

NSO in the Brownfield

Orchestrating T-HT Croatia Services

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Agenda

- Introduction
- The Problem
- Warming up to Orchestration
- Brownfield Implementation
- Impact

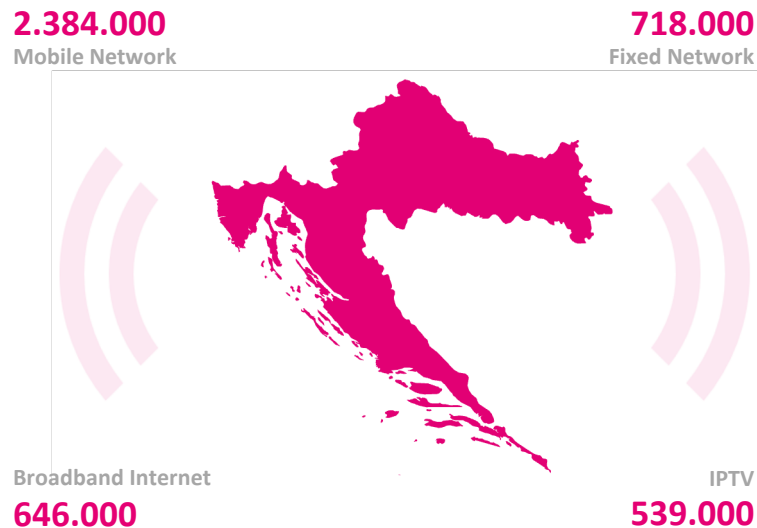
Introduction

The background features a repeating pattern of faint, light blue mathematical symbols and diagrams. These include various types of graphs (trees, star graphs, and connected networks), mathematical notations such as $\{ \}$, $[]$, ∞ , \cup , \cap , and \emptyset , and other symbols like $\llbracket \rrbracket$ and $\llbracket \rrbracket$. The symbols are scattered across the dark blue background, creating a technical and abstract aesthetic.

T-HT Croatia

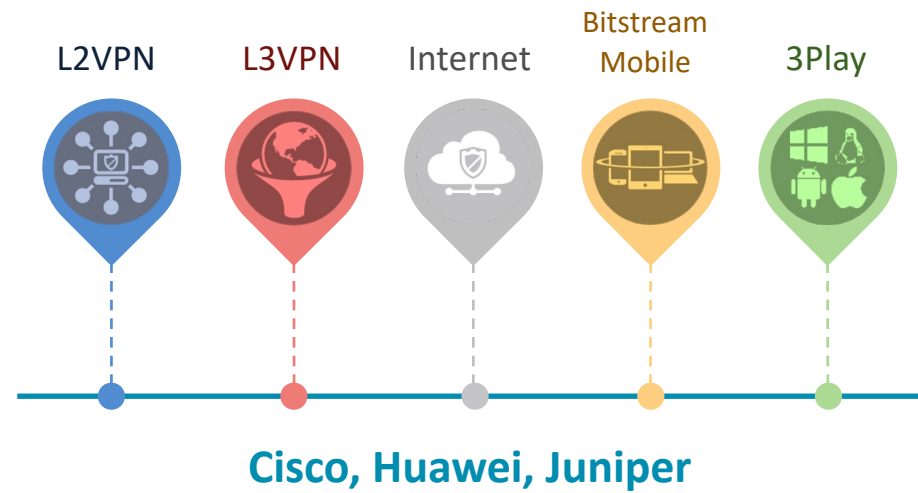
- Leading Service provider in Croatia
- Part of DT NatCos group
- All NT/IT Mob/Fix services provider
- Strong focus on Automation

 Hrvatski Telekom ■ Leading service provider in Croatia



T-HT Croatia Network and Services

- 250+ MPLS-PE devices
- > 4000 L2VPNs (VPLS)
- > 3000 L3VPNs
- ~ 250.000 Subinterfaces



