



ΣΥΖΕΥΞΙΣ II
Δίκτυο Δημοσίου Τομέα

**a glimpse
into a
network
automation
journey**

Agenda

- Intended functionality
- Project environment
- Solution components: architecture & tooling
- Day 2 operations
- Paradigm shift

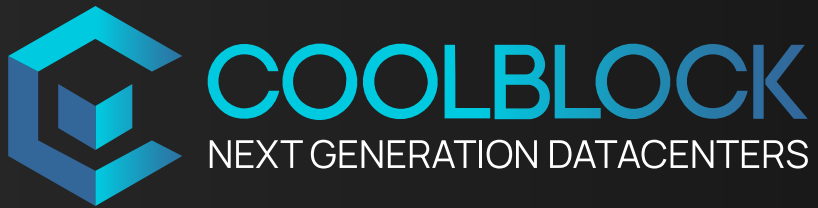
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>>> network `.toCode()`

- network automation engineer
- @ NTC since 2021
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- solutions architect
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- network architect
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Intended functionality: Source of Truth

- Sites/DCs
- Devices / Interfaces
- IP Prefixes & Addresses, VRFs and ASes (IPAM)
- VLANs
- Services
- Circuits

Intended functionality: Config Mgmt

- Produce intended configuration (Golden Config)
- Provision the network devices
- Get and store configuration backups
- Verify configuration compliance (check for drifts)

Intended functionality: Firewall/VPN

- Manage ZBFW on the CPEs based on the agencies requests
- Manage the lifecycle of VPN services for Sizefxis II

Intended functionality: Other

- RBAC: multi-tenant AAA for various orgs (health, finance, etc)
- ZTP: provide bootstrap/full configuration through an API interface
- Device Lifecycle Management: EoL, CVEs, contracts
- OS Upgrades: upgrade devices to their target OS version.

Project environment

- is it an Enterprise or Service Provider Network?
- Designed in early 10's
- Procured around 2014
- Frozen for 4 years
- Revived in 2018-2019
- extended solution upgrade due to EOL/EOS products

