

Bringing next-gen network management to life

Let's visualize the future of automation ...

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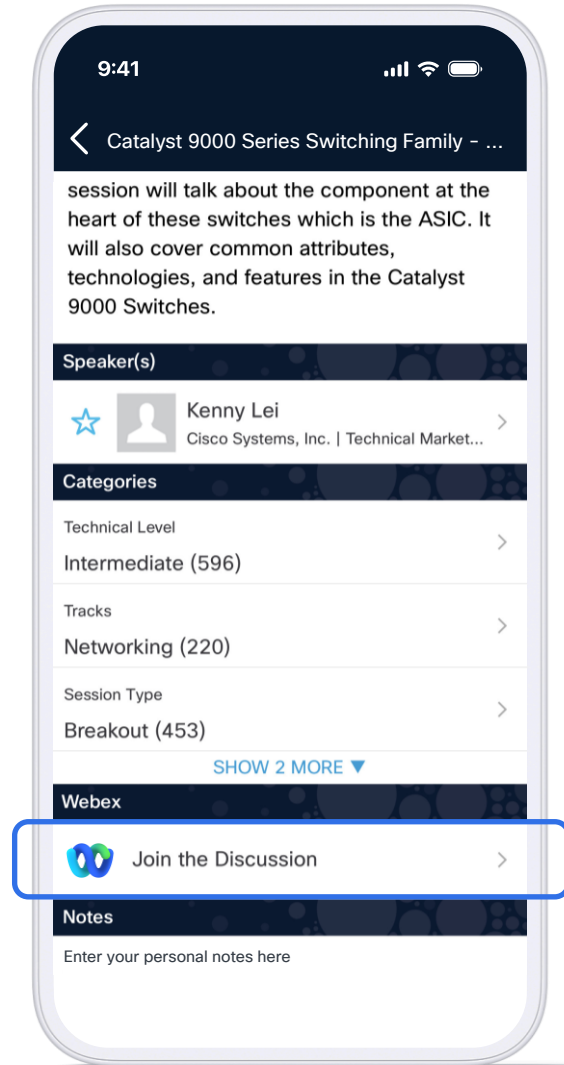
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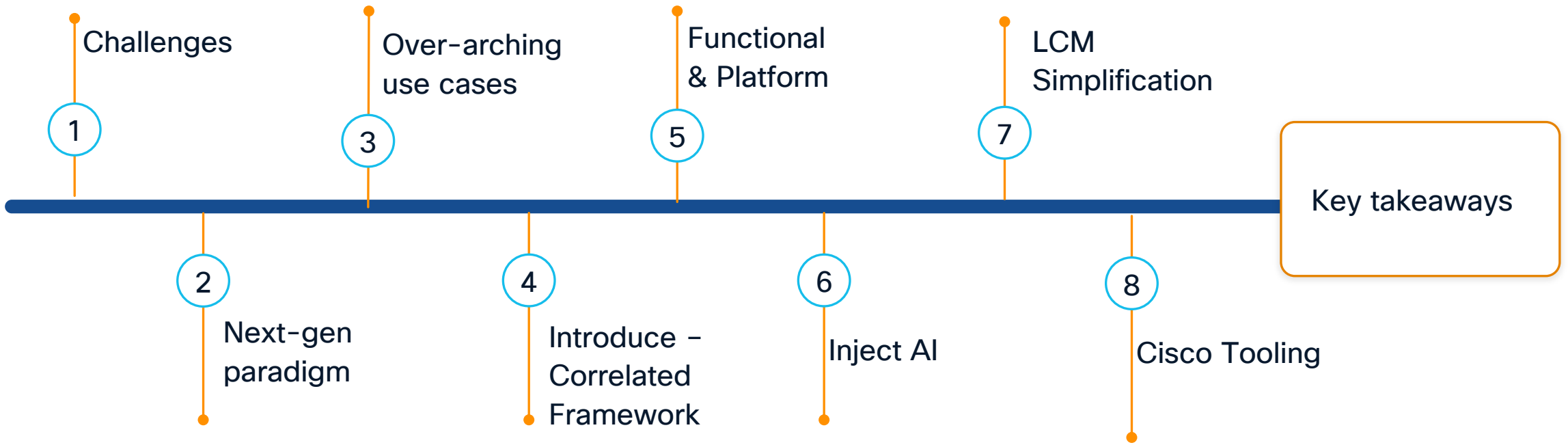
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Agenda

- 01 Network automation - intro
- 02 Challenges
- 03 Over-arching use cases
- 04 Rethink : Automation
- 05 Cisco Products and Solutions
- 06 Key takeaways

The Network Automation story

Story Board



Shaping an Operator's Perspective – Building the Foundations of an Intelligent Network

Challenges

Challenges in Enterprises

Siloed operations across Data Center, WAN, Cloud, and Security domains – each managed, monitored, and automated in isolation