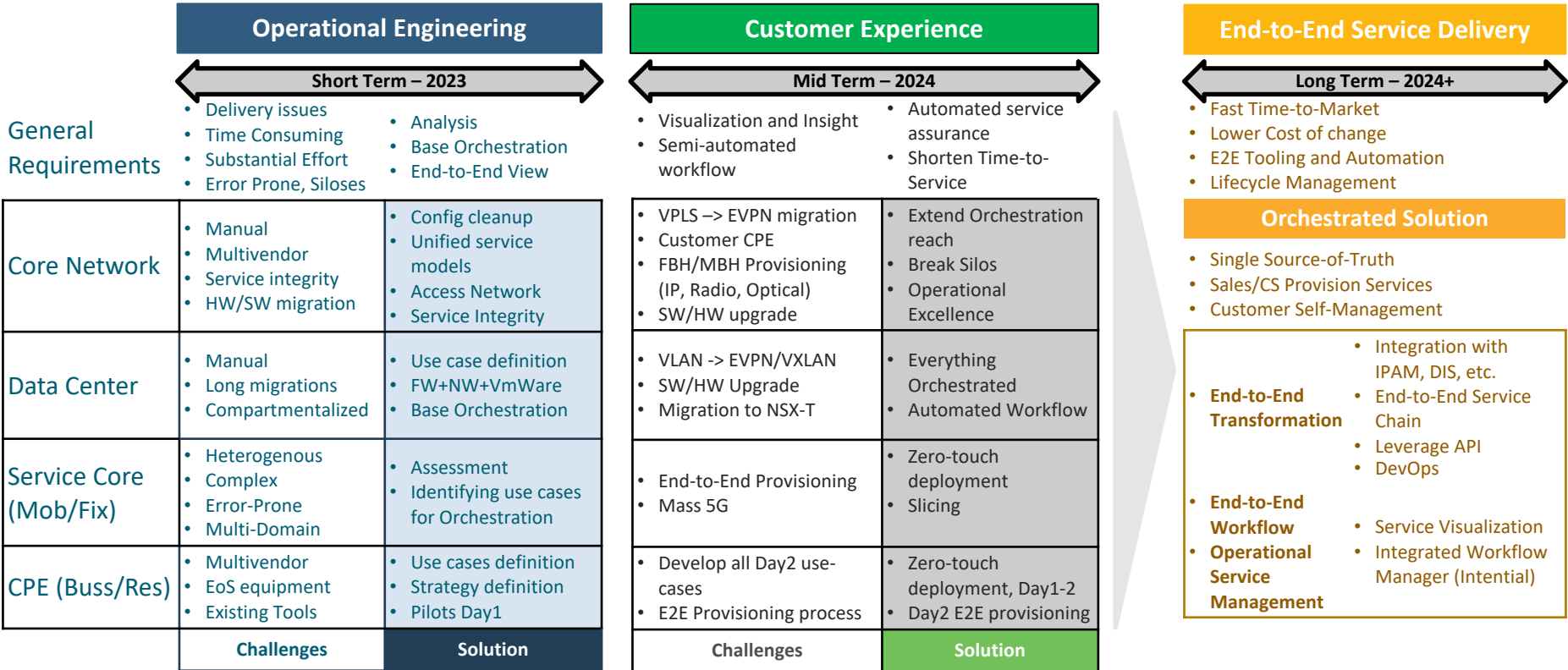
Challenges:

- Single Provisioning WO over multiple teams
- Unified configs across IP Network needed
- Operational excellence increase (less Network faults)
- Speed up Legacy equipment swap-outs, SW upgrades etc., repetitive WO

Solution:

- NSO as Multivendor tool, open for Customization

T-HT Croatia – Automation Strategy

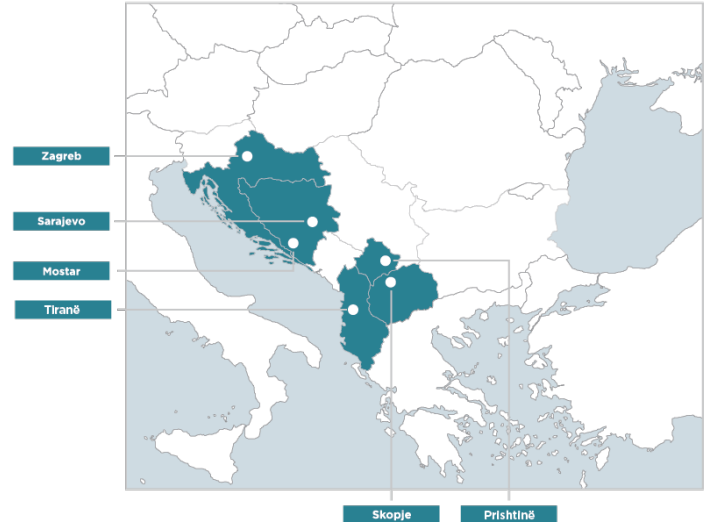


Verso Altima Group

- 15+ years Cisco Gold Partner
- Service-Provider Integration
 - SP Networking
 - IOT
 - SAP Billing and Charging
 - NMS and Orchestration



Business integrator **internationally recognized** in the software and networking business, IoT and digital transformation.



The Problem



Usual Suspects, with a Twist

Configs

- Every engineer left a mark
- Highly skill-dependent

Sw and Hw

- Software upgrades difficult
- Hardware upgrades and replacement more difficult

Service Upgrades

- Moving customers between different PEs not easy
- VPLS -> EVPN. How?

Standards

- “Interpretative dance”
- Not easy to compare with customer DB

Documentation

- “Incomplete”