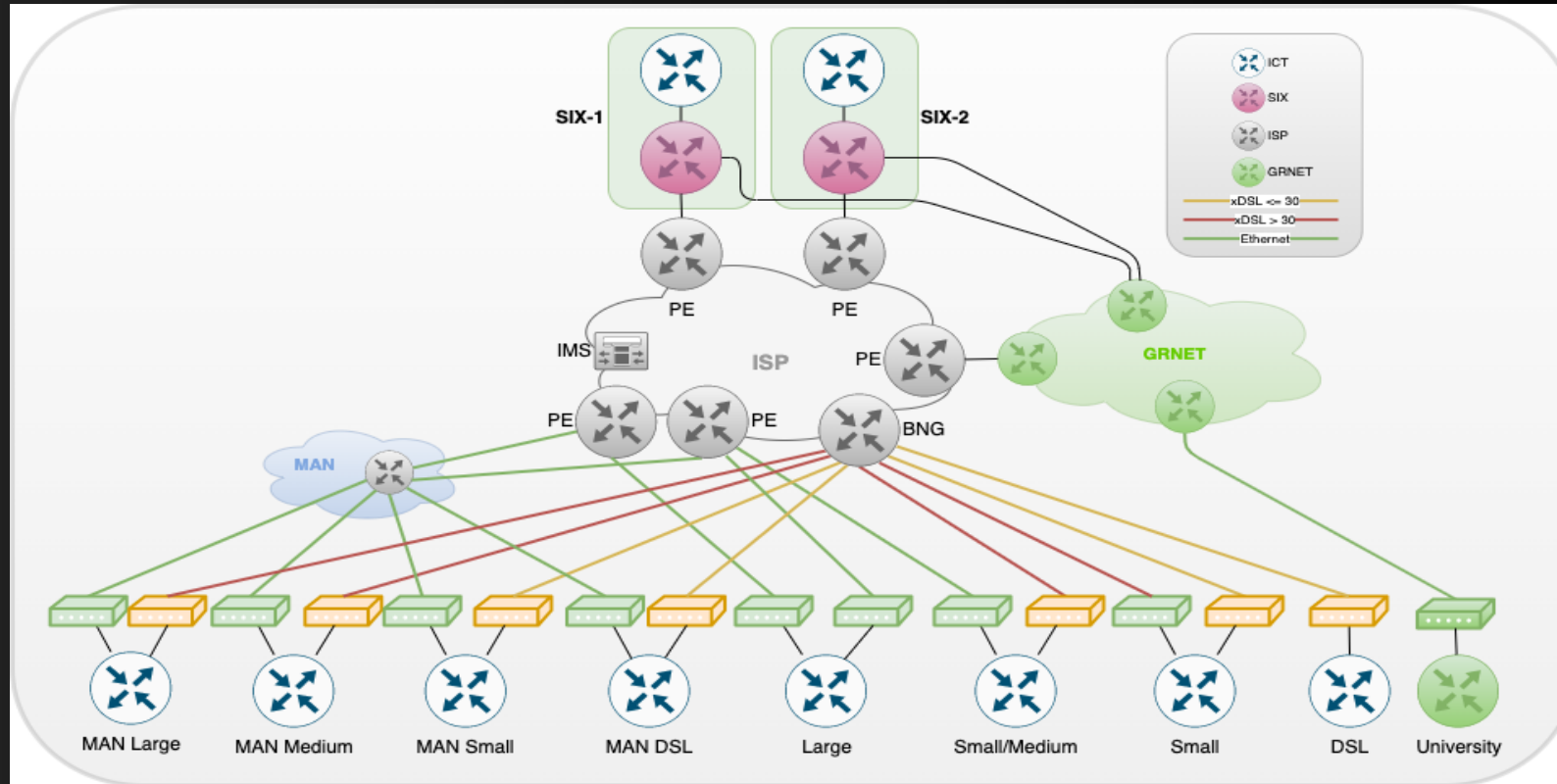
Project environment

- Extended WAN (~30K sites all over Greece)
- Routed Topology
 - Branch to Network connections (L3VPN)
 - BGP and Static Routing
 - 4 Connectivity Providers
 - OTE/Vodafone/Nova/Wind

Project enviroment: Diverse

- Asymmetric Sites (DSL Uplink)
- Small Sites (Metro 10M / DSL backup)
- Medium Sites (Metro 100M/ DSL Backup)
- Large Sites (Dual Access / Dual Homed Metro 1G)
- MAN sites
- Main / Backup circuits provided by the same Provider

Project enviroment



Project enviroment: ...and non diverse

- One equipment Vendor: CISCO
- One CPE Family: ISR
- Two CPE models: 1K & 4K
- One NOS version: IOS-XE

Project enviroment: a lot of legacy

- Sizefxis 2 is successor of Sizefxis 1
- Maintain IP Addressing of Sizefxis 1
- Designed as a "one-solution fits all" but this is not exactly the case!
- Adapt to special requests
- Tenants aka families of branches