Multiple **disjointed** tools , methods & procedures

Diverse deployment models and scaling mechanisms with varying configuration and patch management approaches

Expectation of cross-domain mastery across software, network, and infrastructure stacks

fragmented operations, slower delivery cycles, higher operational costs, and limited agility in managing hybrid environments, security breaches leading to total clamp on changes

Challenges for Service Providers

Siloed operations across service domains - Transport, IP/MPLS, Optical, Access, Edge, and Cloud

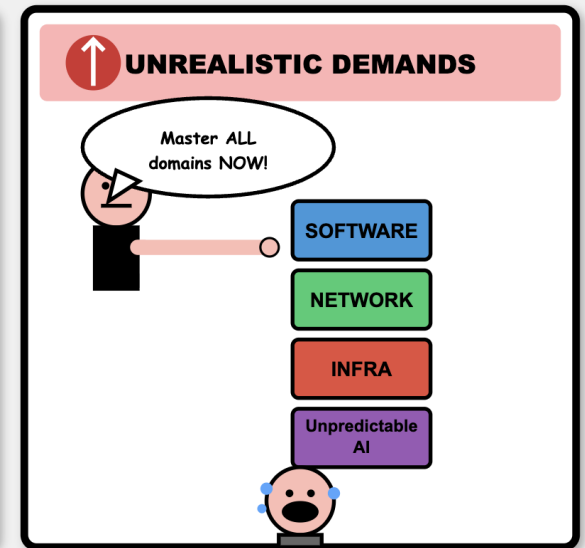
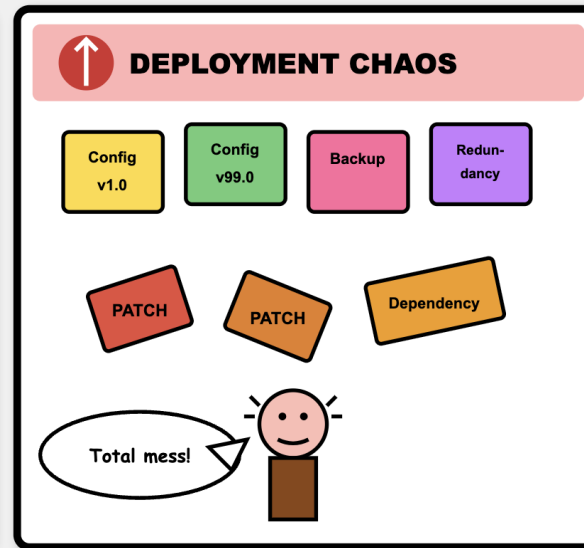
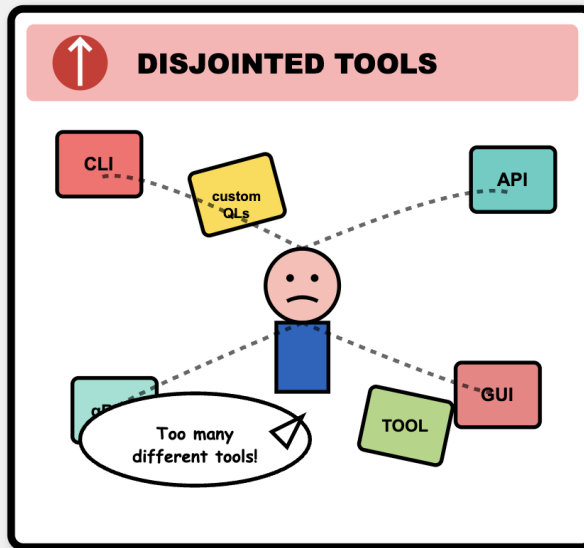
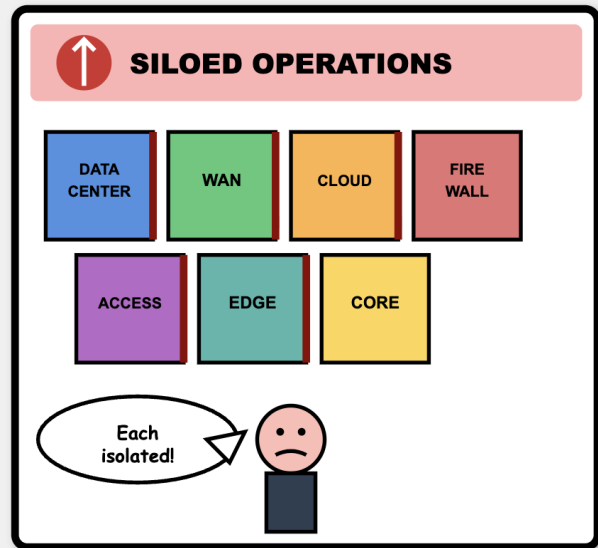
Multiple **disjointed** tools. Telemetry, event correlation, and closed-loop automation limit proactive fault isolation and SLA compliance