Business Outcomes

Service Activation

- Semi-manual, error-prone
- Affects other tasks

Service Accuracy

- Reconciliation between billing and service config not easy

Workflow Automation

- Semi-automatic
- Lots of manual work in workflow chain

Time-to-Service

- Days

Time-to-Repair

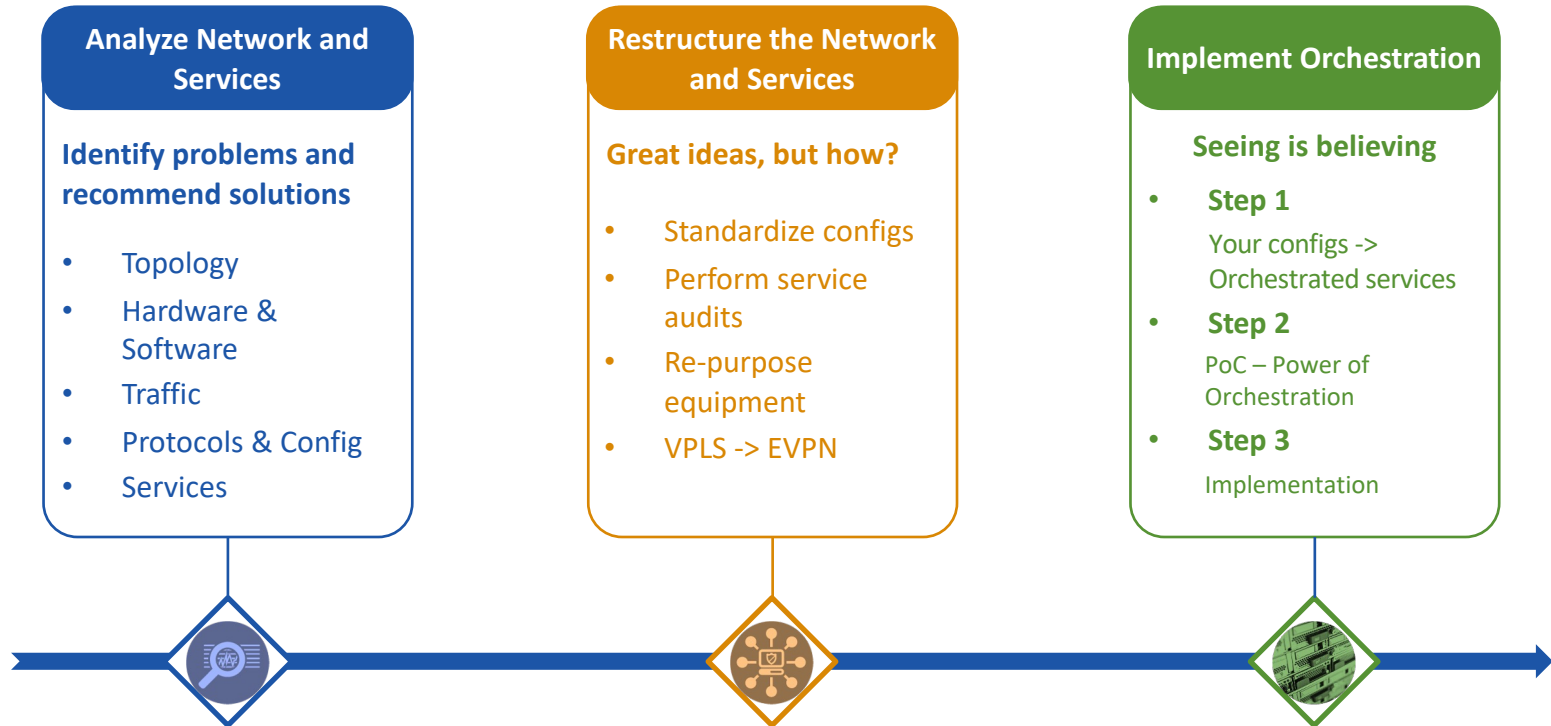
- Skill-dependent
- Hard to achieve targets

Multivendor MPLS Network

Warming up to Orchestration




The background features a repeating pattern of faint, light blue technical diagrams and symbols. These include various types of nodes, lines, and shapes, such as circles with radiating lines, brackets, and curved paths, suggesting a network or orchestration theme.

From Assessment to Proof of Concept



Running Start with Pre-Developed Models

- First for humans, then for machines
- Focus on service compatibility between platforms
- As little input as possible
- Expert mode for Brownfield
- Non-Expert mode for new services