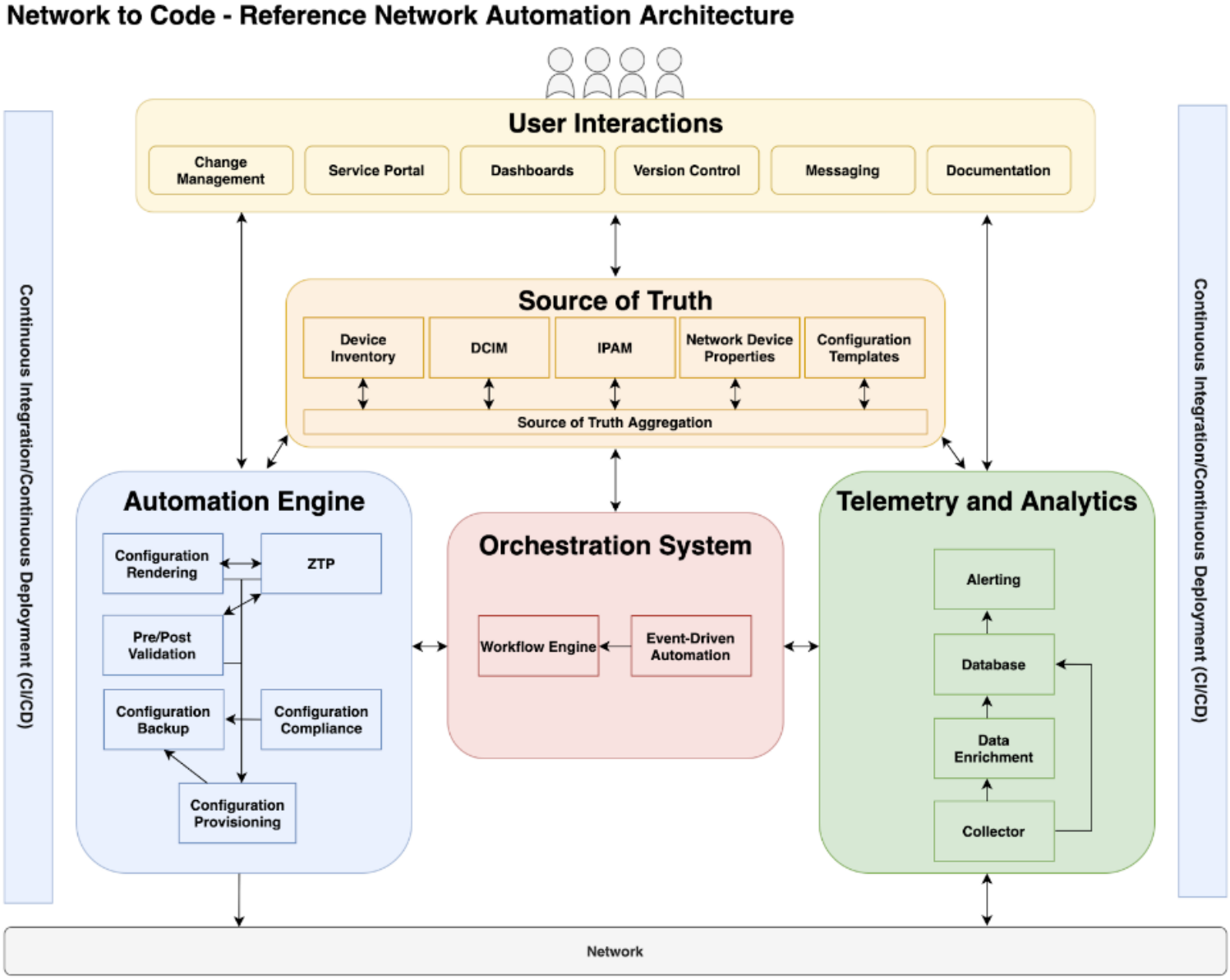
Solution components

- Architecture
- Tooling
- Source of Truth

Solution components: Architecture

- User Interactions
- Source of Truth
- Automation Engine
- Orchestration System
- Telemetry and Analytics