Diverse vendor ecosystems deployment models and scaling mechanisms with their devices , methods & procedures

Expectation of cross-domain mastery across software, network, and infrastructure stacks

Fragmented operations, need to handle at massive scale, SLA-driven pressure, slower delivery cycles, higher operational costs, and limited agility, new threats every day , security breaches

Our story



★ THE CONSEQUENCES:

- Fragmented operations • Slower delivery cycles • Higher operational costs
- Limited agility in hybrid environments • Security breaches → **TOTAL CHANGE LOCKDOWN!**

So... the challenges seem similar

across

SP, DC, Enterprise, Industrial/OT

Next-gen automation paradigm

Next-gen automation paradigm

Building Flexible, Future-Ready Network Automation

Specialized Tools excel

- Laser-focused products will continue to dominate their specific domains.
- Best-of-breed solutions provide deep functionality where it matters most.

One tool can't do it all

Unified Framework Orchestrates

- A comprehensive orchestration layer
- Unifies disparate automation tools
- Provides a base for governance, workflows, and end-to-end
- AI makes automation context-aware and continuously improving

A unified framework integrates and orchestrates all tools

Over-arching use cases across domains

Design - Plan- Implement

Design - Plan- Implement

1 Design

- network design **generation** from natural intent (sheets/natural language)
- interactive **refinement**
- intelligent **topology** optimization
- best practice **recommendations**

✓ Design Approval

- ✓ Automated Git integration for **version control** and audit trails
- ✓ Continuous pull request generation with **peer review** workflows
- ✓ **Compliance** validation against organizational standards

Design - **Plan**- Implement

2 Plan

- Intelligent **scheduling** with ITSM integration and change request automation (calendar & blocking)
- Network **embargo** analysis
- Probabilistic execution time estimation (**SLA** predication)
- Proactive support case for high-risk changes
- Pre-execution **viability checks**
- Optimize maintenance window for **parallelism** without breaking **dependency order** or stability.

✓ Plan Approval

- ✓ **Human-in-the-loop** validation for last-minute adjustments
- ✓ **Interactive approval** workflows through Webex/Teams integration

Design - Plan- **Implement**

3 **Implement**

- Maintenance **windows**
- Pre-execution validation and environmental **readiness checks**
- **Orchestrated** execution with real-time progress **monitoring**
- **Dependency** based **parallel** execution
- Automated **rollback** capabilities with human intervention points
- **Post**-implementation **validation** and automatic incident creation if needed
- Emergency brakes

✓ **Implementation Closure**

- ✓ Comprehensive execution **reports** with success metrics and **KPIs**
- ✓ Change request **closure**
- ✓ **Drift** from estimates (SLA re-evaluation)
- ✓ **Backlog** from failures with Remediation suggestions

Just - in - Time

Just - in - Time

1 Implement

- Real-time stakeholder notification
- Pre-execution checks
- Orchestrated execution with progress monitoring and human intervention points
- Intelligent rollback capabilities with automated failure detection
- Post-implementation validation

2 Reconcile

- Automated propagation of configuration changes to upstream systems
- State synchronization across network management platforms
- Inventory and Design refresh

3 Closure

- ✓ Comprehensive execution reports
- ✓ Change request closure
- ✓ Performance analysis and model calibration for continuous improvement
- ✓ Causation and Remediation recommendation

Zero-Touch

- Intent based
- Closed loop

Zero-Touch

1

Request Generation

- From the network itself as a part of a remediation flow
- From business user as an intent
- From OSS/BSS or other integrated elements

2

Implementation

- Pre-execution validation
- **Orchestrated** execution
- **Priority Queuing & Dependency** based **parallel** execution
- Automated **rollback** capabilities
- **Post**-implementation **validation** and automatic incident creation

3

Closure

- ✓ Comprehensive execution report with success metrics and KPIs (**Origination** based **Daily** reports)
- ✓ Change request **closure**

Compliance & Remediation

Compliance and Remediation

1

Drift Detection

- AI based drift detection of Network Configuration
- Rules based drift detection from standard Config Models
- Golden Config Template based

2

Design

- Generate or build config templates
- What-if analysis on config & topology
- Design approval

3

Plan & Plan Approval

4

Implement & Closure

Detect-and-Reconcile

1

Detection

- Event-driven detection
- State-driven detection
- Analytics-driven detection

1

Reconcile

- Propagate changes to upstream systems
- Inventory and Design refresh

Assure

Assurance- backbone of “closed-loop”

1

Intent Assurance & Drift Detection

- Detect desired state vs. actual state drifts
- Enables deterministic automation