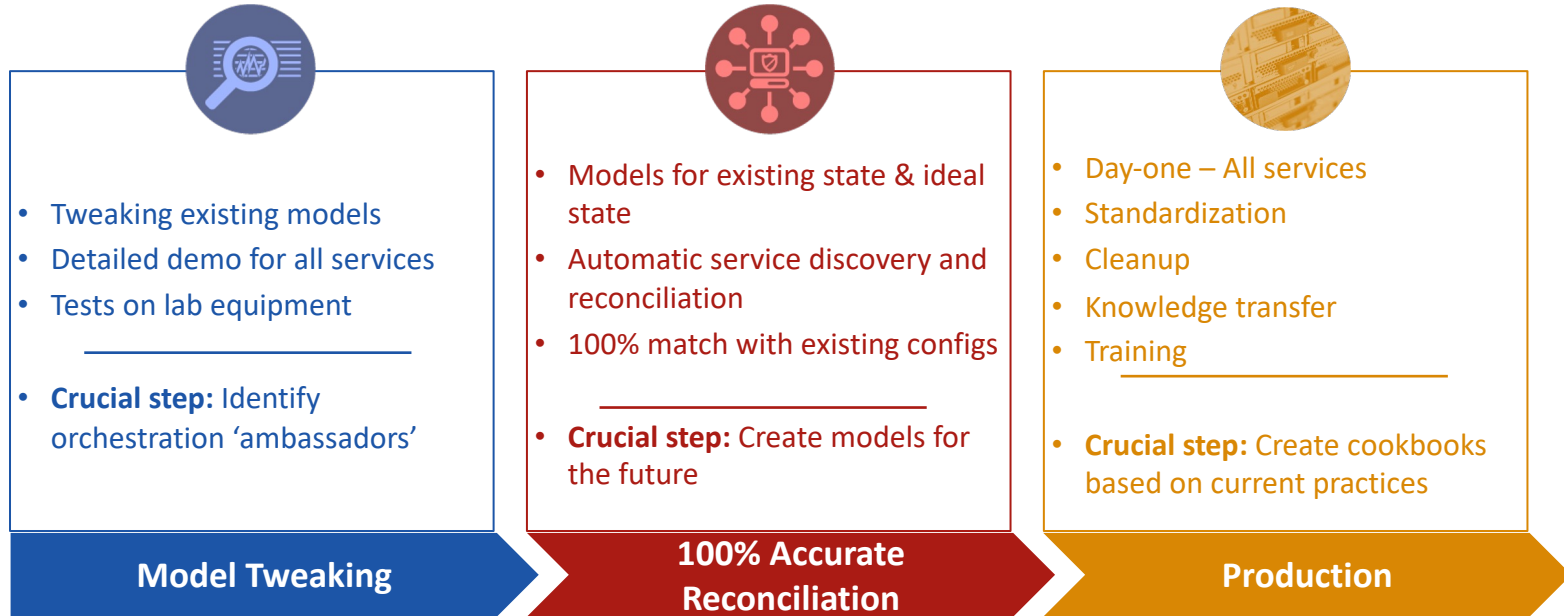
L2VPN	L3VPN	Magic Commands
All Flavors	With Multicast	The Power of Orchestration
VPLS, EVPN, Both Point-to-Point Multipoint MEF Compliant Sensible Defaults	Auto RD, RT All Topologies PE-CE Protocols Bridge-Domain Mode Sensible Defaults	Create Pingable Interfaces VPLS → EVPN Transition Virtual Interconnection Consistency Checks Service Tests
		

