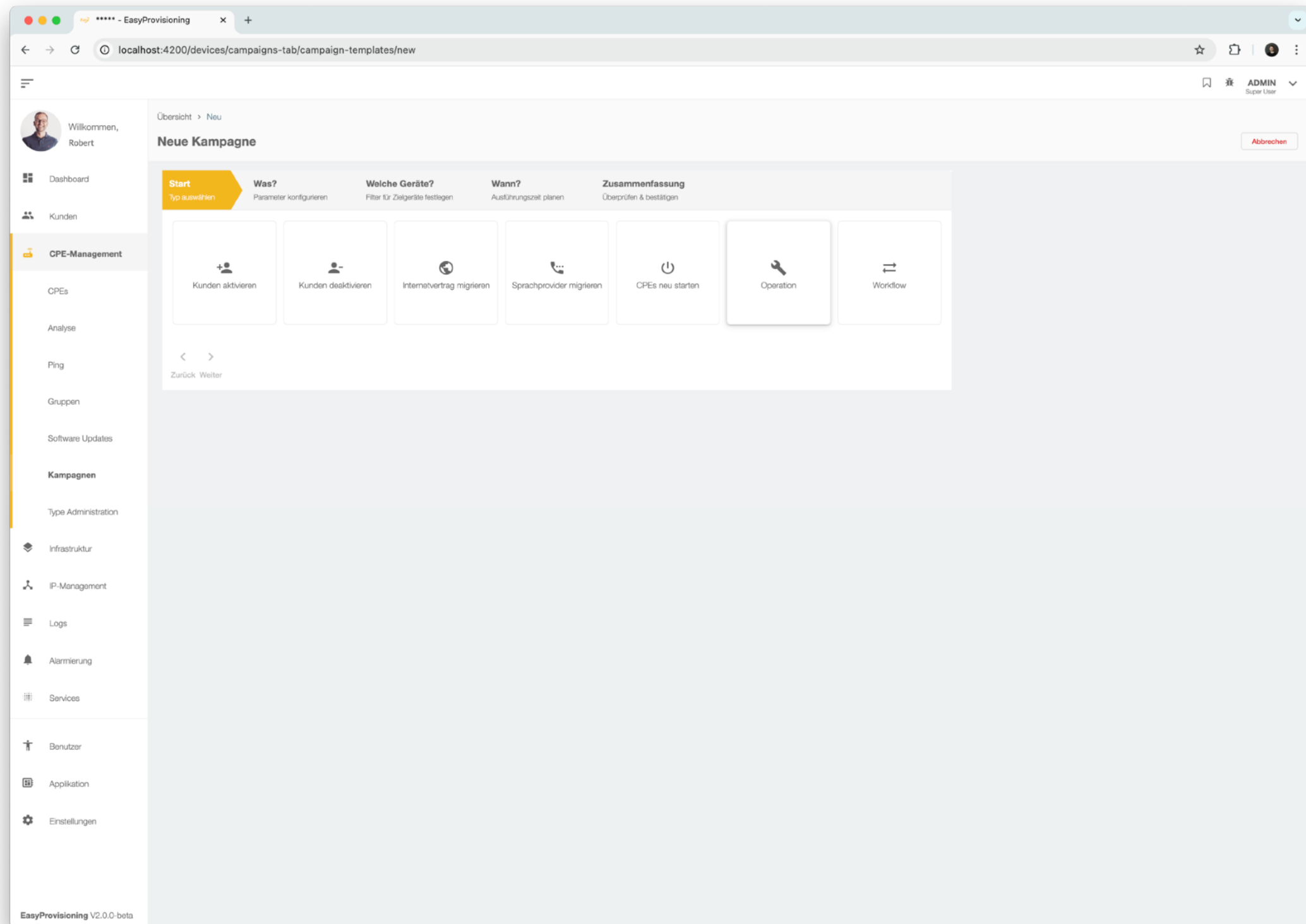
- 1** **GetValuesOperation**
InternetGatewayDevice.DeviceInfo.ProvisioningCode
Result Map:
provisioning_code: `<%= operation_result[:parameters].first[:value] %>`
- 2** **GetValuesOperation**
InternetGatewayDevice.WANDevice.1.WANConnectionDevice.1.WANPPPOConnectionNumberOfEntries
- 3** **ConfigurationFileDownloadOperation**
download_url: `http://192.168.215.5:8000/fritz_4050_luwy.export`
username: `lu`
password: `lu`
- 4** `<%= params[:network_type] == 'radius' && provisioning_code == 'eag-oan' %>`
TRUE ConfigurationFileDownloadOperation
download_url: `http://192.168.215.5:8000/fritz_4050_luwy_oan.export`
password: `lu`
username: `lu`
- 5**

Unsere Anfänge



Kampagnen

Kampagnen



Kampagnen

localhost:4200/devices/campaigns-tab/campaign-templates/new

ADMIN Super User

Willkommen, Robert

Dashboard

Kunden

CPE-Management

CPEs

Analyse

Ping

Gruppen

Software Updates

Kampagnen

Type Administration

Infrastruktur

IP-Management

Logs

Alarmierung

Services

Benutzer

Applikation

Einstellungen

EasyProvisioning V2.0.0-beta

Übersicht > Neu

Neue Kampagne

Abbrechen

Start
Typ auswählen

Was?
Parameter konfigurieren

Welche Geräte?
Filter für Zielgeräte festlegen

Wann?
Ausführungszeit planen

Zusammenfassung
Überprüfen & bestätigen

Zeitfenster
Kampagnen werden zwischen dem angegebenen Zeitraum ausgeführt.

00:00 00:45 01:30 02:15 03:00 03:45 04:30 05:15 06:00 06:45 07:30 08:15 09:00 09:45 10:30 11:15 12:00 12:45 13:30 14:15 15:00 15:45 16:30 17:15 18:00 18:45 19:30 20:15 21:00 21:45 22:30 23:15 00:00

CPE Bulk-Größe
Definiert die maximale Anzahl der betroffenen cpe's im angegebenen Zeitfenster. Wenn das Limit erreicht ist, werden die Kampagnen für weitere Tage über den angegebenen Datumsbereich in den Zeitfenstern verteilt.

500

Datumsbereich
Gültigkeitsbereich in dem die Kampagnen ausgeführt werden dürfen.

26.8.2025 VON

26.8.2025 BIS

< >

Zurück Weiter

Kampagnen

Willkommen, Robert

Dashboard

Kunden

CPE-Management

CPEs

Analyse

Ping

Gruppen

Software Updates

Kampagnen

Type Administration

Infrastruktur

IP-Management

Logs

Alarmierung

Services

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EasyProvisioning V2.0.0-beta

Übersicht

IPv4NeededOnWan - 21.08.2025

Kampagnenplan

Kampagnenplan löschen

✓ abgeschlossen

IPv4NeededOnWan - 21.08.2025

Verpflichtend

Customer.City

Enthält

Wendling

Verpflichtend

DeviceStatus

Enthält

online

Zeitfenster

00:00

01:15

02:30

03:45

05:00

06:15

07:30

08:45

10:00

11:15

12:30

13:45

15:00

16:15

17:30

18:45

20:00

21:15

22:30

23:45

CPE Bulk-Größe

500

Datumsbereich

21.8.2025

VON

21.8.2025

BIS

Operation:

GetValuesOperation

InternetGatewayDevice.X_AVM-DE_AdvancedSettings.IPv4NeededOnWan

Resultat exportieren

Export automatisch löschen:

1 Monat

Exportieren als:

CSV

JSON

Kampagnen - Tägliche Ausführungen

STATUS	KAMPAGNEN-TYP	ZEITPLAN VON	ZEITPLAN BIS	EXPORT	FORTSCHRITT	BENUTZER
✓ abgeschlossen	Operation	22.8.2025, 11:00	22.8.2025, 11:20	Export	100%	Robert Wurm
✓ abgeschlossen	Operation	21.8.2025, 11:00	21.8.2025, 11:20	Export	100%	Robert Wurm

STATUS	ZEITPLAN VON	ZEITPLAN BIS	CPE	RESULTAT
✓ erfolgreich	21.8.2025, 11:17	21.8.2025, 11:20	74427F336630	RESULT ✓
✓ erfolgreich	21.8.2025, 11:15	21.8.2025, 11:20	3C37127BF2D9	RESULT ✓
✓ erfolgreich	21.8.2025, 11:12	21.8.2025, 11:20	3CA62F96ED2B	RESULT ✓
✓ erfolgreich	21.8.2025, 11:07	21.8.2025, 11:20	444E6D7304EA	RESULT ✓
✓ erfolgreich	21.8.2025, 11:05	21.8.2025, 11:20	3C3712F06DB6	RESULT ✓
✓ erfolgreich	21.8.2025, 11:02	21.8.2025, 11:20	2C3AFD29E302	RESULT ✓
✓ erfolgreich	21.8.2025, 11:00	21.8.2025, 11:20	1CED6F72779D	RESULT ✓