2

Predictive Service Health & SLA Assurance

- Learn patterns of degradation
- Correlate
- Provide options

3

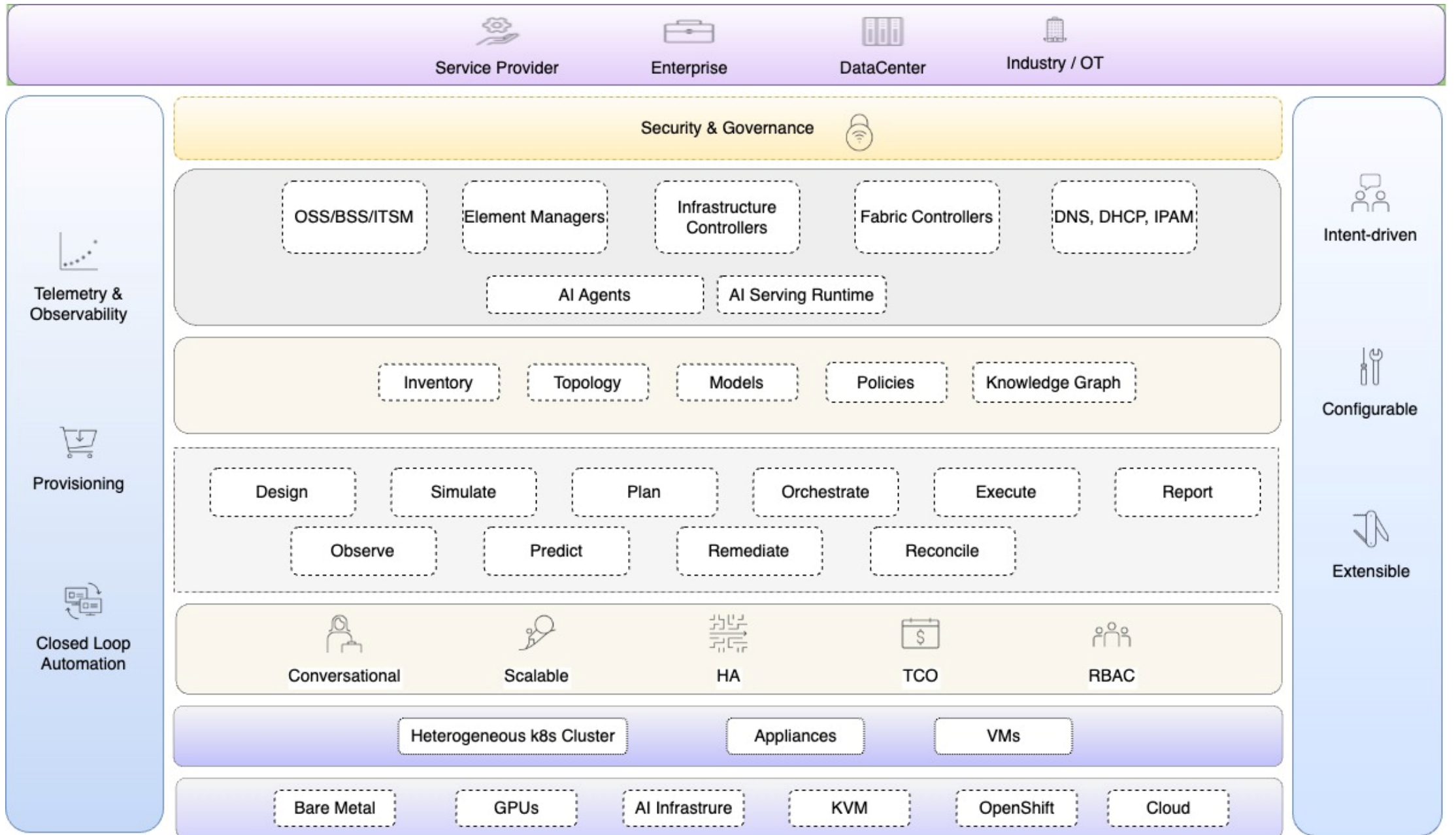
Root Cause & Impact Analysis

- ✓ Isolate the true root cause
- ✓ Assess service impact

Automation can only be deterministic if the network state is known and continuously validated.

A common framework

Unified Framework Capabilities



Foundational Pillars



A word cloud of foundational pillars in blue text. The words are arranged in a non-linear fashion, with some being significantly larger than others. The largest words are 'secure', 'resilience', 'high-availability', and 'conversational'. Other prominent words include 'interoperability', 'traceability', 'self-learning', 'predictive', and 'ai-agents'. Smaller words include 'closed-loop', 'network-awareness', 'rbac', 'scalability', 'ztp', 'observability', 'api-first', and 'cloud-native'.

conversational
cloud-native
high-availability
interoperability
closed-loop
secure
network-awareness
rbac
predictive
traceability
ai-agents
api-first
self-learning
scalability
ztp
observability
resilience