Cisco IOS, Cisco IOS XR, Cisco NXOS, Huawei, Juniper

Brownfield Implementation



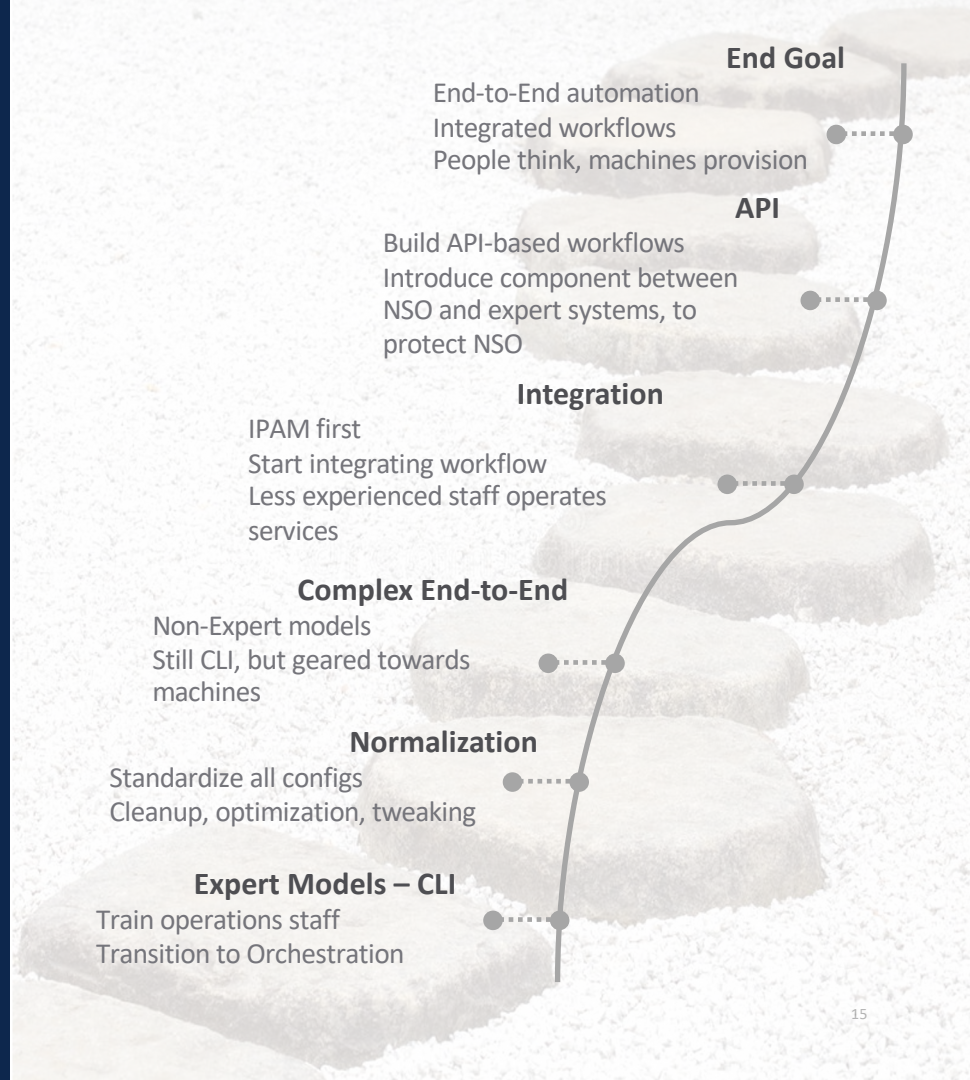
Managing the Brownfield



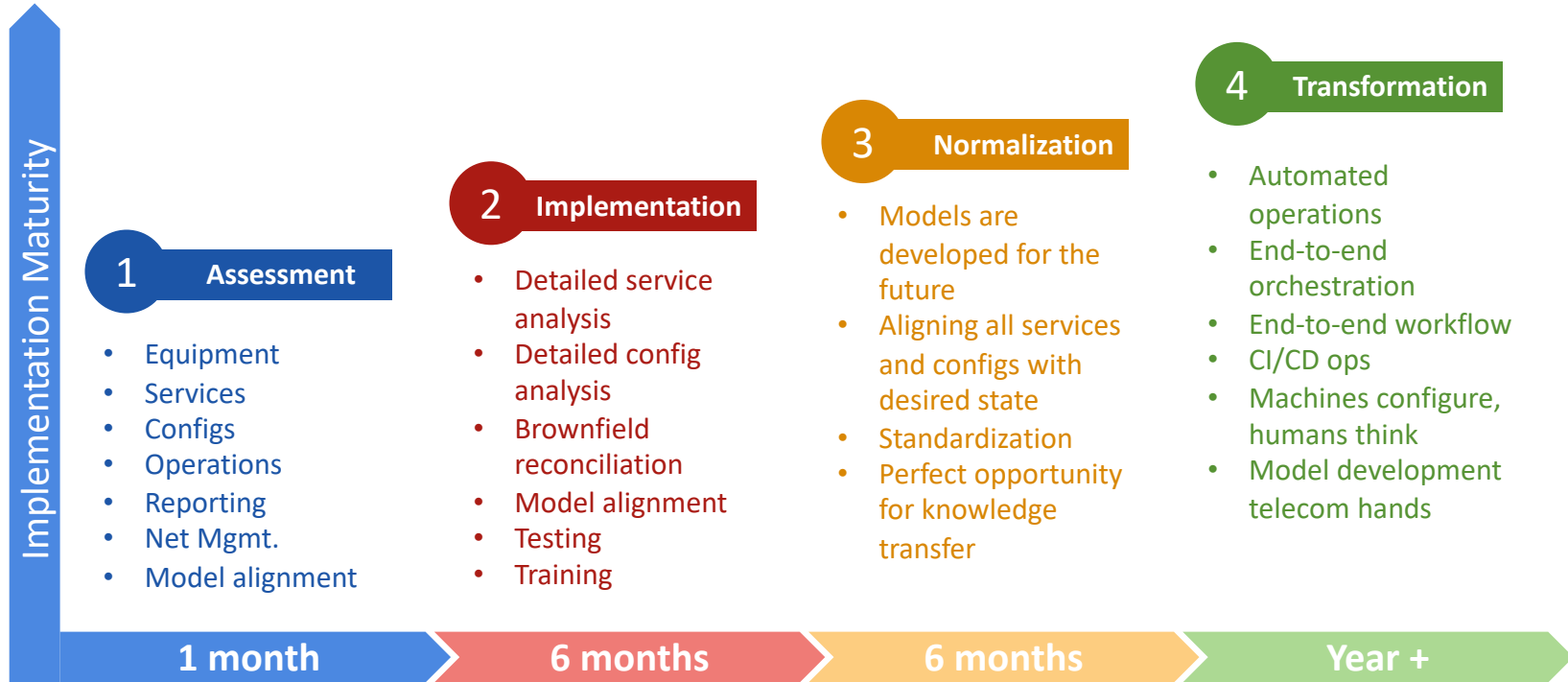
Key: Most of the burden is on the competent integrator