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Kampagnen

Übersicht > IPv4NeededOnWan - 21.08.2025

Kampagnenplan

✓ abgeschlossen

IPv4NeededOnWan - 21.08.2025

Verpflichtend Customer.City Enthält Wendling

Verpflichtend DeviceStatus Enthält online

Operation:

Export automatisch löschen: 1 Monat

Exportieren als: CSV JSON

Device Serial Number	Device ID	Operation Class	Key	Value
1CED6F72779D	9ae7053f-0b89-4056-869b-8649d5e11234	GetValuesOperation	InternetGatewayDevice.X_AVM-DE_AdvancedSettings.IPv4NeededOnWan	0x00000000
2C3AFD29E302	33ed5305-71e2-460d-9835-15eb86def453	GetValuesOperation	InternetGatewayDevice.X_AVM-DE_AdvancedSettings.IPv4NeededOnWan	0x00000040
3C3712F06DB6	e506d86a-c1a7-4673-ab77-9a0f80128077	GetValuesOperation	InternetGatewayDevice.X_AVM-DE_AdvancedSettings.IPv4NeededOnWan	0x00000069
444E6D7304EA	d8005391-4136-4b08-8e0d-8d2dfc7310ef	GetValuesOperation	InternetGatewayDevice.X_AVM-DE_AdvancedSettings.IPv4NeededOnWan	0x00000040
3CA62F96ED2B	623abe92-eeb4-4f44-bb8e-d7e96a36c1a3	GetValuesOperation	InternetGatewayDevice.X_AVM-DE_AdvancedSettings.IPv4NeededOnWan	0x00000000
3C37127BF2D9	01cbebdb-6378-4545-ad70-1a33ccb3ab3b	GetValuesOperation	InternetGatewayDevice.X_AVM-DE_AdvancedSettings.IPv4NeededOnWan	0x00000000
74427F336630	dbc913f6-2898-43b2-a19f-6fc76de1dc9c	GetValuesOperation	InternetGatewayDevice.X_AVM-DE_AdvancedSettings.IPv4NeededOnWan	0x00000000
2C91ABFF7101	183aa241-35ca-496a-a611-3c3b66912832	GetValuesOperation	InternetGatewayDevice.X_AVM-DE_AdvancedSettings.IPv4NeededOnWan	0x00000042

Services

Benutzer

Applikation

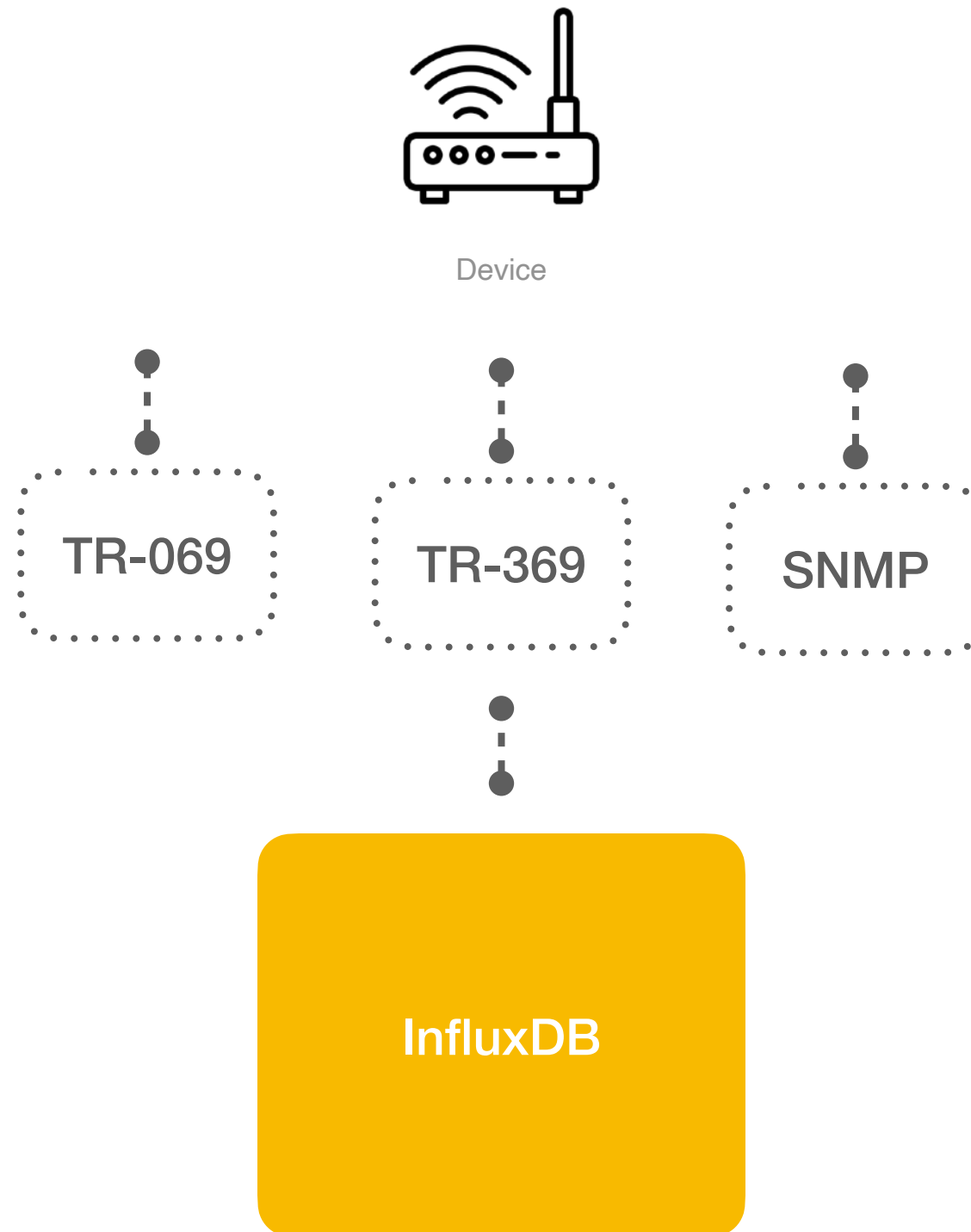
Einstellungen

EasyProvisioning V2.0.0-beta

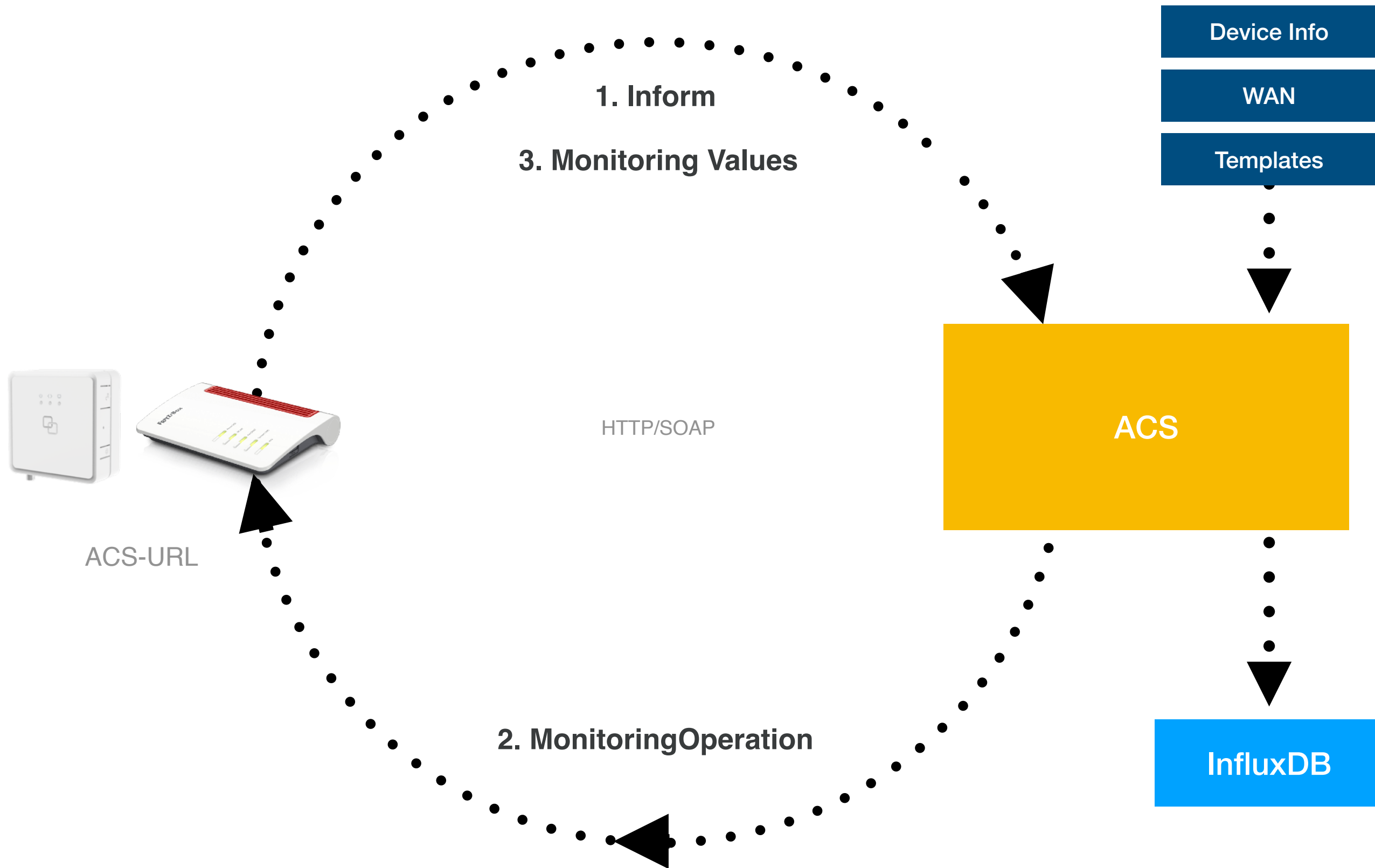
✓ erfolgreich	21.8.2025, 11:17	21.8.2025, 11:20	74427F336630	RESULT ▼
✓ erfolgreich	21.8.2025, 11:15	21.8.2025, 11:20	3C37127BF2D9	RESULT ▼
✓ erfolgreich	21.8.2025, 11:12	21.8.2025, 11:20	3CA62F96ED2B	RESULT ▼
✓ erfolgreich	21.8.2025, 11:07	21.8.2025, 11:20	444E6D7304EA	RESULT ▼
✓ erfolgreich	21.8.2025, 11:05	21.8.2025, 11:20	3C3712F06DB6	RESULT ▼
✓ erfolgreich	21.8.2025, 11:02	21.8.2025, 11:20	2C3AFD29E302	RESULT ▼
✓ erfolgreich	21.8.2025, 11:00	21.8.2025, 11:20	1CED6F72779D	RESULT ▼