Framework components

Framework facets

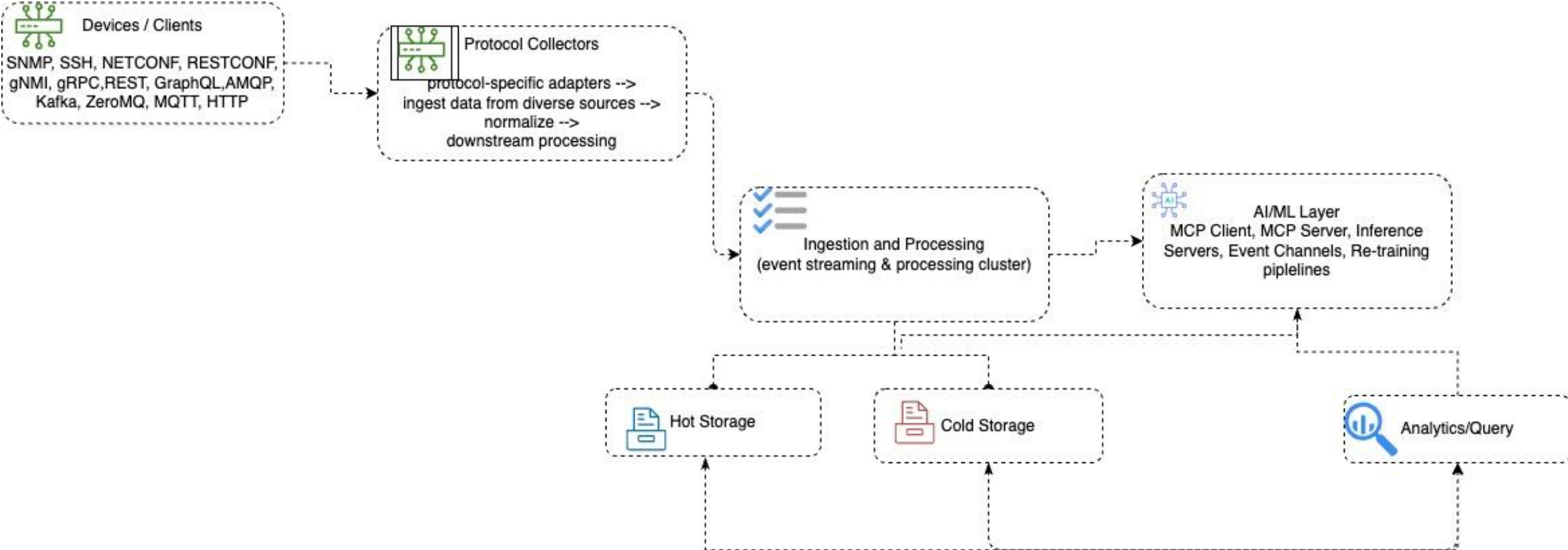
Functional

- Business use-cases
- Connectivity with network elements
- Connectivity with management tools
- Data Collectors
- Protocols
- Security Postures
- Orchestration
- AI

