inter.link

Software Best Practices for Networkers

"Look Mum, No Unit Tests!"

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03.04.2023

AGENDA

- Background
- Problem Statement
- Data Modelling
- Tech Stack
- Coding
- Testing
- Debugging
- Questions

Background

- First sustainable connectivity provider in the world
- Fully automated connectivity services
- Fully transparent services (pricing, operation, status)
- Are we playing "buzz word bingo" James?

inter.link Dashboard Settings Tickets

Location > Ports > IP-Transit > Summary

Search Locations

BER

Berlin
16 Locations

IPB Lützowstr
Lützowstraße 105

IPB Kitzingstr
Boxhagener Straße 80

NTT BER1
Boxhagener Straße 80

Lumen/CenturyLink G60 Berlin
Boxhagener Straße 80

IP-Transit

Location

Berlin IPB Lützowstr

Prefix V4

/31 2 Addresses 5,00 € /mo

Prefix V6

/127 2 Addresses 0,00 € /mo

Location > Ports > IP-Transit > Summary

Contract Term 12M 24M 36M

SELECT PORT SPEED

1 Gbps	10 Gbps	25 Gbps	100 Gbps	400 Gbps
SFP	SFP+	SFP28	QSFP28	QSFP-DD
250,00 €	500,00 €	750,00 €	1.500,00 €	2.500,00 €

SELECT PREFIX V4

Recommended		
/31	/30	
2 Addresses	2 Addresses	
5,00 €	10,00 €	

SELECT PREFIX V6

Recommended		
/127	/126	
2 Addresses	2 Addresses	
0,00 €	0,00 €	

CONFIGURE VLAN

VLAN ID*

123

Back

Next

IP-Transit

Location

Berlin IPB Lützowstr

Port Speed

Committed Data Rate	-
Port Speed	10 Gbps
VLAN ID	123
One Time Fee	500,00 €
Monthly Fee	-

Prefix V4

/31 2 Addresses 5,00 € /mo

Prefix V6

/127 2 Addresses 0,00 € /mo

Location > Ports > IP-Transit > Summary

Contract Term 12M 24M 36M

CONFIGURE BGP SESSION

AS-Number*: 5405

AS-SET*: RIPE::AS-INTERDOTLINK

Session Password: ••••••••••••••••

Prefix v4 Limit*: 500

Prefix v6 Limit*: 100

CONFIGURE IP-TRANSIT

Purchase Reference: eg: PO-1

Committed Data Rate

100 Mbps	500 Mbps	1 Gbps	3 Gbps	5 Gbps	10 Gbps
2,00 €	0,80 €	0,60 €	0,45 €	0,35 €	0,30 €

Back Next

IP-Transit

Location

Berlin IPB Lützowstr

BGP Session

AS-Number	5405
AS-SET	RIPE::AS-INTERDOTLINK
Prefix limit V4	500
Prefix limit V6	100

Port Speed

Committed Data Rate	5 Gbps
Port Speed	10 Gbps
VLAN ID	123
One Time Fee	500,00 €
Monthly Fee	0,35 €

Prefix V4

/31 2 Addresses 5,00 € /mo

Prefix V6

/127 2 Addresses 0,00 € /mo

Location > Ports > IP-Transit > Summary

Contract Term 12M 24M 36M

IP-Transit

Location

Berlin IPB Lützowstr

BGP Session

AS-Number	5405
AS-SET	RIPE::AS-INTERDOTLINK
Prefix limit V4	500
Prefix limit V6	100

One Time Setup Fee

Port Speed	500,00 €
Total	500,00 €

Recurring Monthly Fee

Committed Data Rate	0,35 €
Prefix v4	5,00 €
Prefix v6	0,00 €
Total	15,00 €

Port Speed

Committed Data Rate	5 Gbps
Port Speed	10 Gbps
VLAN ID	123
One Time Fee	500,00 €
Monthly Fee	0,35 €