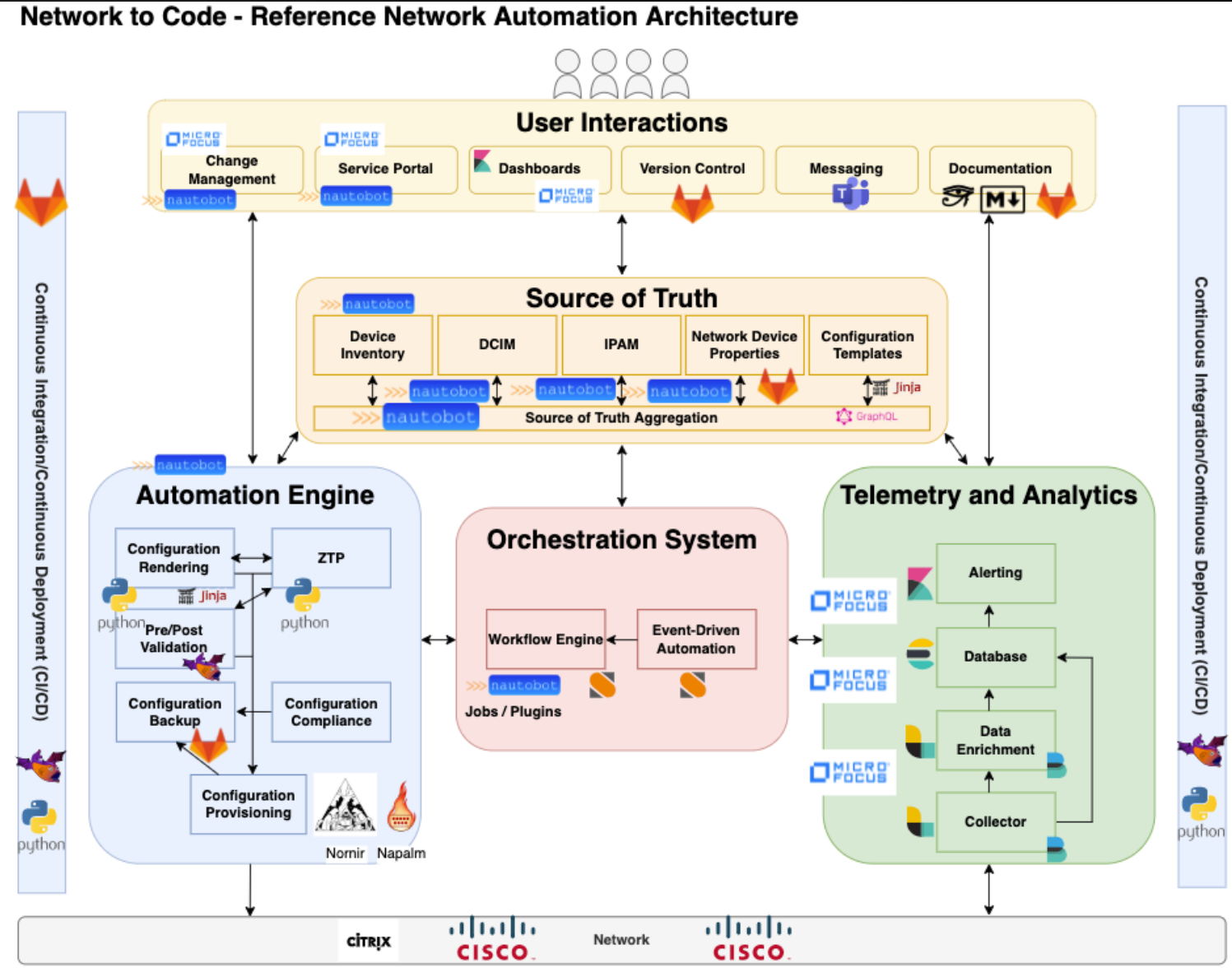
Solution components: Architecture



Solution components: Tooling

- **User Interactions:** Nautobot Jobs, Git, Elastic
- **Source of Truth:** Nautobot, Git, Jinja templates
- **Automation Engine:** Python, Nautobot Golden Config plugin (Nornir/NAPALM), Batfish
- **Orchestration System:** Nautobot
- **Telemetry and Analytics:** Elastic Stack