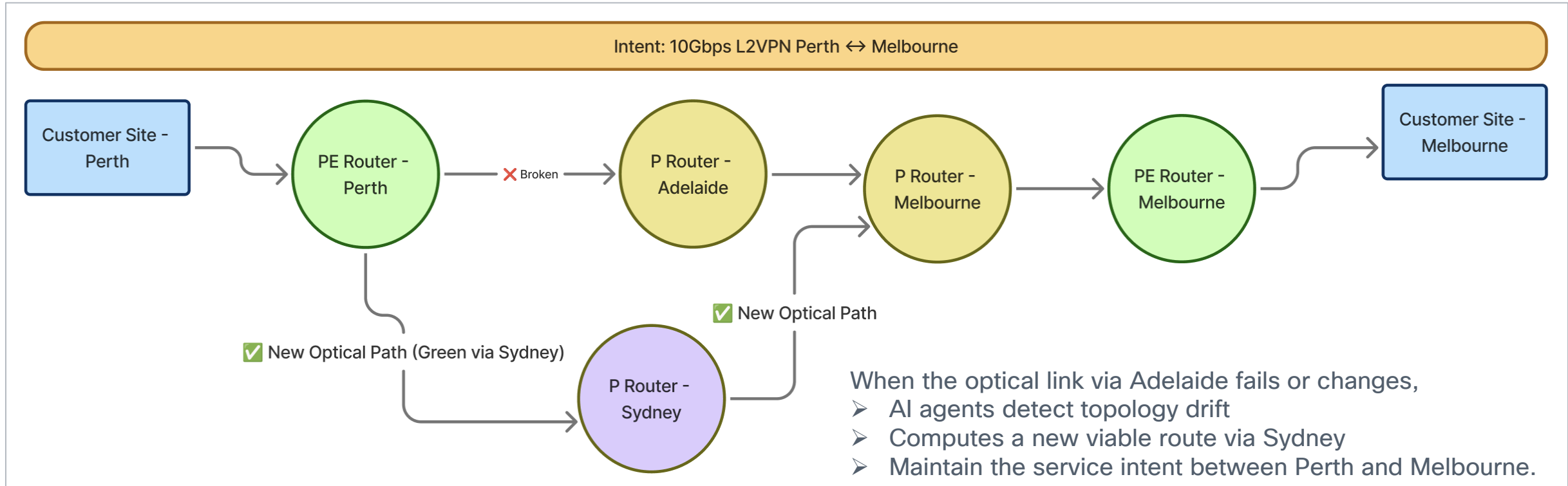
Platform

- ✓ Workload placement
- ✓ Deployment
- ✓ Day 0/1 Configuration
- ✓ Day 2 maintenance
- ✓ Scaling
- ✓ High-availability
- ✓ Platform Security
- ✓ AI

Intelligence Pipeline



Network Service Orchestration & AI Agents



Intent remains deterministic, execution becomes intelligent.

When & Why AI Agents ?



Navigate Complexity Multi-vendor, multi-domain environments where identifying orchestration rules becomes impractical



Velocity & Scale Business requires extremely high throughput with tight SLA compliance



Adapt to Change Handle out of band changes making static data & configurations unreliable



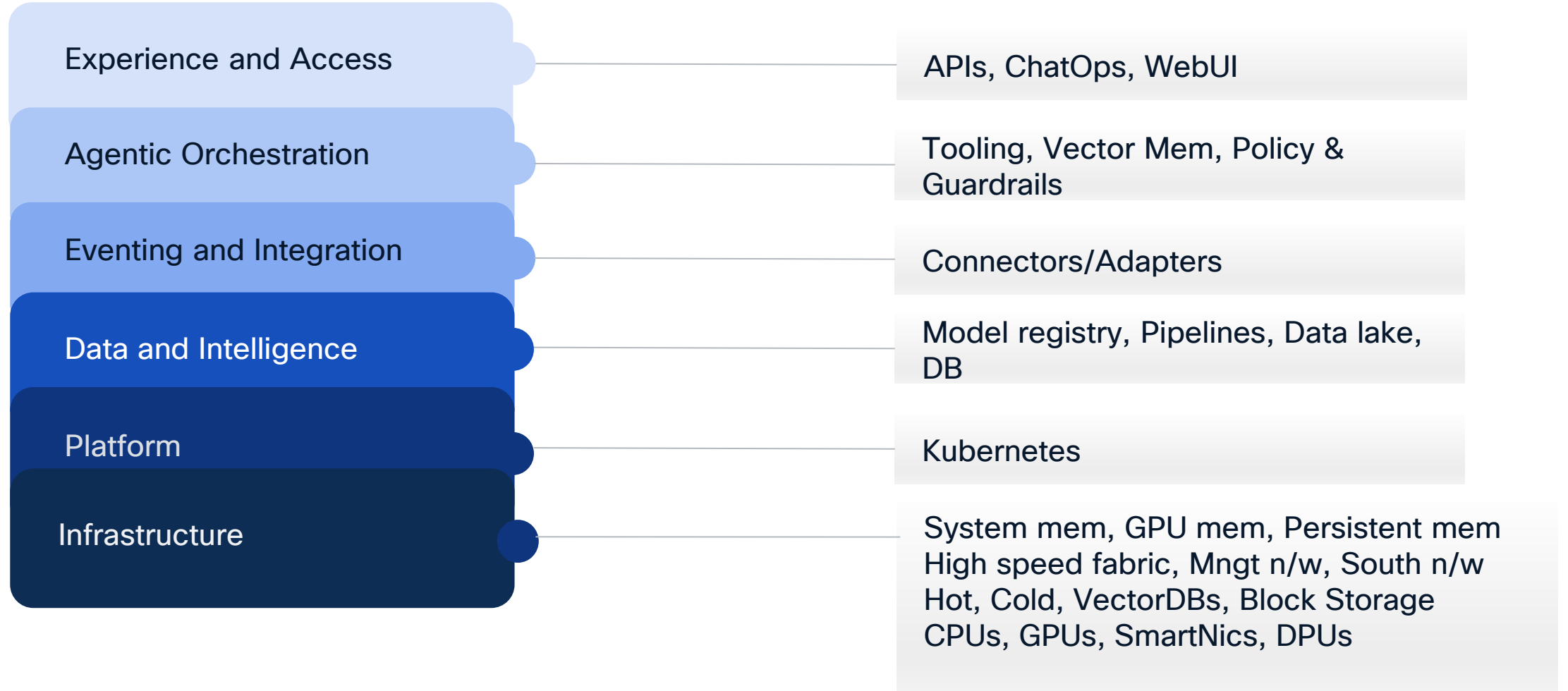
Multi-Objective Optimization Balance conflicting objectives (cost, latency, reliability etc) dynamically in real time