Prefix V4

/31 2 Addresses 5,00 € /mo

Prefix V6

/127 2 Addresses 0,00 € /mo

Back

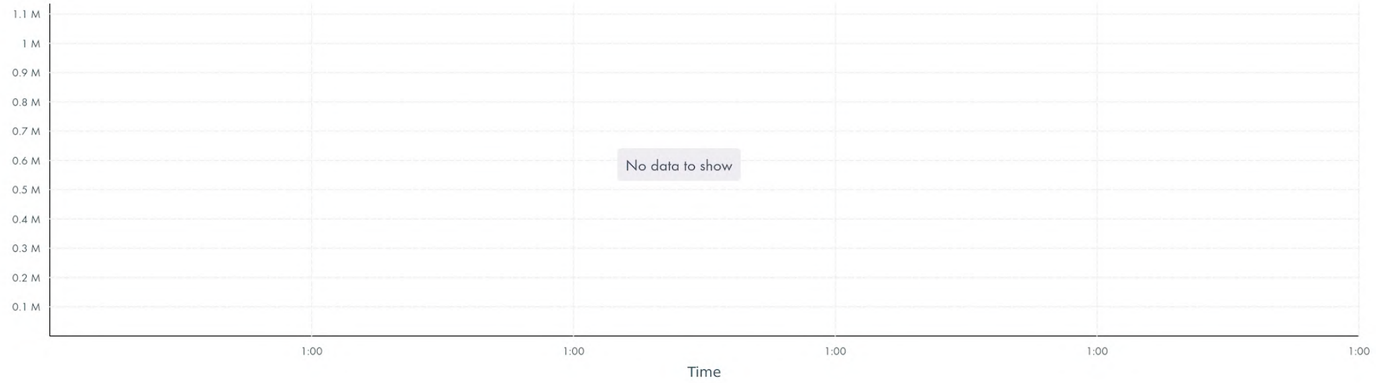
Order

My Services > SID264

SID264 • IP-Transit - Commitment 10G-LR (SFP+) Mbit/s - BER1-DE

Ready for Service Germany - Berlin

Last 24 hours Bandwidth



Service Information

Start date	2023-02-21	**Notice Period**	30 days
End date	2024-02-20	**Renewal Period**	12 months

Components

SERVICE	PRODUCT COMPONENT	PRICE	TOTAL PRICE
IP-Transit - Commitment 10G-LR (SFP+) Mbit/s - BER1-DE	BGP Session	0,00 EUR	0,00 EUR
IP-Transit - Commitment 10G-LR (SFP+) Mbit/s - BER1-DE	BGP Session	0,00 EUR	0,00 EUR
IP-Transit - Commitment 10G-LR (SFP+) Mbit/s - BER1-DE	Billing Group	0,00 EUR	0,00 EUR
IP-Transit - Commitment 10G-LR (SFP+) Mbit/s - BER1-DE	Port	0,00 EUR	0,00 EUR
IP-Transit - Commitment 10G-LR (SFP+) Mbit/s - BER1-DE	Prefix	0,00 EUR	0,00 EUR
IP-Transit - Commitment 10G-LR (SFP+) Mbit/s - BER1-DE	Prefix	0,00 EUR	0,00 EUR
IP-Transit - Commitment 10G-LR (SFP+) Mbit/s - BER1-DE	Setup	0,00 EUR	0,00 EUR
IP-Transit - Commitment 10G-LR (SFP+) Mbit/s - BER1-DE	VLAN	0,00 EUR	0,00 EUR

Problem Statement

- Status-quo: "Auto-magic everything"
- Migration to fully automated operations is a "journey", even for green-field
- What are the questions you need to be asking if you're new to software and development?
- Spoiler: we can re-use our lessens learned from networking

Data Modelling

- How: the "Lego bricks" approach

Components

SERVICE	PRODUCT COMPONENT ↑	PRICE	TOTAL PRICE
IP-Transit - Commitment 10G-LR (SFP+) Mbit/s - BER1-DE	BGP Session	0,00 EUR	0,00 EUR
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IP-Transit - Commitment 10G-LR (SFP+) Mbit/s - BER1-DE	Prefix	0,00 EUR	0,00 EUR
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IP-Transit - Commitment 10G-LR (SFP+) Mbit/s - BER1-DE	Setup	0,00 EUR	0,00 EUR
IP-Transit - Commitment 10G-LR (SFP+) Mbit/s - BER1-DE	VLAN	0,00 EUR	0,00 EUR