Monitoring

Optimierte Dashboards



TR-069



Optimierte Dashboards

```
SELECT
  last("UpTime") as "UpTime"
FROM
  $acs_template(Device Info)
WHERE
  time > $date_from AND time < $date_to
  AND "device_serial_number"=$serial_number
ORDER BY DESC LIMIT 1
```



Geräte Informationen		⌵
Uptime - Datum	04/04/2021, 16:51:22	
Uptime - Tage	15 Tage	
1 Minute		↻

InfluxDB

```
> select * from "6115419d-5e33-48b9-b96c-05302ed50814" limit 10
name: 6115419d-5e33-48b9-b96c-05302ed50814
time                UpTime  acs_key  device_serial_number
----                -
1571082484000000000  16539   root    444E6DF72602
1571082493000000000  120042  root    444E6DFEC366
1571082493000000000  182451  root    444E6D17B45C
1571082501000000000  5802371 root    444E6DF6A332
1571082505000000000  3363668 root    444E6DF6C35A
1571082506000000000  9531668 root    E0286D7B5076
1571082509000000000  822347  root    444E6DF6A386
1571082511000000000  4339404 root    444E6DF6AFDB
1571082512000000000  225345  root    444E6DFEC971
1571082528000000000  2426276 root    444E6DF6A35C
>
```

Optimierte Dashboards

The screenshot displays the EasyProvisioning V2.0.0-beta dashboard. The interface includes a sidebar with navigation options like Dashboard, Kunden, Übersicht, Standorte, Historie, CPE-Management, Infrastruktur, IP-Management, Logs, Alarmierung, Services, Benutzer, Applikation, and Einstellungen. The main content area shows details for a customer named Robert, including a list of CPEs (e.g., B4FC7D9D9C32) and their status (ONLINE). Below this, there are tabs for configuration: Allgemein, WAN, LAN, WIFI, Voice, Logs, Alarms, Internet-Service, WLAN-Service, and Fernzugriff. The WAN tab is active, showing a table of WAN connections (WAN-1) with details like Physical Link (Up), Type (Ethernet), and Max-Bitrate. The IP-CONNECTIONS table shows connections for VOIP, TR069, and INTERNET, with status indicators (Disconnected, Connected, Aktiviert). The DATEN VOLUMEN section shows download and upload volumes. The WAN TRAFFIC section displays a line graph of traffic over time. A modal window in the bottom right corner prompts for a username and provides a link to generate a public view.

Customer Details:

- Kunden > Kunde**
- *******
- Suche Cwmp...** **Suche Gpon Serien...** **Suche Mac...** **Suche Type...**
- + Kunde hinzufügen** **+ CPE hinzufügen** **+ Service ohne Gerät**

CPE Details:

- B4FC7D9D9C32** (AVM FRITZ!Box 4050)
- 4050 bei Kunden** **GPON**
- Letzte CPE-Informationen:** 3 Minuten TR069
- CWMP-ID:** B4FC7D9D9C32
- GPON Serien-Nummer:** --
- MGMT-Mac:** --
- Management IP-Adresse:** 10.46.26.183
- IP-Adresse extern:** 185.253.17.203
- Software Version:** 287.08.02
- ONLINE**

Configuration Tabs: Allgemein, **WAN**, LAN, WIFI, Voice, Logs, Alarms, Internet-Service, WLAN-Service, Fernzugriff

WAN Configuration:

WAN	WAN-1
Physical Link	Up
Type	Ethernet
Max-Bitrate Upstream	25600 kbps
Max-Bitrate Downstream	54272 kbps

IP-CONNECTIONS:

Name	VOIP	TR069	INTERNET
Status	Disconnected	Connected	Connected
Aktiviert	Deaktiviert	Aktiviert	Aktiviert
NAT	Aktiviert	Aktiviert	Aktiviert
Uptime	8/26/2025, 9:11:55 AM, 0 Tage	8/26/2025, 9:06:33 AM, 0 Tage	8/26/2025, 9:06:34 AM, 0 Tage
IP-Adresse		10.46.26.183	185.253.17.203
Type	Static	DHCP	PPPoE
Letzter	Kein Error	Kein Error	Kein Error

DATEN VOLUMEN:

	D	W	M	Y
Download	1.29 MB			
Upload	4.80 MB			

WAN TRAFFIC:

	D	W	M	Y
Σ MAX	146.48 Kbit/s			
	122.07 Kbit/s			
	97.66 Kbit/s			
	73.24 Kbit/s			

Modal Window:

