

# Network as code

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# My profile

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Datacenter and Enterprise Practice Lead at Natilik

Co-Founder of Bubakov.net

Contributing to Open-Source software, playing with Linux and automating since 2001

Ex-Googler, Ex-IBMer, (Decent) Ex-network engineer, (Terrible) ex-programmer 😊

# Good old times

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- Dozens of APs and switches to manage
  - Old Pentium 1 PCs with multiple 2,4 GHz wireless cards
  - Running on Slackware 8.0 and HostAP
- Bash and SSH running scripts remotely
- Our own ‘orchestrator’ in PHP
- No automation tools or language, only scripts



# Auto....what?

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- Predominantly Cisco and Juniper environments
- Using TCL and expect module and Python
- Enterprises were ignoring automation
- Automating roll-outs only

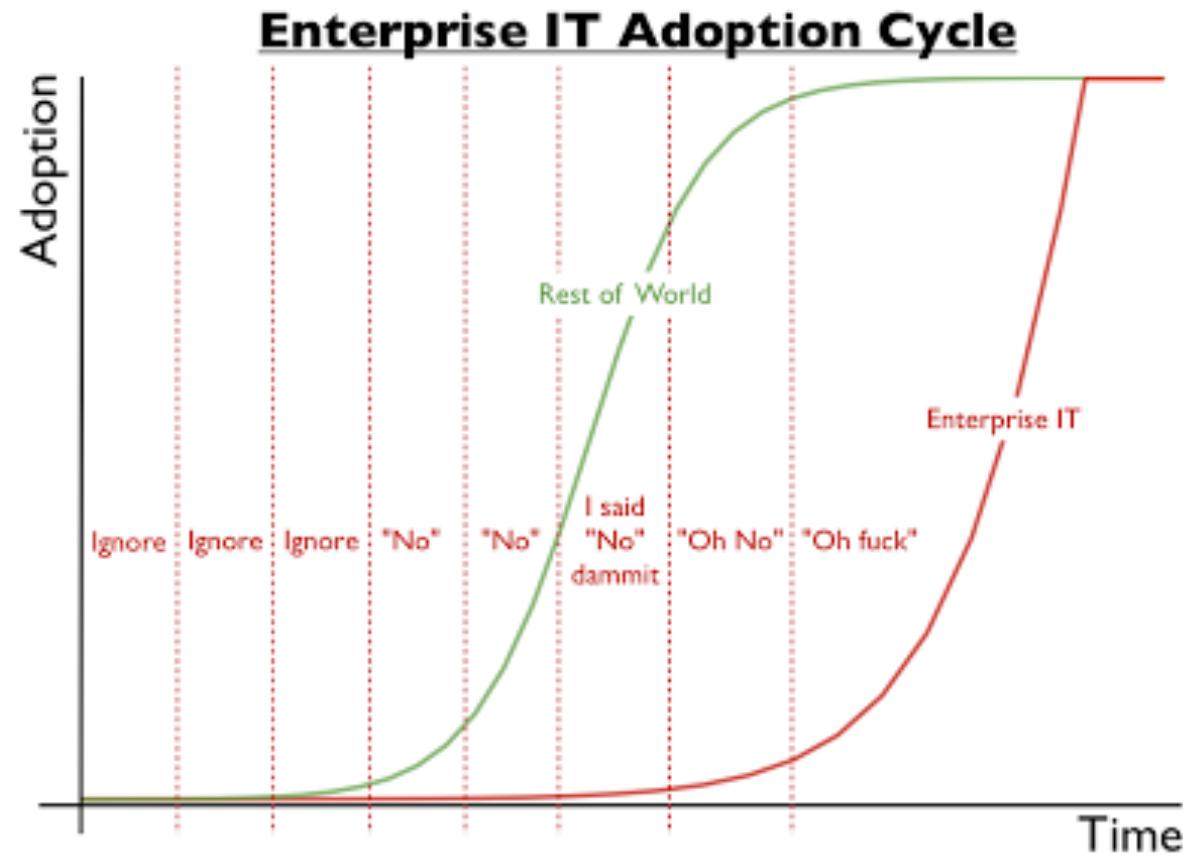
# Automate everything

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- Mainly Linux environment
- Automating vast rollouts in the DC or on the edge
- Orchestration
  - Adding new racks in DC
  - Any changes
- Chef, Puppet etc.

# Ignore, prevent, tolerate, allow, integrate.

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# Automation

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- Great progress in the last 5 years
- Automation became the important part of our networking skills
- Open Source community was the main driver
- Big vendors like Red Hat, Cisco, Juniper has started to being more engaged
- Learning A\*\*\*\*, P\*\*\*\*, Ch\*\*\*\* or Python is just scratching the surface

# Scratching the surface?

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## Telemetry

- Structured and real-time stats from the network

## Network's source of truth

- PeeringDB
- NetBox, NSot?