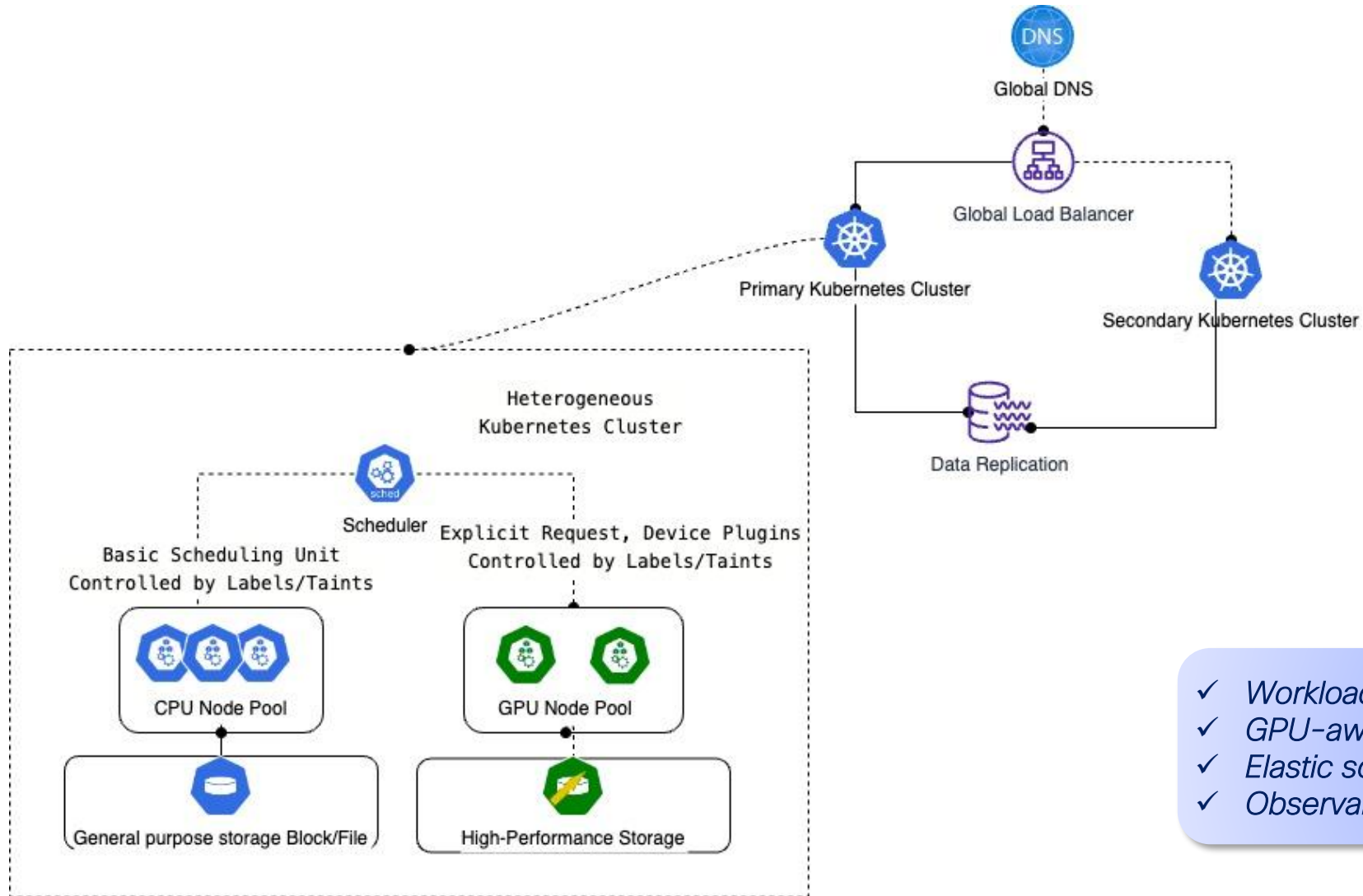
Intelligent Platform Scaling Demand-driven, pattern-aware, anomaly - detecting scaling of VMs, Kubernetes Pods, Queue workers

Integrate agents with human-In-the-loop for critical decisions , building trust and training data

AI



Workload placement



- ✓ *Workload queueing & Backfill strategy*
- ✓ *GPU-aware scheduling*
- ✓ *Elastic scaling*
- ✓ *Observability-driven automation*

LCM - Simplified and Guided

Classification

Intent driven guided deployment of platform

- Guided natural language to generate intent.
- Pre-checks to verify viability of intent.
- Deployment of a complete platform from intent.
- Post checks to verify application infrastructure, platform and application availability.
- Idempotent process.

Intent driven guided application tuning

- Common configurations and performance tuning.
- Verify current system configurations before committing changes.
- Human in the middle to confirm changes.

