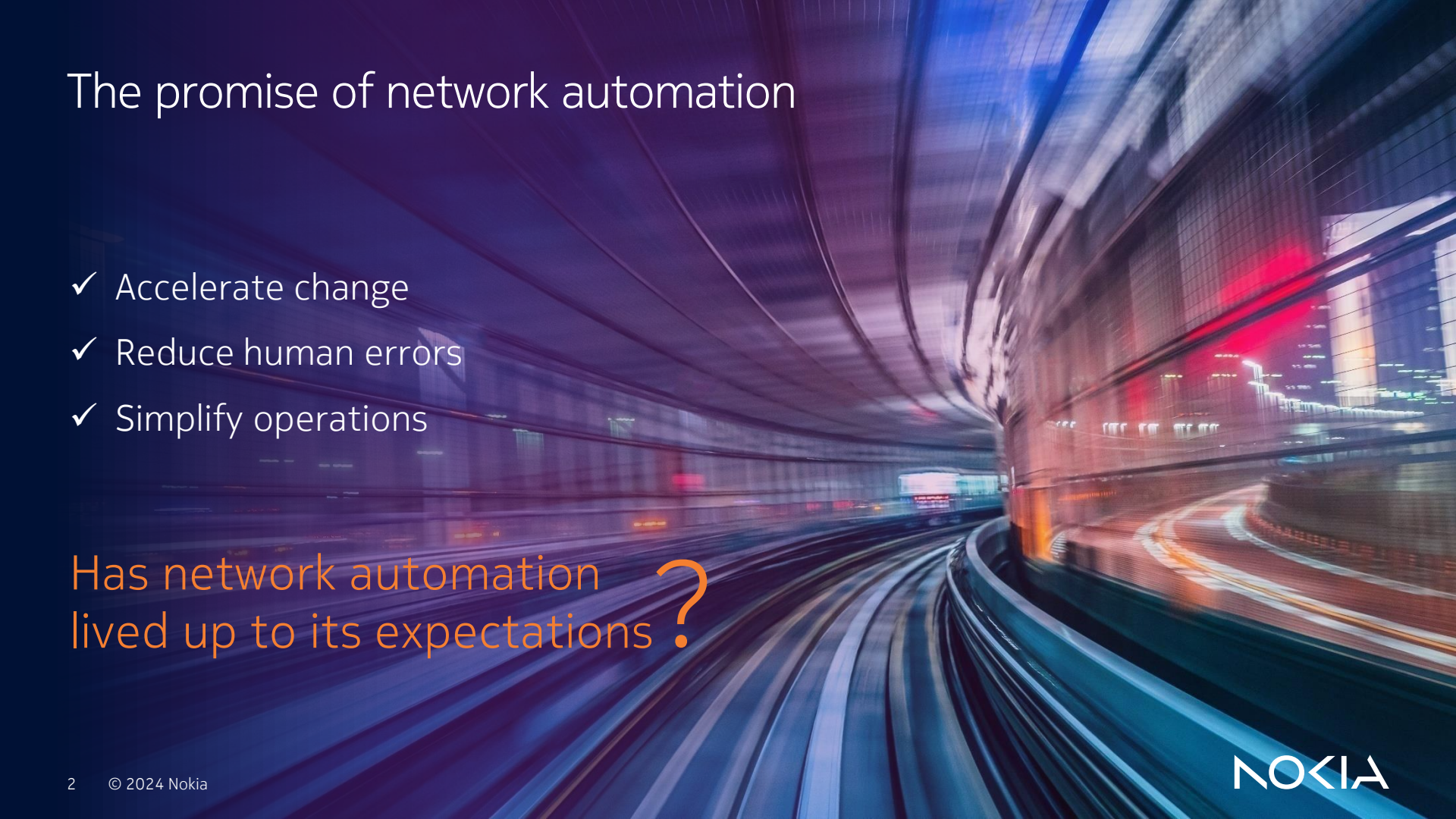
Data center network automation
Driving Human error to Zero

sami

The promise of network automation



- ✓ Accelerate change
- ✓ Reduce human errors
- ✓ Simplify operations

Has network automation lived up to its expectations ?