Benutzername

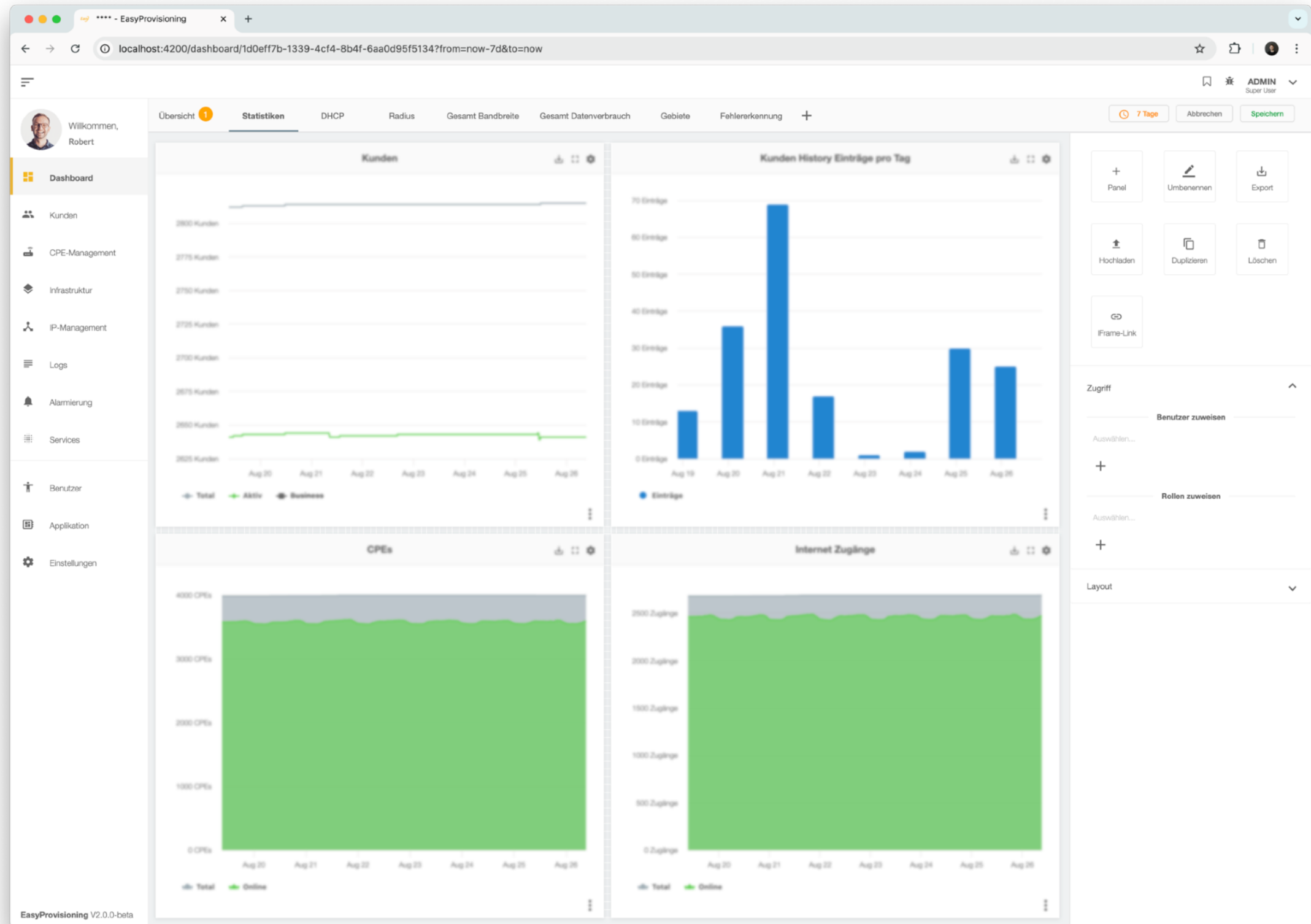
not public

Anmeldung beim Öffnen

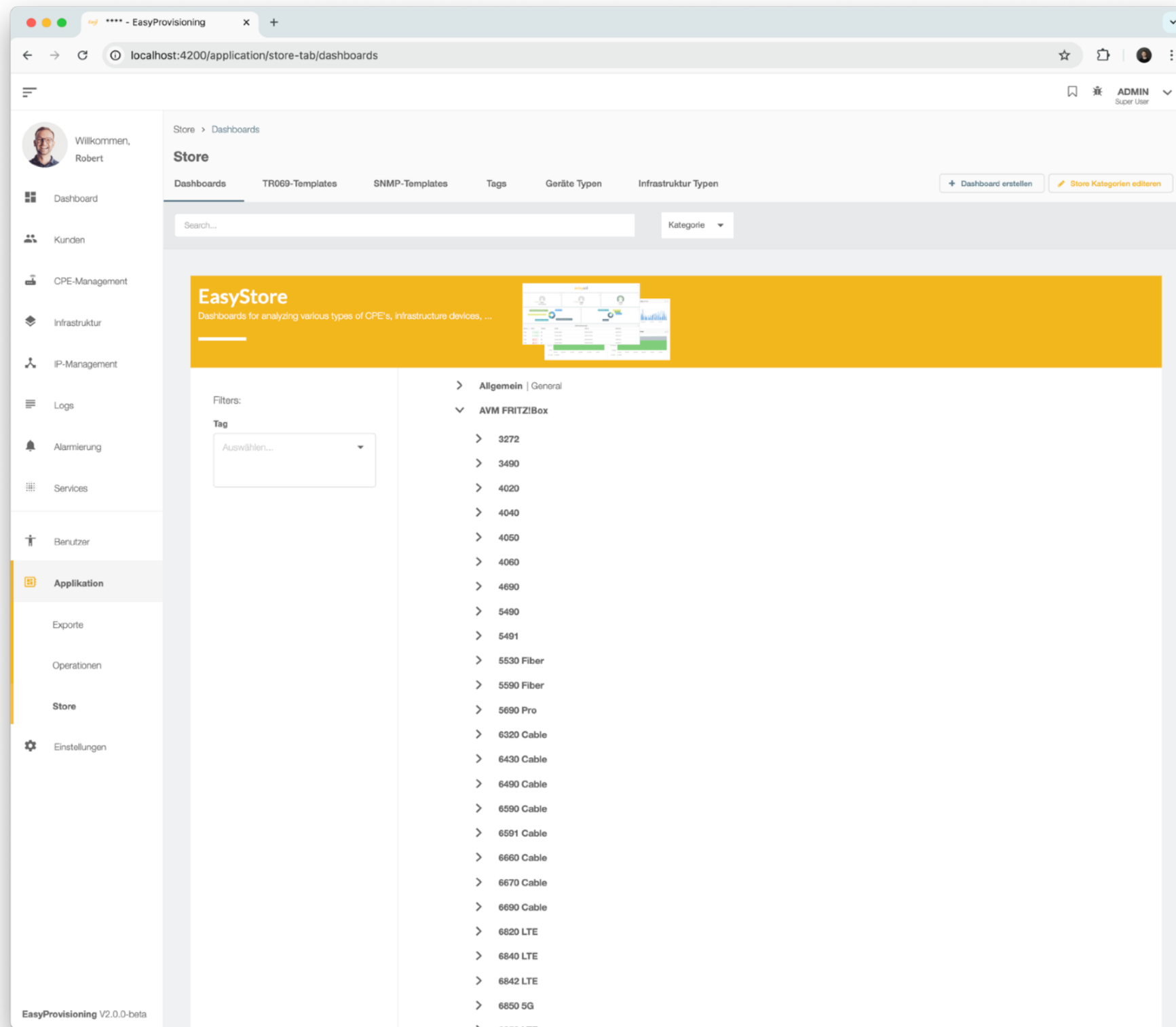
Beim Öffnen des generierten Links erfolgt automatisch eine Anmeldung mit den angegebenen Zugangsdaten. Die eingetragte Ansicht besitzt die Berechtigungen dieses Benutzers.

Link generieren

Optimierte Dashboards



EasySol Store



EasySol Store

The screenshot displays the 'EasySol Store' interface within a web browser. The browser's address bar shows the URL: `localhost:4200/devices/device-tab/4d0d8113-73f9-4cc9-88dc-2d96eb3683c5/analyze/dashboard/20052937-4403-4310-86a9-0962288036b2?from=1756185000000&to=175619231040`. The interface is divided into two main sections: 'Verfügbare Dashboards' (Available Dashboards) and 'Optionen' (Options).

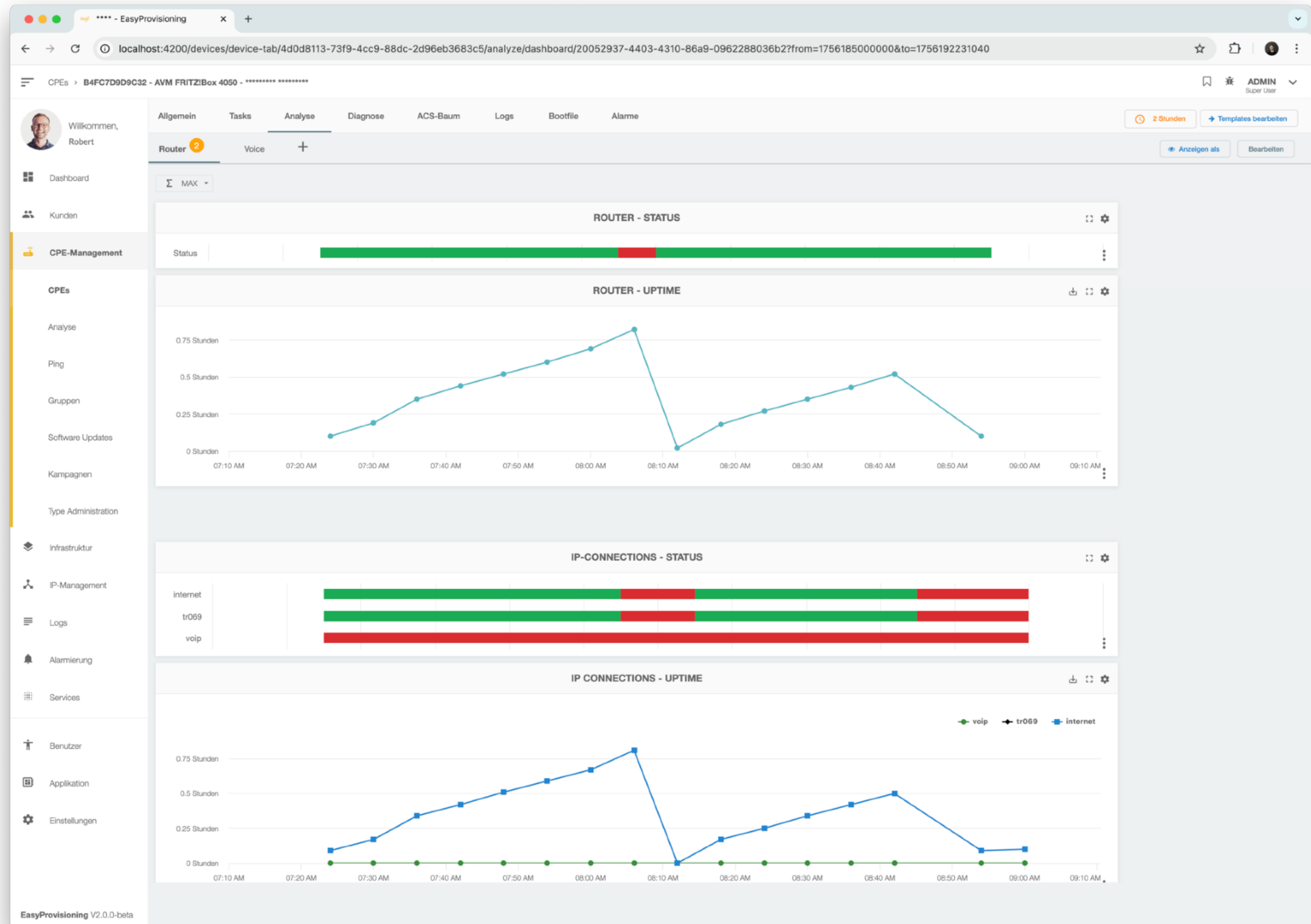
Under 'Verfügbare Dashboards', there are two sub-sections: 'Analyse Dashboards beim Kunden' (Analyze Dashboards at the customer) and 'Analyse Dashboards beim Gerät' (Analyze Dashboards at the device). Each sub-section contains several dashboard cards, each with a preview image, a title, a description, a version number, and a 'details' link.