Data Modelling

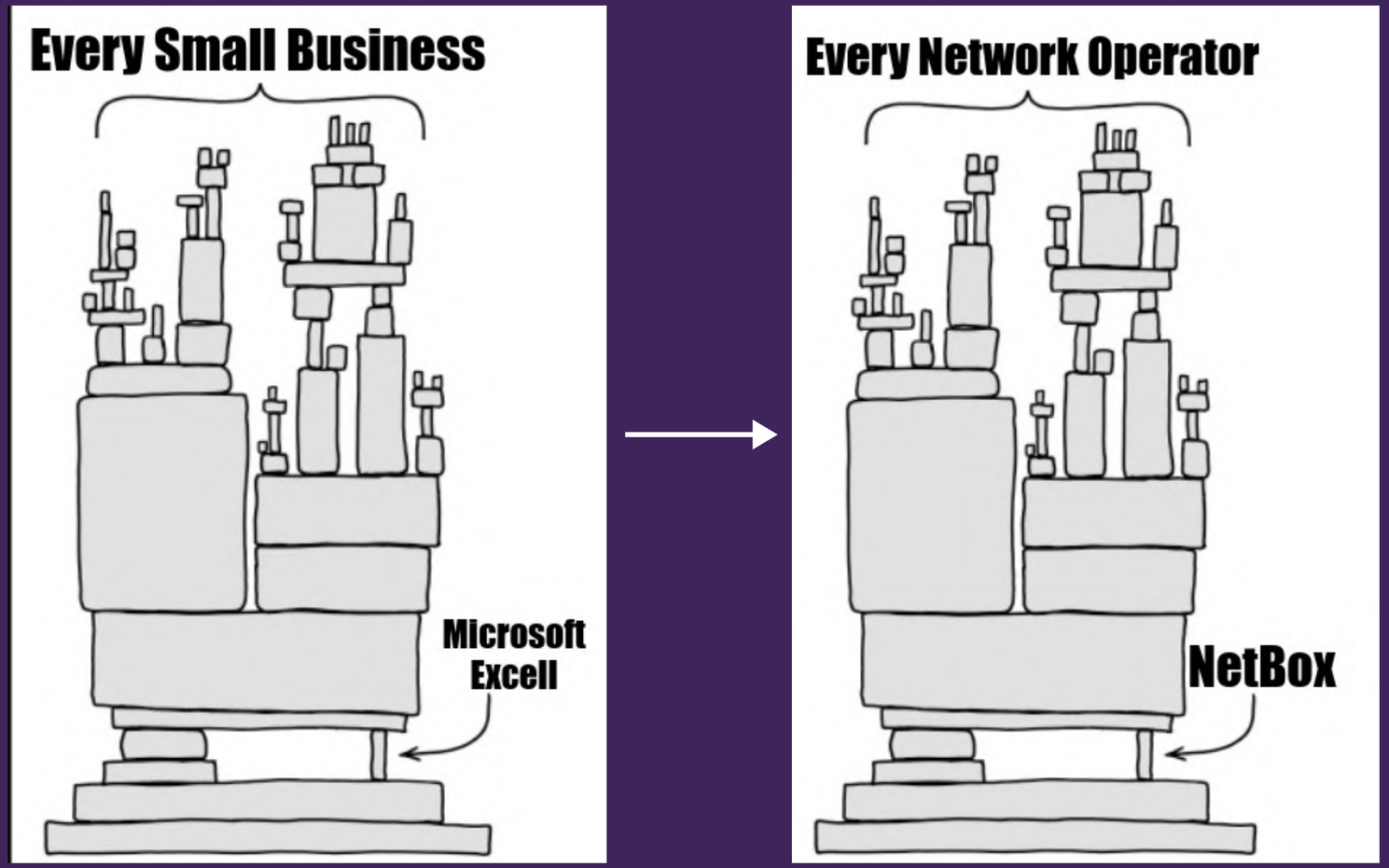
- What: Implicit vs explicit modelling
- Where: Global IDs
- Why: multiple sources can feed into a SSOT
- When: Data validation (as close to source as possible)