“No deploy Fridays” culture

No deployments on Fridays: A good practice for software development teams

Deploying new code to production can be a stressful experience, especially if it's done at the end of the week. That's why many software development teams follow a practice called "no deployments on Fridays."

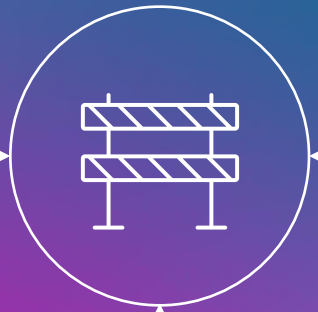
"The first rule of any technology used in a business is that automation applied to an efficient operation will magnify the efficiency. The second is that automation applied to an inefficient operation will magnify the inefficiency."

Bill Gates

Automation is key - what's holding us back?

Barriers to network automation

TOOLS



PEOPLE

- Config and state divide
- Vendor specific

- Workforce evolution
- Lack of trust in automation

Is it going to work as expected?

If not, will I be able to roll back?

What if it causes an outage?

MINDSET

- Optimized for speed

... but what about reliability?

- Amplifying human behavior


How can we evolve with confidence towards autonomous operations?
Our goal: Driving network downtime to zero

Lessons from other industries
Aviation

Lessons from other industries
IT management and containerization

Leveraging from other industries

Kubernetes - open source, automation platform

kubernetes

Successful automation and orchestration in multiple domains

5.6M+ users

- Containers
- VMs
- Clouds
- Bare metal
- Storage
- Server workloads
- AI
- Applications, mobile Core/RAN
- …

What about networks ?

Declarative Abstractions

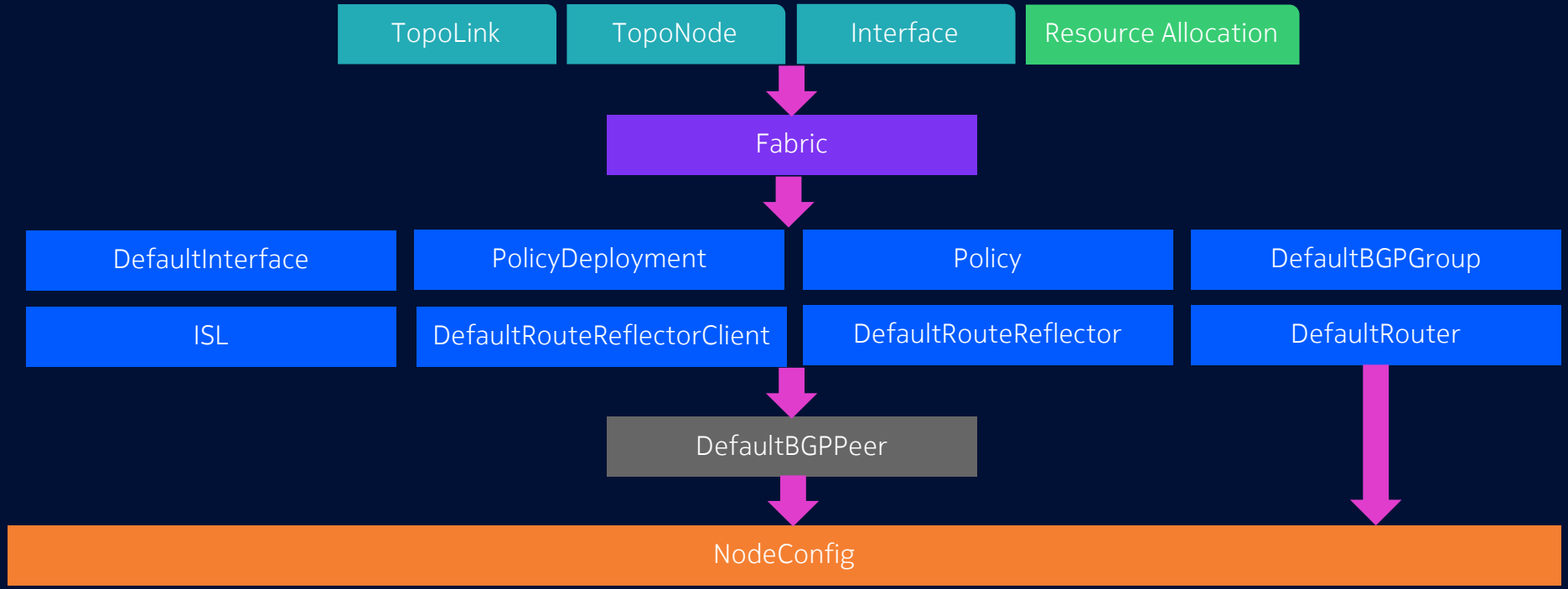
A POD, is a POD, is a POD.