Available Dashboards:

- Allgemein** (Router uptime view): 1.0.0 (public). AVM Router.
- WAN** (Last measured and historical values): 1.0.0 (public). AVM Router.
- WIFI** (Last measured and historical values): 1.0.0 (public). AVM Router.
- Voice** (Last measured and historical voice values): 1.0.0 (public). AVM Router.
- LAN** (Last measured and historical values): 1.0.0 (public). AVM Router.
- Netzwerk** (List of assigned network topology nodes): 1.0.0 (public). Network Topology.
- Router** (Historical values of the router): 1.0.1 (public). AVM Router.
- Voice** (Historical values of voice parameter of the router): 1.0.0 (public). AVM Router.

At the bottom of the interface, there are two buttons: 'Abbrechen' (Cancel) and 'Weiter' (Next).

EasySol Store

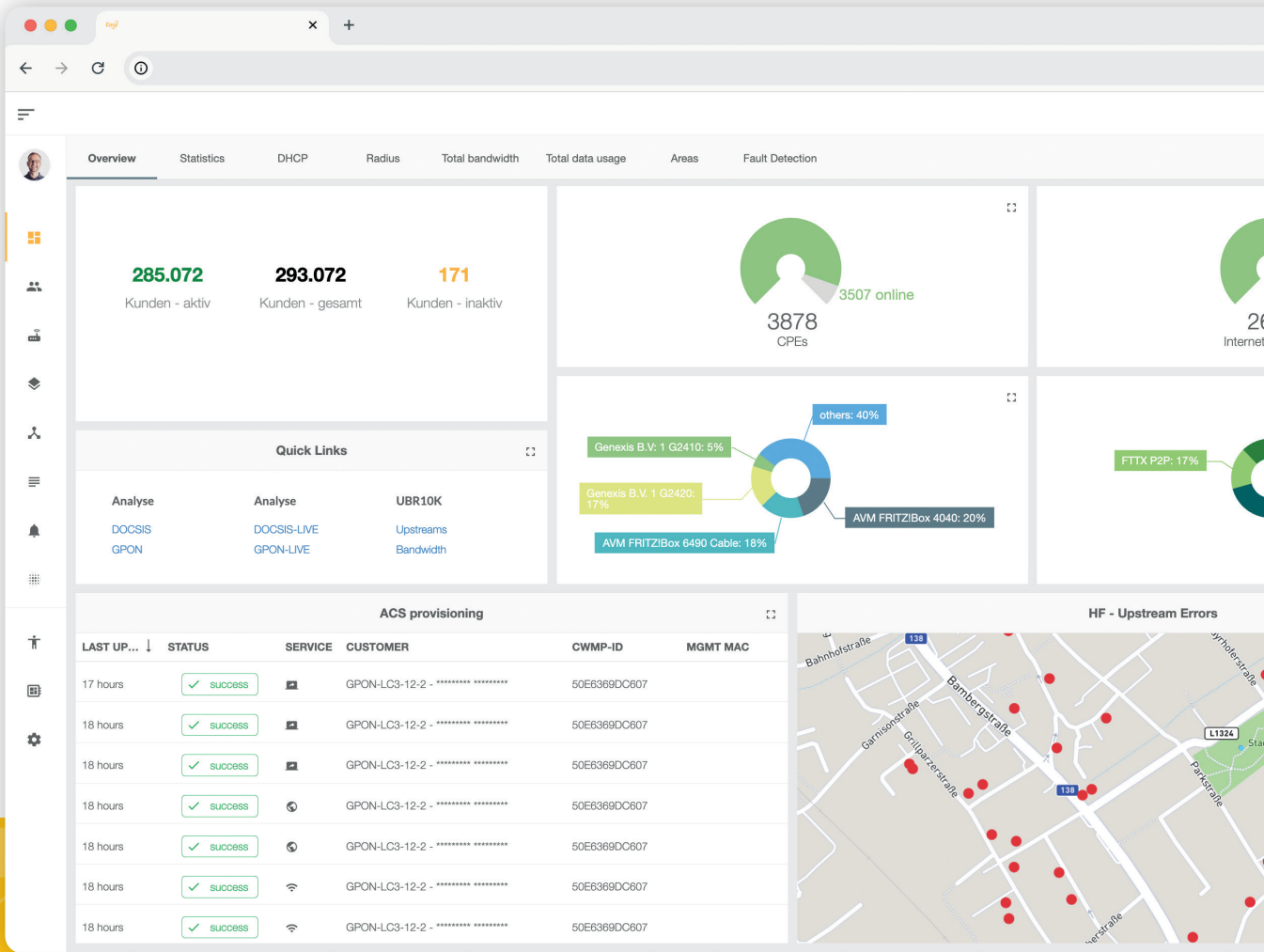


Optimierte Dashboards

The screenshot shows the 'Berechtigungen' (Permissions) page in the EasyProvisioning application. The page is designed for managing user roles and their associated permissions. The left sidebar contains a navigation menu with items like Dashboard, Kunden, CPE-Management, Infrastruktur, IP-Management, Logs, Alarmierung, Services, Benutzer (selected), Übersicht, Berechtigungen, Applikation, and Einstellungen. The main content area is titled 'Berechtigungen' and features a table with columns for different roles: Admin, Buchhaltung, Techniker, Verkauf, and Vertrieb. Each role has a 'Super User' status. The table lists various permissions under two main categories: 'Dashboard' and 'Kunden'. The 'Dashboard' category includes permissions like 'Alle Berechtigungen', 'Menü Dashboard', 'Dashboards löschen', 'Dashboards bearbeiten', 'Dashboards hochladen', 'Dashboards hinzufügen', 'Dashboardgruppe hinzufügen', 'Dashboardgruppe bearbeiten', 'Dashboardgruppe löschen', 'Rollen zu Dashboards zuweisen', and 'Benutzer können eigene Dashboards erstellen'. The 'Kunden' category includes permissions like 'Alle Berechtigungen', 'Menü Kunden', 'Menü Standorte', 'Menü Historie', 'Kunden löschen', 'Kunden bearbeiten', 'Kunden hinzufügen', 'Kunden Notizen bearbeiten', 'Kunden deaktivieren', 'Kunden aktivieren', 'Kunden Historie Einträge hinzufügen', 'Installationen löschen', 'Alle inaktive Installationen löschen', 'Installationen bearbeiten', 'Zugangstechnologien bearbeiten', 'Installationen hinzufügen', 'Inaktive Installationen hinzufügen', 'Installationen wechseln', 'Installationen exportieren', 'Installationen deaktivieren', 'Installationen aktivieren', 'CPE hinzufügen', 'CPE löschen', 'CPE Reboot', 'CPE Austausch', 'CPE ACS Inform Request', 'Rufnummer manuell zuweisen', 'Kunden importieren', 'Internet Service hinzufügen', 'Internet Services bearbeiten', 'Internet Service löschen', 'Voice Service hinzufügen', 'Voice Services bearbeiten', 'Voice Service löschen', 'WLAN-Service hinzufügen', 'WLAN-Service bearbeiten', 'WLAN-Service löschen', 'WLAN-Hotspot-Service hinzufügen', 'WIFI-Hotspot-Service bearbeiten', and 'WIFI-Hotspot-Service löschen'. Each permission has a corresponding checkbox in each role's column, indicating whether the role has that permission. The top right of the page shows the user 'ADMIN Super User' and buttons for 'Rolle hinzufügen' and 'Speichern'.