## Data correlation and analysis

- With the right abstraction we need to be able correlate and analyze all the telemetry data against the single source of truth
- Complex Event Processing

## Various levels of abstraction

# Telemetry

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**Why do we need focus on telemetry?**

- Unstructured
- Each vendor is different
- Filtering, categorizing
- Configuration and monitoring should be available via telemetry stream
- Faster troubleshooting

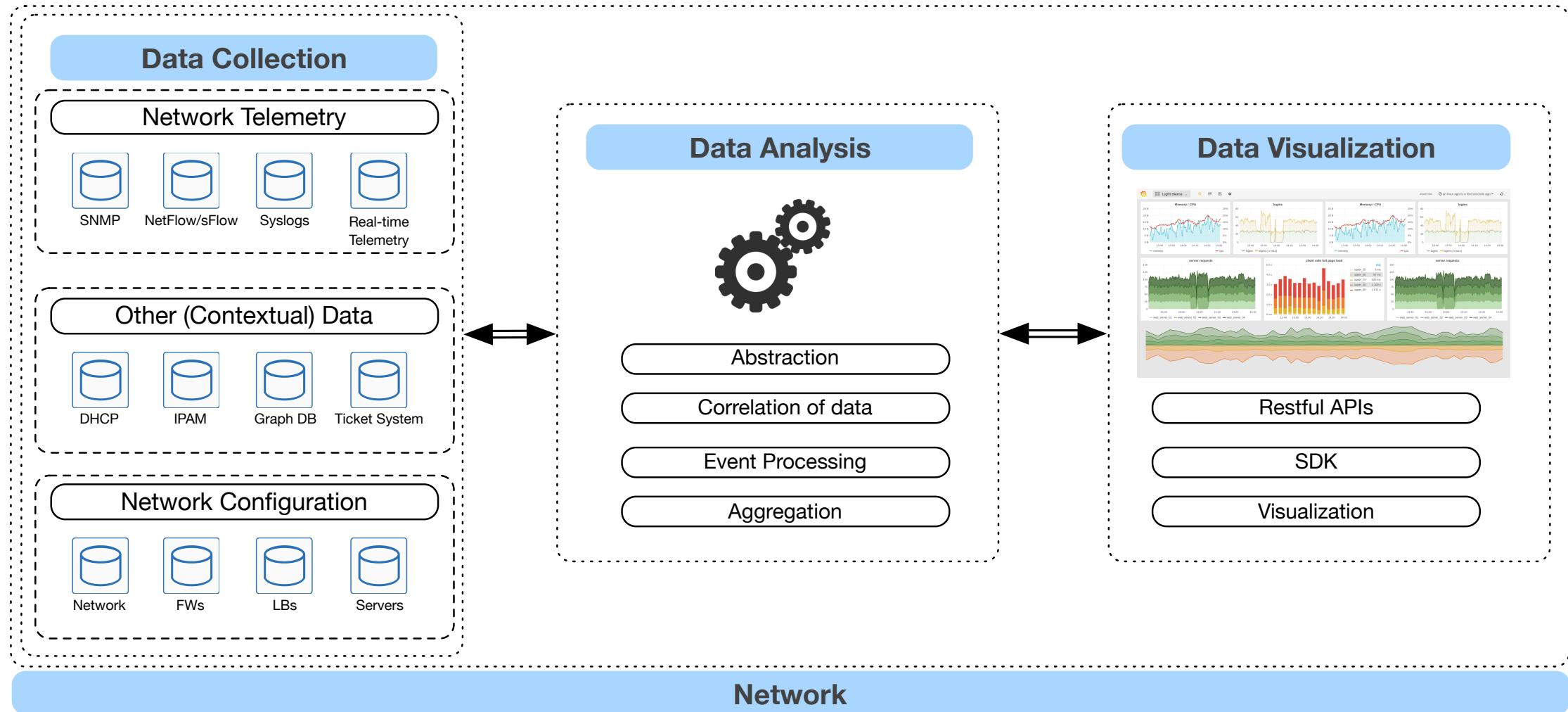
**There hasn't been too much focus on telemetry**

**We can't analyze the intent without any real-time telemetry**

# Single source of truth

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- Currently the single source of truth is the device (or spreadsheet)
- It will need to be able to collect all data
- It will need to provide the context with different level of abstraction
- Mapping complex relationships
- Providing API



# Observations

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## **Consistency**

- Need to be vendor-neutral model
- Decouple the model from releases

## **Validation**

- Not just do dry-run
- Network model against which one validation tests will be run

## **Telemetry**

- Real-time session based monitoring
- In-band telemetry

## **Vendor agnostic**

- Vendor should provide standardized platform

## **End to end**

- It is not just routing/switching but also firewalls, load-balancers etc.

Thank you