Tech Stack

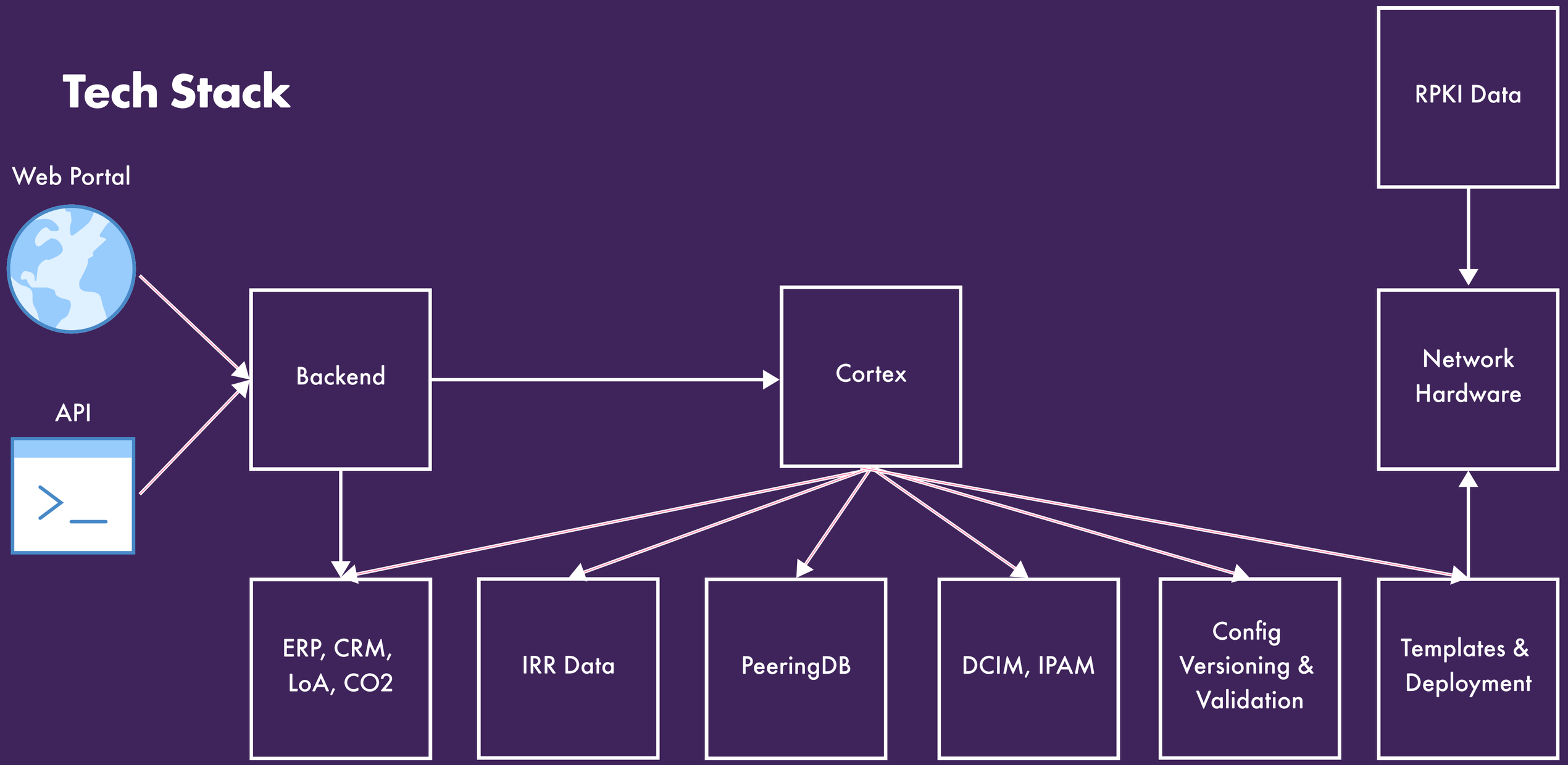
- When to have a single application per role (scalability vs extensibility)?
- Consider your user-base (they're technical, but maybe not dev's)?
- Try to reduce lock-in / tech-debt
- Network centric examples are NetBox, Ansible, and Jinja2