An interface, is an interface, is an interface.

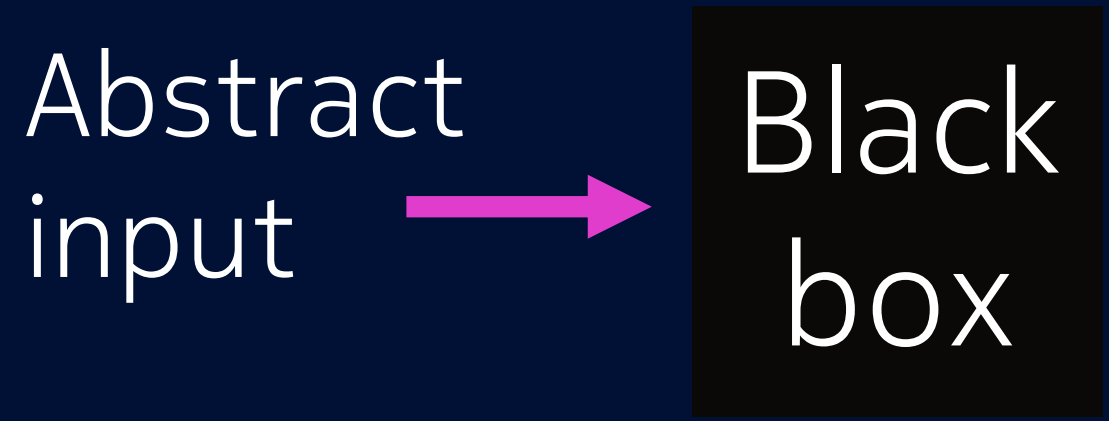
A BGP peer, is a BGP peer, is a BGP peer.