As a Code Patches and Upgrades

- Workflow driven patches and upgrades.
- Source Control and Reviews.

Cisco tools

Cisco

A unified ecosystem powering network automation and intelligence

Automation & Control

- ✓ Crosswork Network Automation
- ✓ ACI
- ✓ NSO
- ✓ Catalyst Center
- ✓ Nexus Dashboard

Infrastructure & Fabric

- ✓ Silicon One
- ✓ AI Infrastructure

AI & Observability

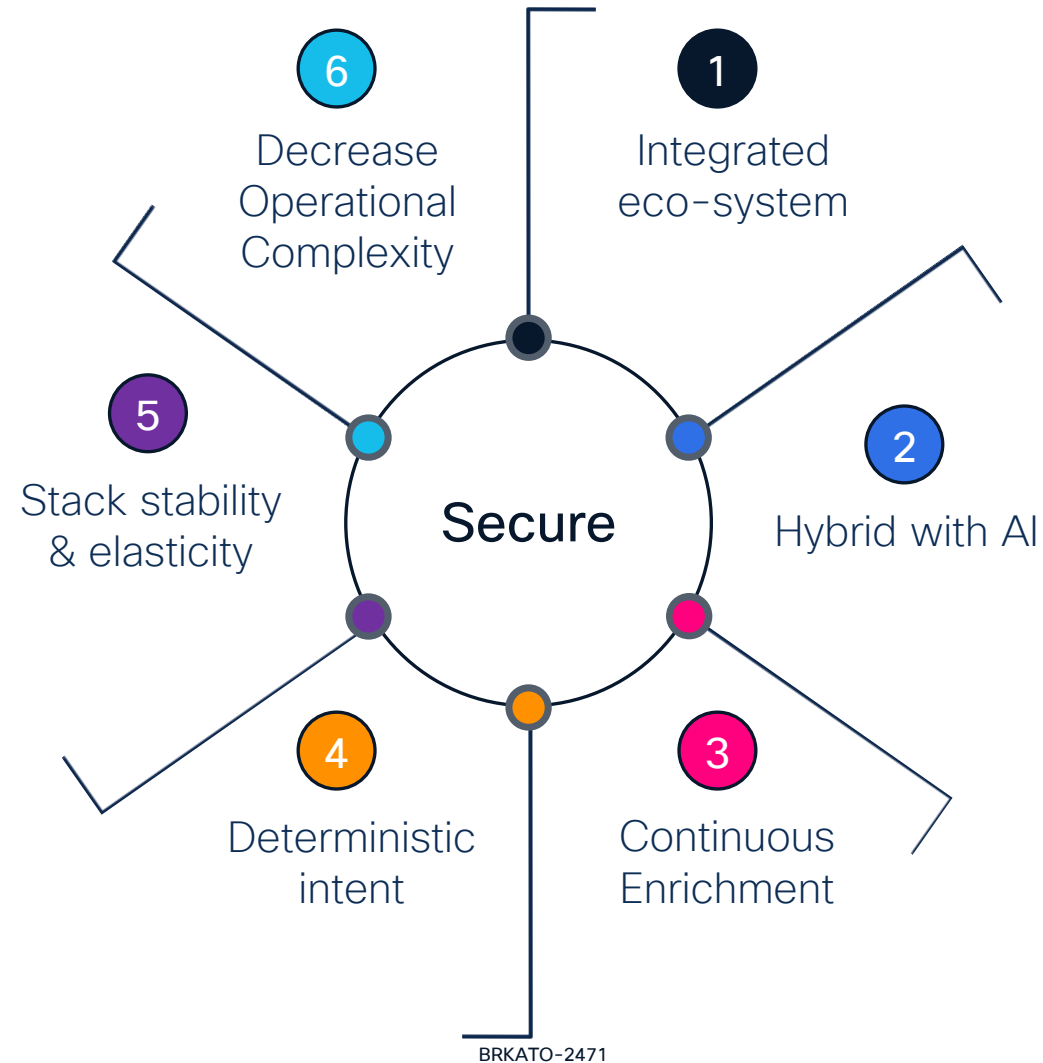
- ✓ AI Infrastructure
- ✓ Splunk
- ✓ Hypershield
- ✓ AI Defence

Delivery & DevOps **

- ✓ As-a-Code
- ✓ Digitized Delivery
- ✓ Platform Installer
- ✓ Power of Simulation

True **operations** is **less**
about the might of tools, and
more about the **quiet** poetry
of weaving them into
coherence.

Recipe for the future of network ops



Links

[Network Automation](#)

[Crosswork](#)

[Catalyst Center](#)

[ACI](#)

[NSO](#)

[ND](#)

[Silicon One](#)

[AI Infra](#)

[Splunk](#)

[Hypershield](#)

[AI Defense](#)

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