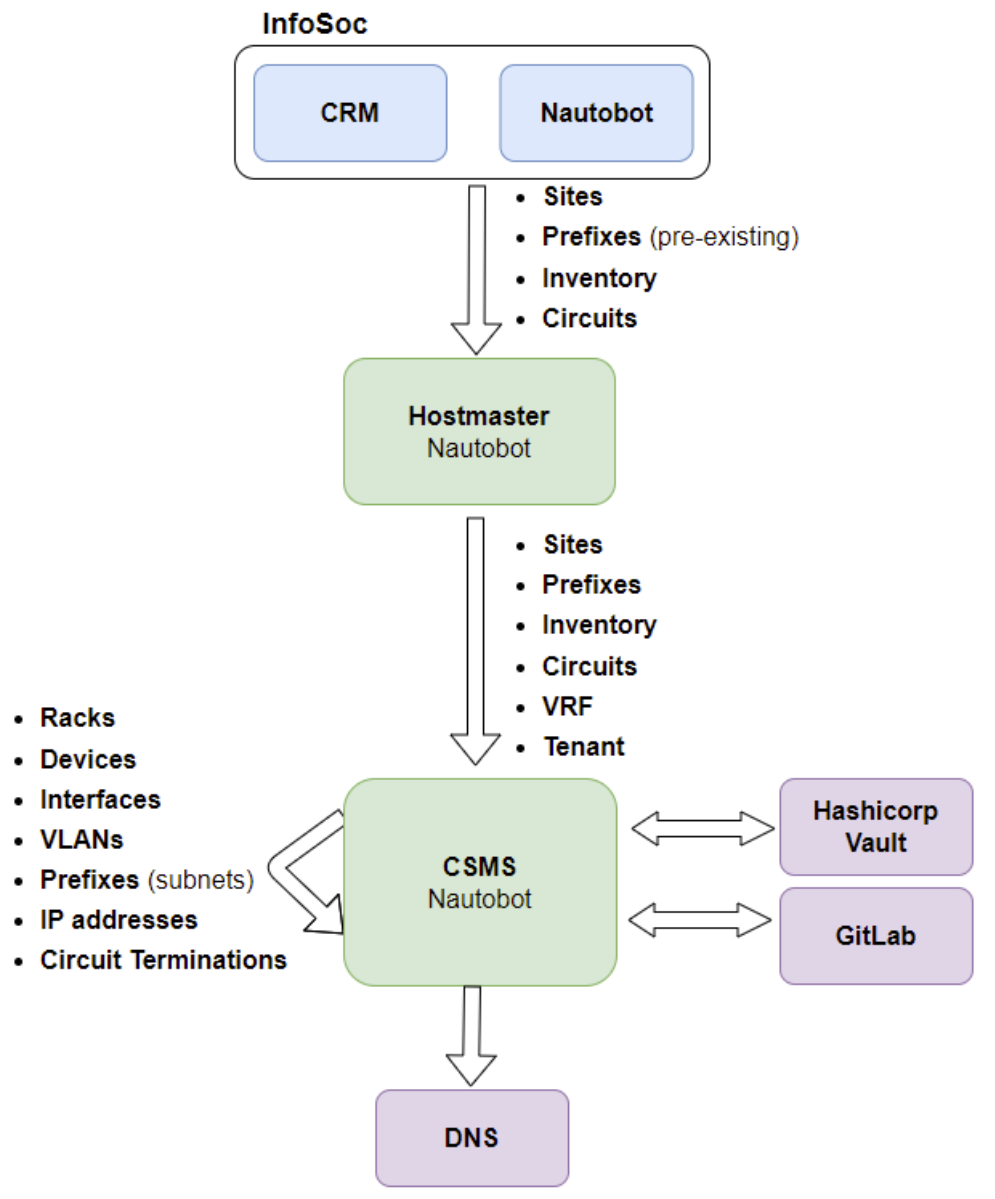
Solution components: Tooling



Solution components: Source of Truth

- Sync from/to multiple Systems of Record (SoR)
- Aggregate collected information
- Provide one centralized, authoritative Source of Truth
- Consume via GUI, SDK, API, GraphQL

Solution components: Source of Truth



Solution components: Nautobot plugins

- Golden Config
- Single Source of Truth (HostMaster Sync)
- Firewall Models
- Device Lifecycle Management
- Secrets Provider (HC Vault)
- Nornir Nautobot

Demo Time

Day 2 challenges

- Operators must adapt to the new stack (procedures, Git, YAML)
- Migrate to Restconf / YANG models
- Repeated workflows become candidates for automation
- Integration with 3rd party systems (ticketing, NMS)
- Respect and maintain the integrity of the Source of Truth

Paradigm shift

- From a turnkey solution towards an open-source approach
- From software monoliths to chain of tools
- From traditional NetOps to NetDevOps

Q&A

Thank you!