Declarative Abstractions

Composing a Fabric with Reusable Primitives



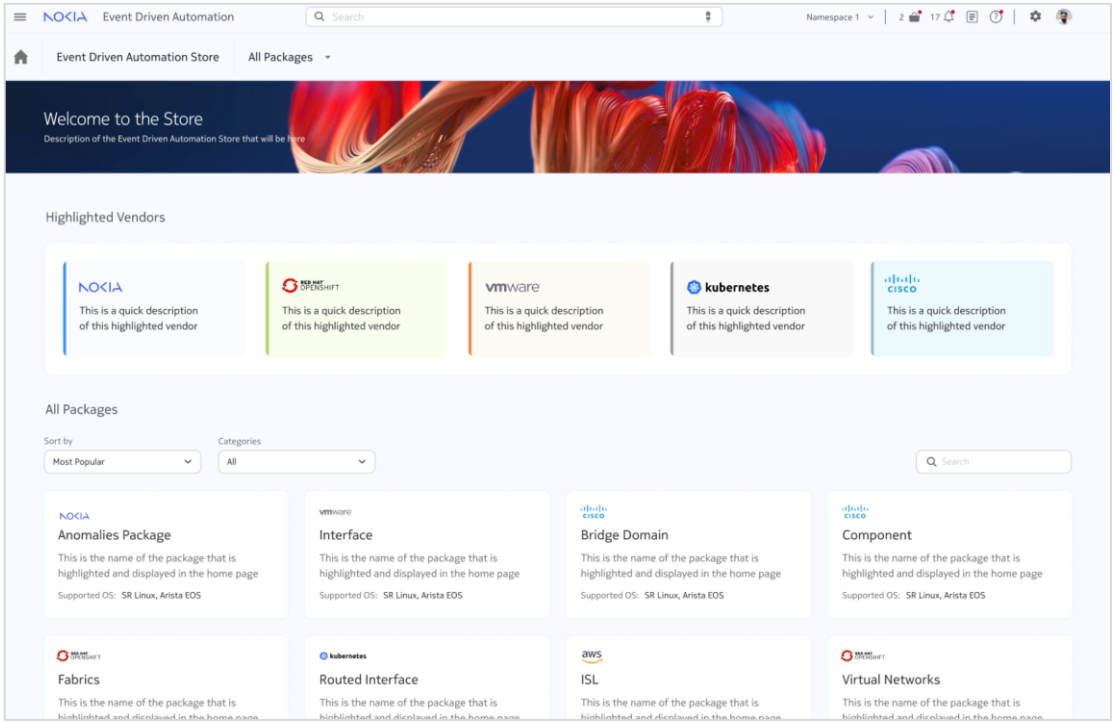
Declarative Abstractions – but at what cost?



How can we avoid the black box dilemma?

Automation app store

Consume as you go!



- Open-source automation applications distributed through the EDA app store
- Notifications on upgrades, verification of compatibility
- New application support all without upgrading any core components
- App lifecycle maintained through CI/CD semantics – always know the golden state of infrastructure
- Backended via Git repositories – allowing customization of applications in the field.

What is a Interface?