Path to Success

- Carefully and clearly outlined steps
- Select realistic and manageable steps
- Start with CLI
- The goal is Operational Excellence – End-to-End orchestration and automation



Time to Operational Excellence



The Sync-From

- Operated manually for 20 years
- How to approach manual changes?
- Magic sync-from?

1 Test NEDs for full config through NSO

2 Start with operations through NSO

3 Do not create magic 'sync-from'

4 NSO is the source of truth

5 Implement useful service tests

6 Add operational knobs to models

Impact

The background features a repeating pattern of faint, light blue geometric shapes and lines on a dark blue background. These shapes include various polygons, lines, and dots, some resembling stylized molecular structures or network diagrams. The overall aesthetic is clean and modern.

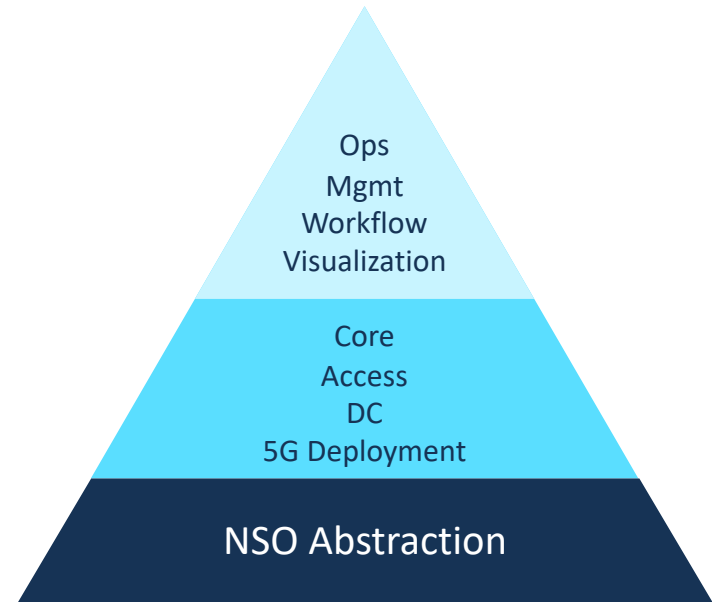
True Business Transformation

- Non-technical personnel can provision complex services
- Integration into DevOps
- Time-consuming tasks become trivial
- **Ability to attract talent**



CTO's Dream

- Ultimately, ability to simply compose new service from well defined building blocks
- Consistent, unified, modeled software-like view of the underlying infrastructure is the key



You will never look back



The bridge to possible