Tech Stack

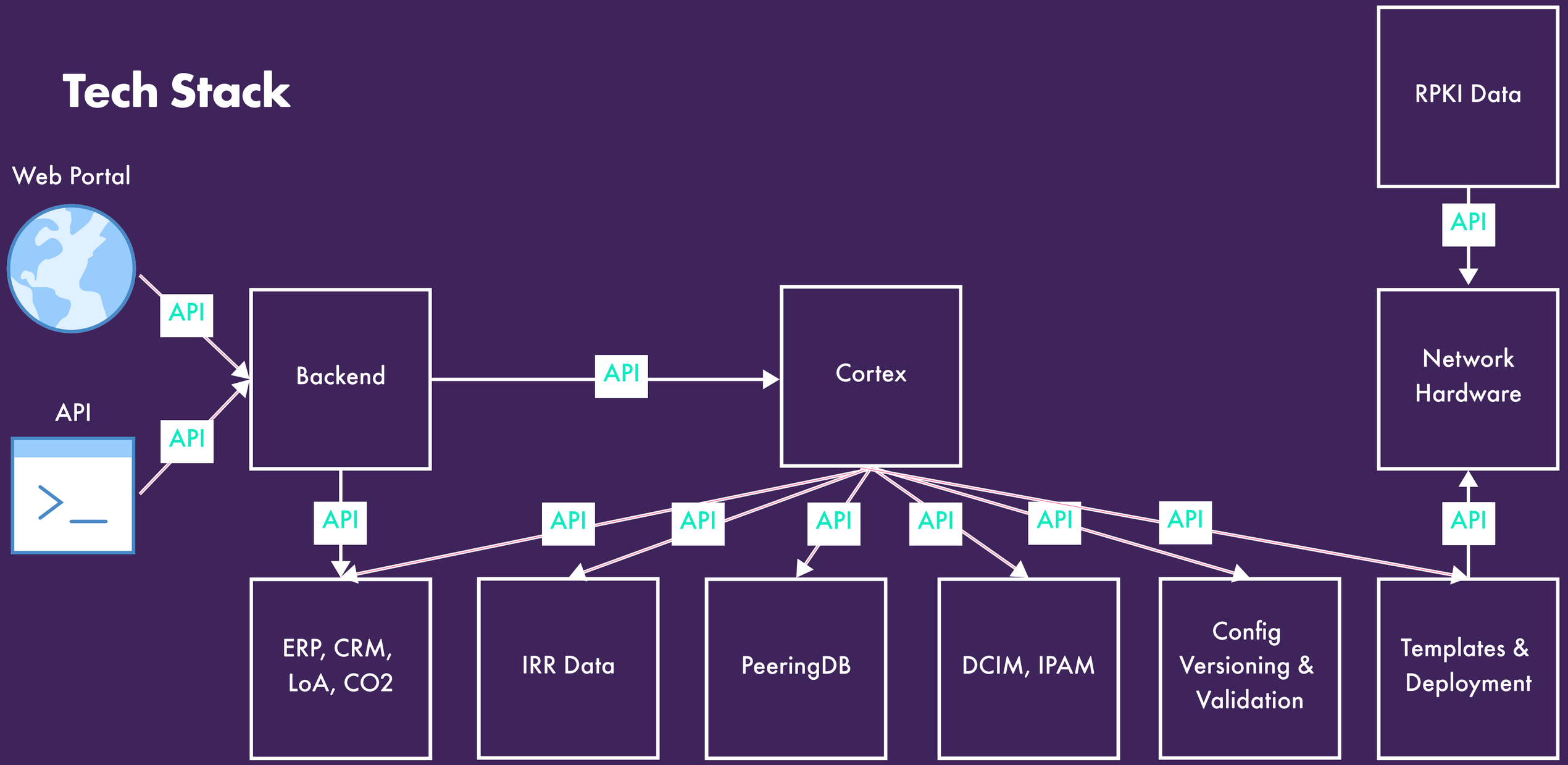
- Easy to deploy
- Easy to use
- Easy to integrate
- Creates massive tech-debt



Tech Stack


RPKI Data
Web Portal
API
Backend
Cortex
Network Hardware
ERP, CRM, LoA, CO2
IRR Data
PeeringDB
DCIM, IPAM
Config Versioning & Validation
Templates & Deployment

Tech Stack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Tech Stack

- What is practical? Full config replace vs partial config
- Fragility vs issue masking
- Clear: Source of Truth ⟶ Network
  Not clear: Network⟶ Source of Truth

Coding

- Agree on an overall framework (coding style, contribution guidelines)
- What are sensible defaults?
- Use linting and style tools to establish a consistent style
- Use pull/merge requests to establish the contribution process, start with "non-blocking"

Coding

- Documentation - where will it live and what will it cover?

Testing

- Start with small unit tests
- CI pipelines help to automate the testing process, start with "non-blocking"
- Test coverage is a never ending story, work out what is "reasonable" for you
- Create a simulation environment with production data

Debugging

- Write human friendly error messages
- Logging/monitoring
- Fail-safe

Questions?

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