More than just config

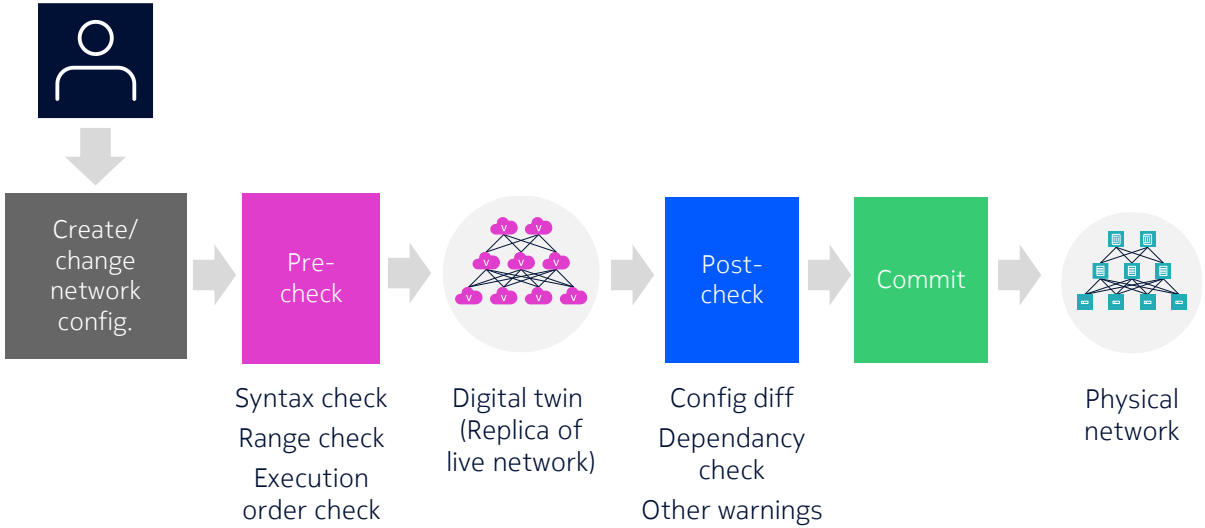
Configuration + State + Operations

=

EDA app

Operations as code – Pre-checks and Post-checks

Ensures assurance and confidence



Pre-checks

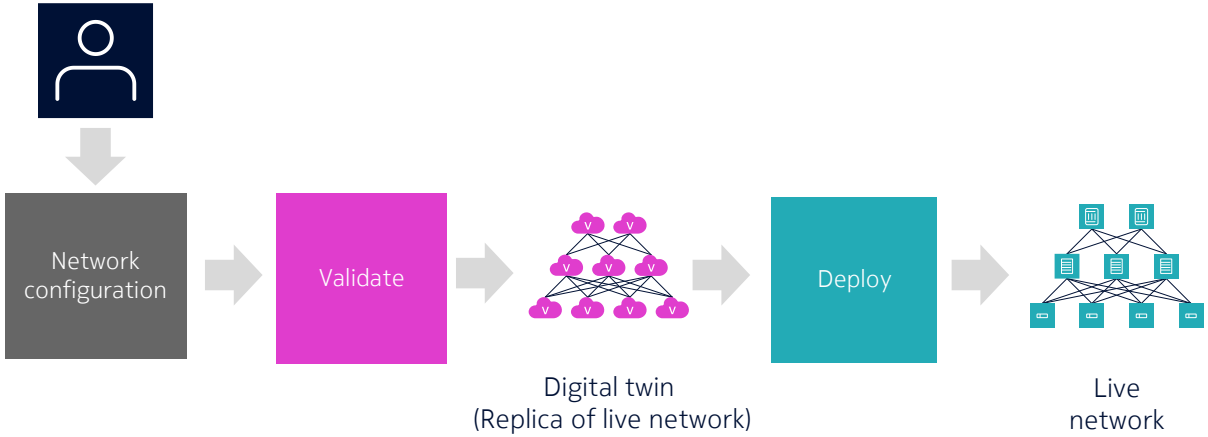
- Syntax check of the configuration changes
- Range check for command parameters
- Check if commands are executed in the right order

Post-checks

- After the configuration has been verified with Digital twin post-checks are made before the commit phase

Validate and de-risk change

With integrated digital twin



Digital twin

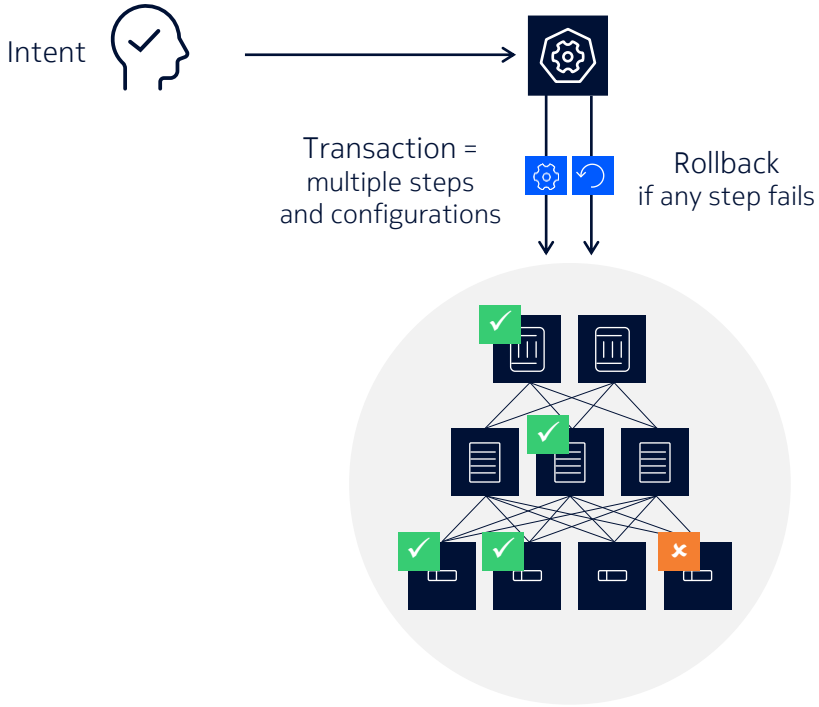
- Virtual replica of the real network
- Any network change is validated in the digital twin first, then deployed in live network
- A significant differentiator for Nokia EDA