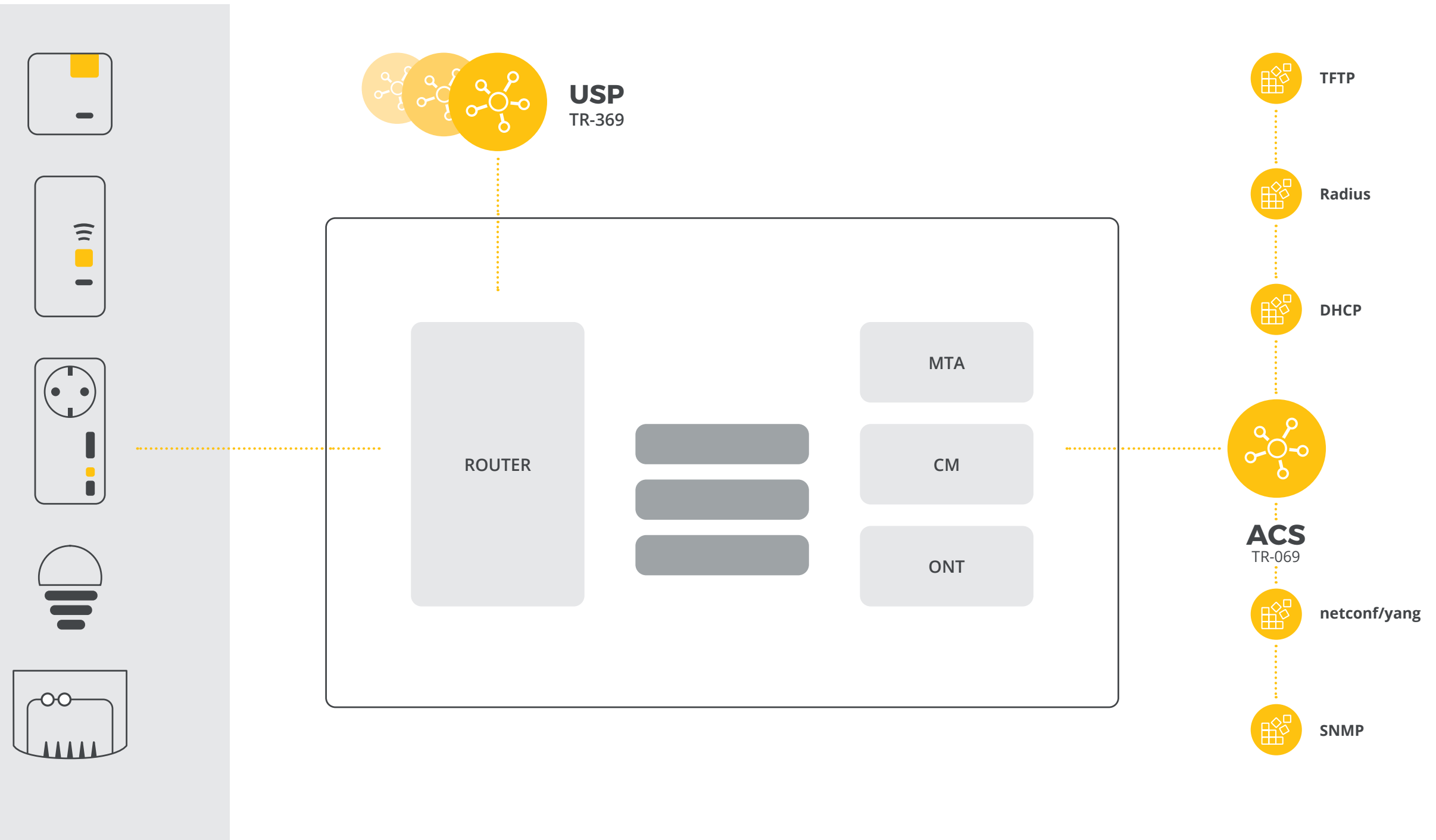
Provider Analytics Software

USP (TR-369) ist nicht nur die Zukunft, es ist das Jetzt.



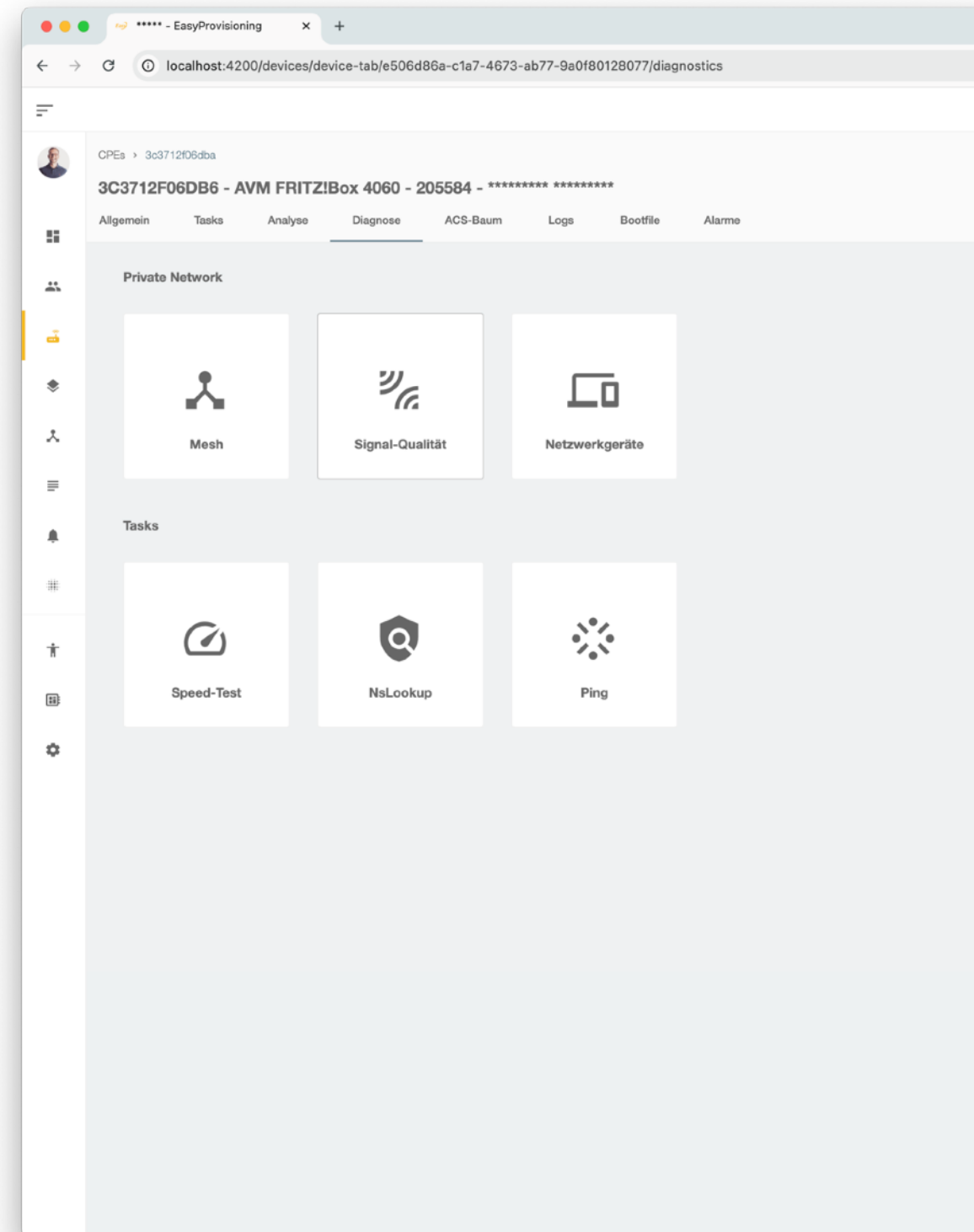
Sprechen Sie schon TR-369?

Echtzeit-Kommunikation auf Basis eines standardisierten Protokolls.