Benefits

- Time and resource savings
- Greatly reduced risk
- Lower lab expenses
- Reduced power consumption
- Ease of use

Network-wide transactions

Ensures assurance and confidence



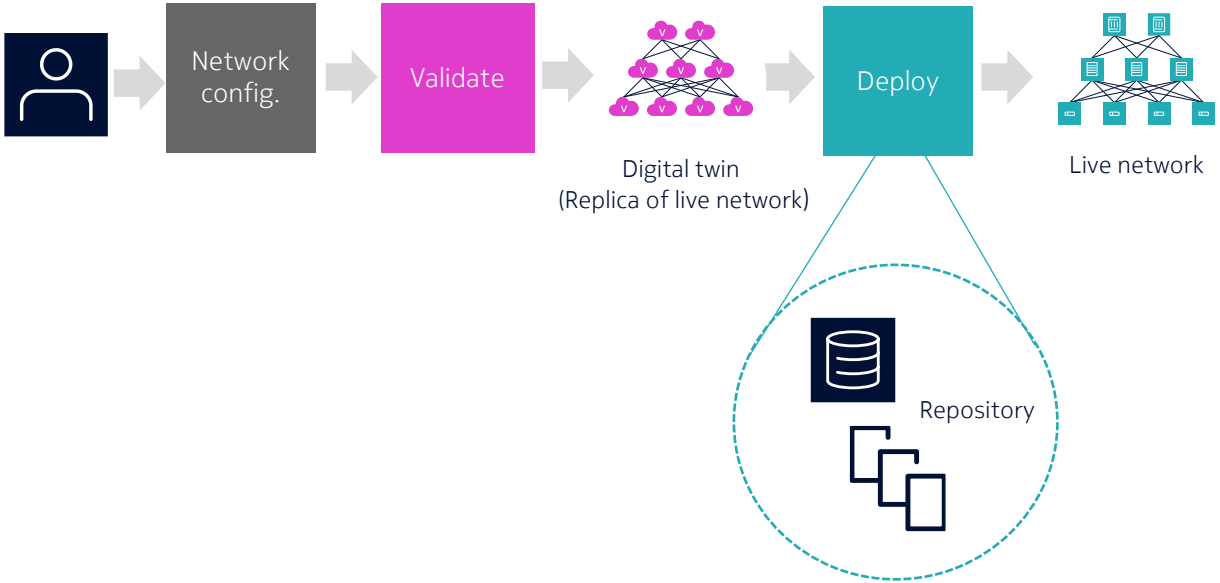
Network-wide transactions

- EDA can combine multiple configuration changes into a single fate-shared transaction
- If a transaction fails, all changes are rolled back network wide

Why it matters

- Prevent a half-deployed policy change from impacting your network

Version control and rollbacks



Version control

- Every time a change is committed to the repository, a new version of the configuration is created.
- The Git repository maintains all the versions

Rollback

- Revert the state of infrastructure to any version in the past

Benefits of version control

- Rollback to any version in the past
- Maintain sanity via ‘Golden state’
- Audit trail of configuration changes
- Facilitates collaboration among DevOps staff

Introducing EDA – the enabler of datacenter network automation

Move fast with confidence

EDA

built on kubernetes

Making network automation

✓ Predictable

✓ Consumable

Deliver reliable outcomes

Simplify lifecycle management

Quickly adapt to evolving demand

⚠ While reducing risks and the barrier to entry


NOKIA