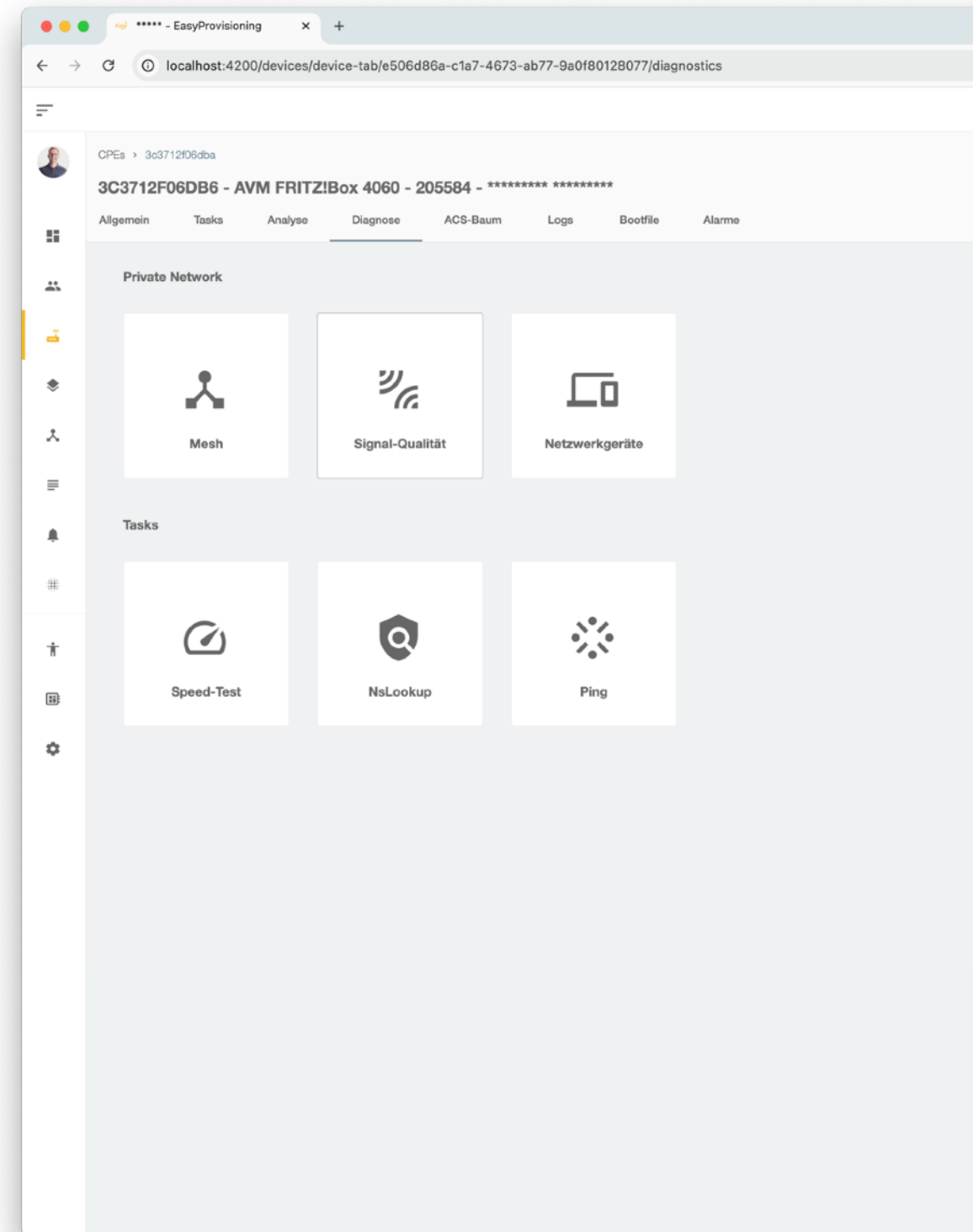


EasyInsights

- **Lightweight TR-369-Controller**
- **Websocket und MQTT**
- **Features**
 - **CPE-Monitoring**
 - **Speedtest**
 - **Advanced Diagnostics**
 - **Operations (Get,Set,...)**



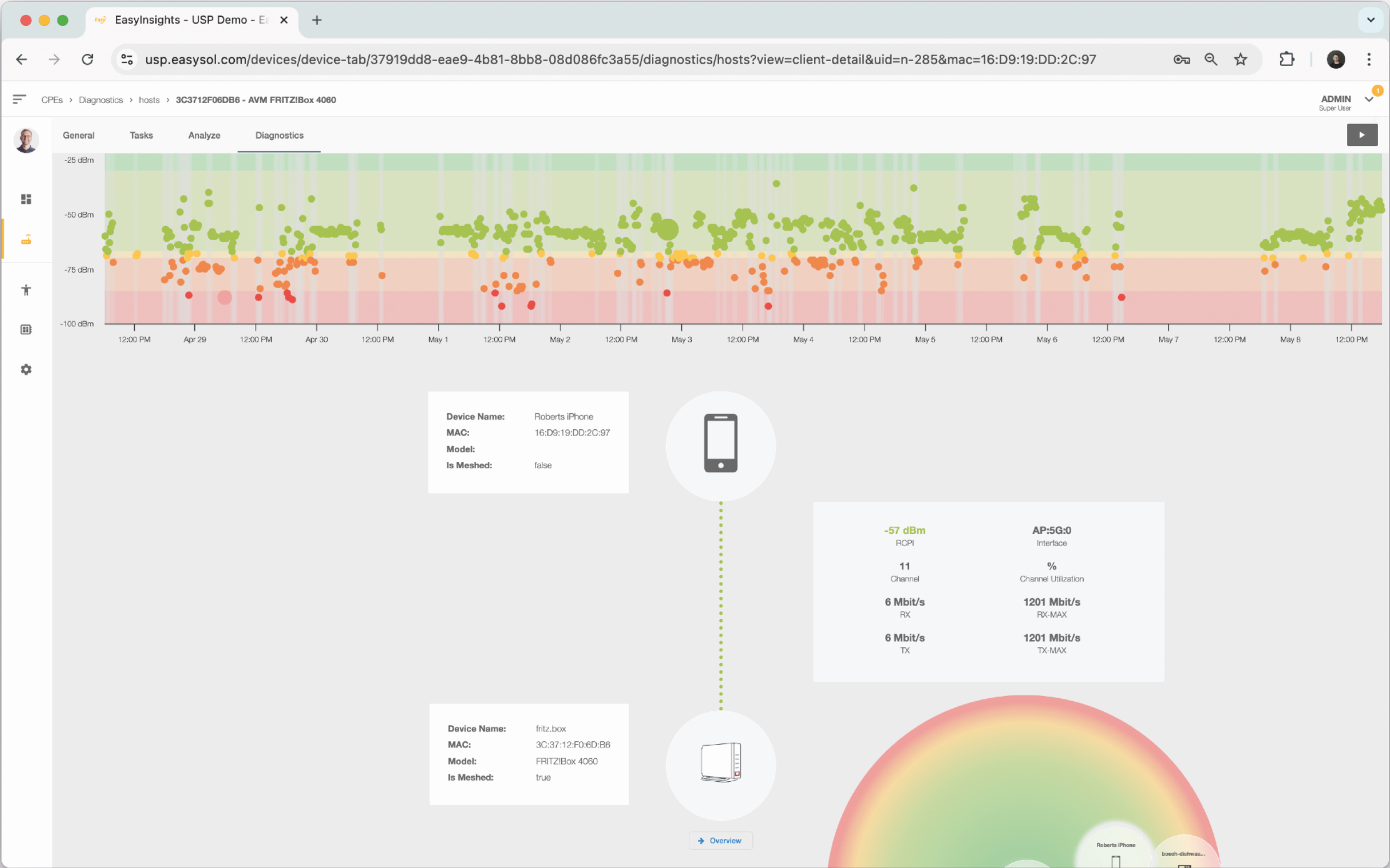
- **Optimiert für maximale Performance**
- **Komplete Architektur überarbeitet**
- **Go (Google)**



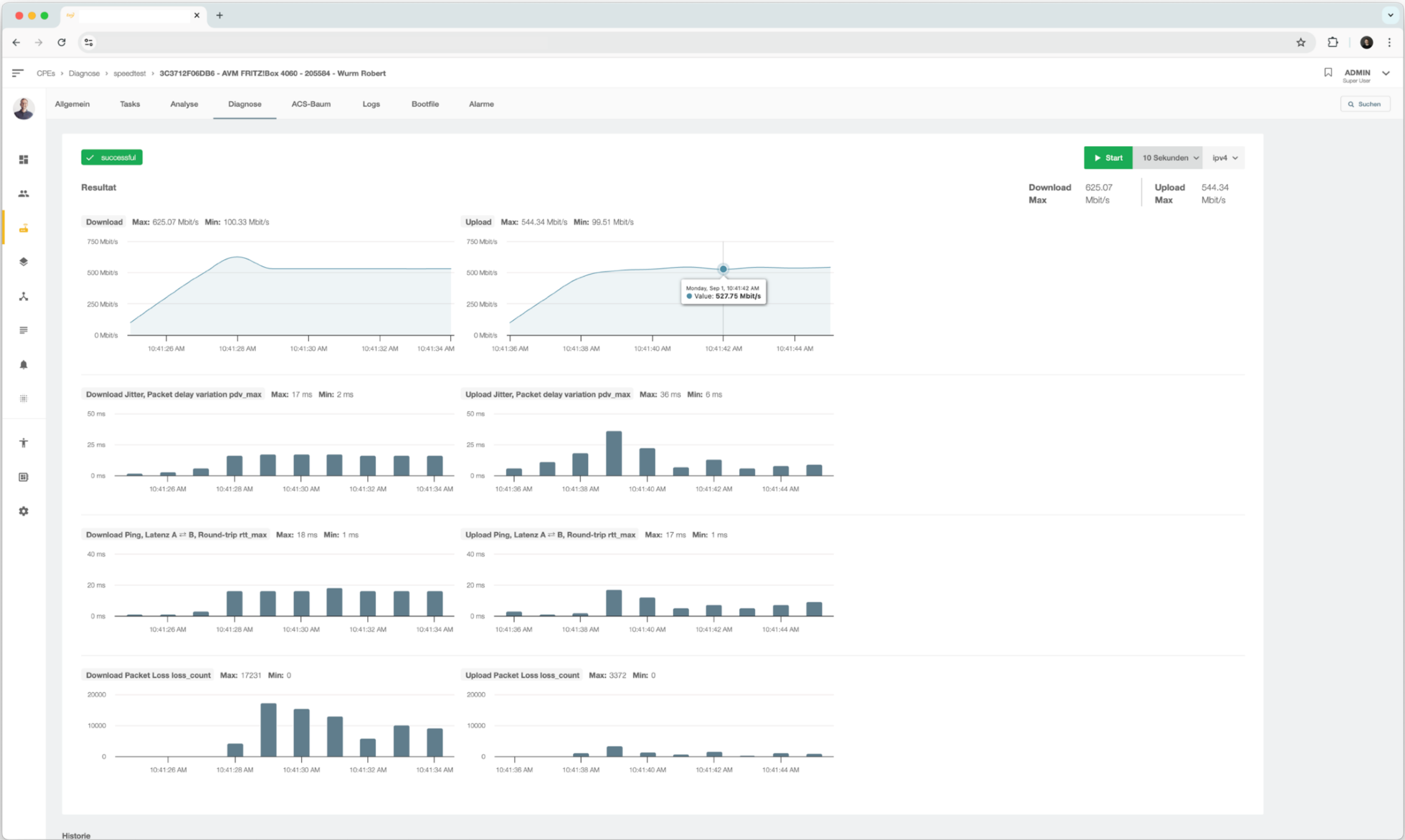
Echtzeit WiFi-Analyse



Echtzeit WiFi-Analyse



UDP-Speedtest



Suchen

Historie								
STATUS	ERSTELLT ↓	HOSTNAME	IP-VERSI...	LATENZ				BENUTZER
				MIN	AVG	MAX		
(Alle) ▼		🔍	🔍	🔍	🔍	🔍		(Alle) ▼
✓ successful		www.easysol.com	ipv4	12,0 ms	12,0 ms	13,0 ms		easy Robert Wurm
Anzahl: 1								

Aktivierung von USP

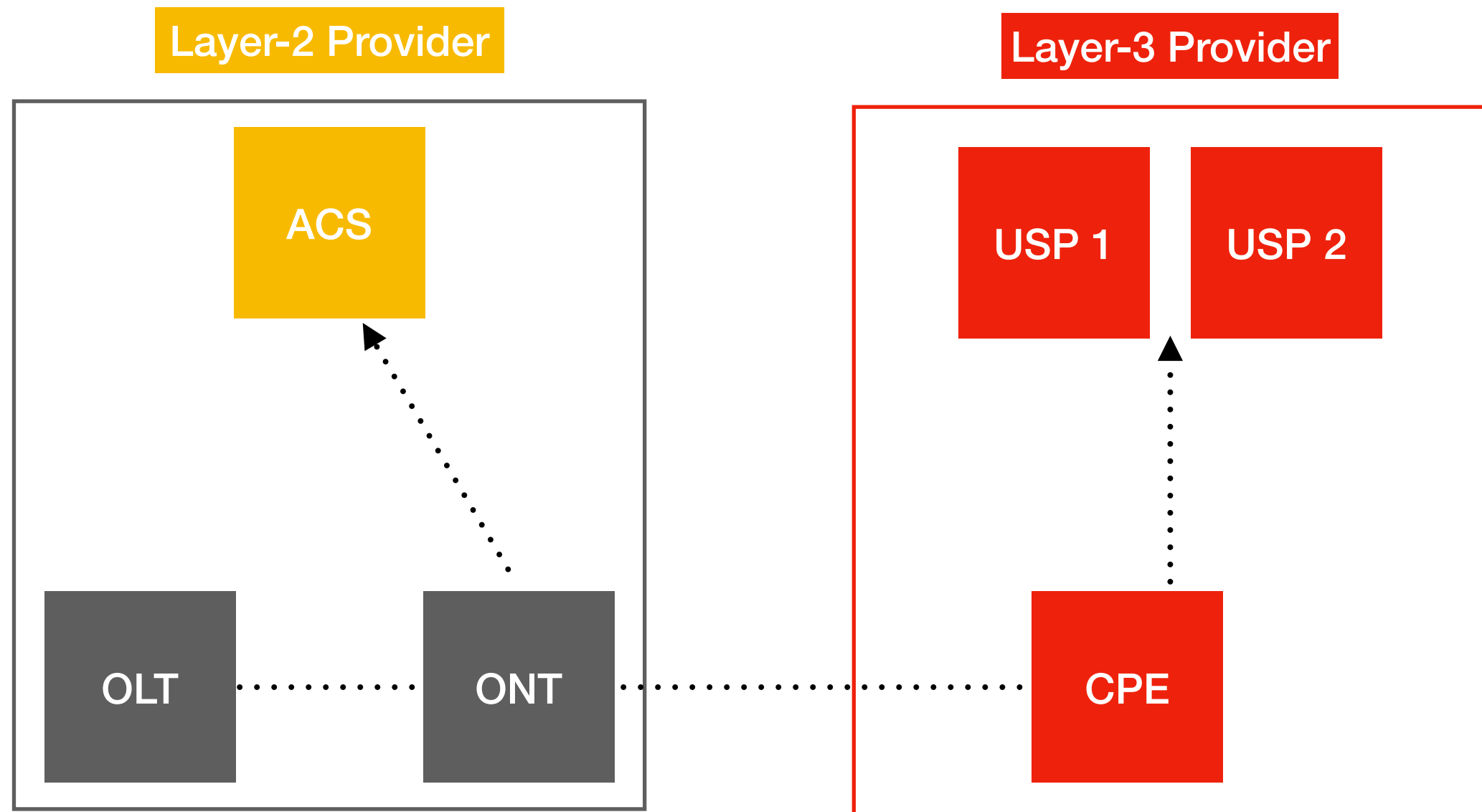
- **DHCP-Option**
- **ACS-Server**
- **TR-064**

Navigation: Allgemein | WAN | LAN | WIFI | Voice | Logs | Ping | Alarme | Internet-Service | Voice-Service | Fernzugriff | **USP**

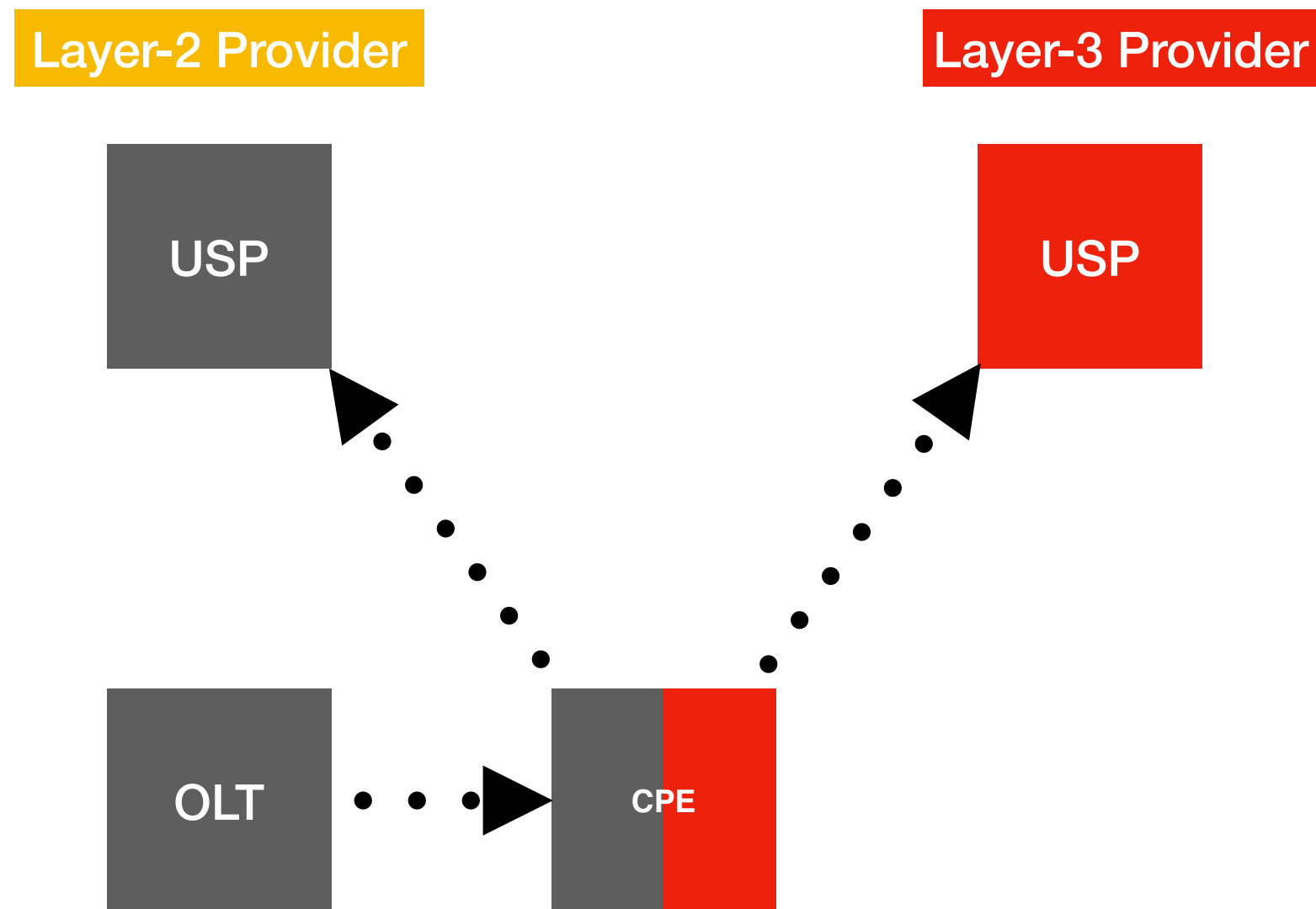
USP

Host *	cosys-usp.easysol.at
Port *	443
Path *	/
protocol *	websocket
Controller-Id *	self::usp-controller

Multi-Controller Strategie



Multi-Controller Strategie



Vielen Dank!