The bridge to possible

Accelerate Service Agility, Operational Efficiency, and User Experiences with Cisco AI

Javier Antich, Principal PLM, AI-Automation, Cisco

PSOSPG-1208

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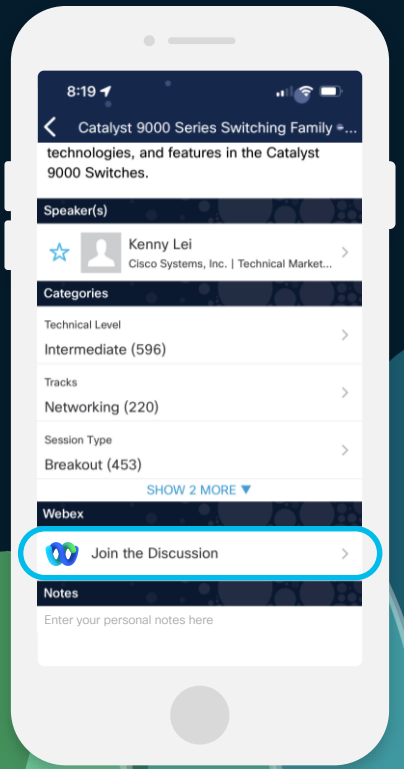
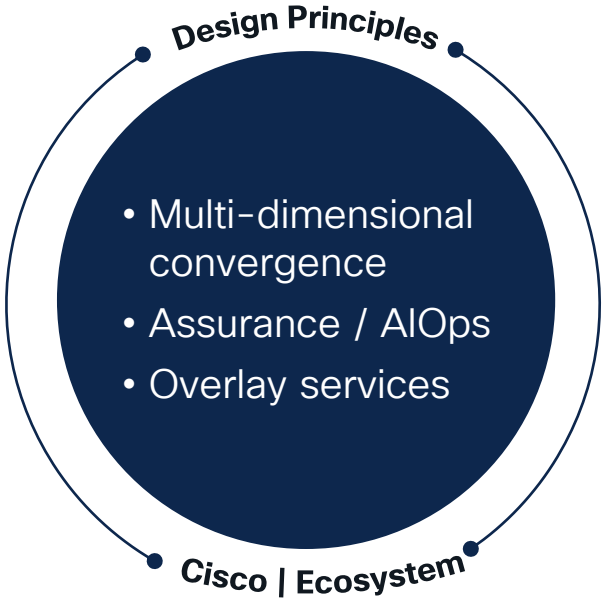


Agenda

- An Industry perspective
- Why AI?
- Automation Foundational Blocks
- Towards the Autonomous Network

Cisco Networking Cloud

Key design principles for **Service Provider**



Digital Experience Assurance

Simplified, AI-Native Operations

End-to-End Secure Networking

*“AI for **plan, build and operate** using machine learning.”*

Abdu Mudesir, Deutsche telekom Group CTO

*“AI and automation can bring restoration capabilities through **analysis of past incidents,** accelerating root cause identification, and troubleshooting to minimize downtown.”*

Nikos Katinakis, Zayo CTO

*“Network engineers should not fear AI but consider it a tool that can **make a good engineer great.**”*

Zeus Kerravala, ZK Research

*“**Autonomous** O-RAN networks represent an evolution beyond automation.”*

Jinsung Choi, Chair of O-RAN Alliance

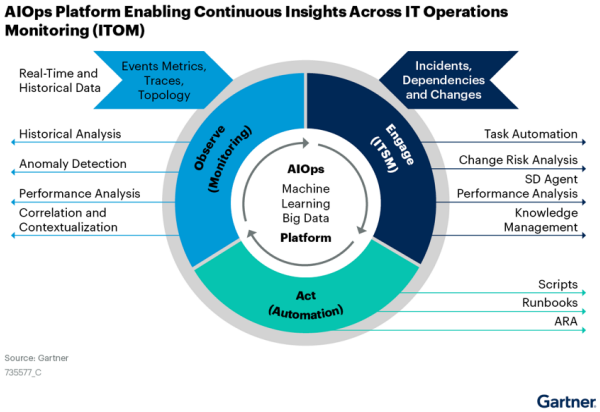
*“With **GenAI,** an employee could feasibly communicate **in layman’s terms** with Telco’s NOCs and SOCs (its network and service operations centers) to find out what is going on.”*

Bruno Zerbib, Orange CTO

AIOps: A brief history

AIOps

The application of AI to IT operations.
Gartner 2016



Data + Algorithms (AI) = Operational insights

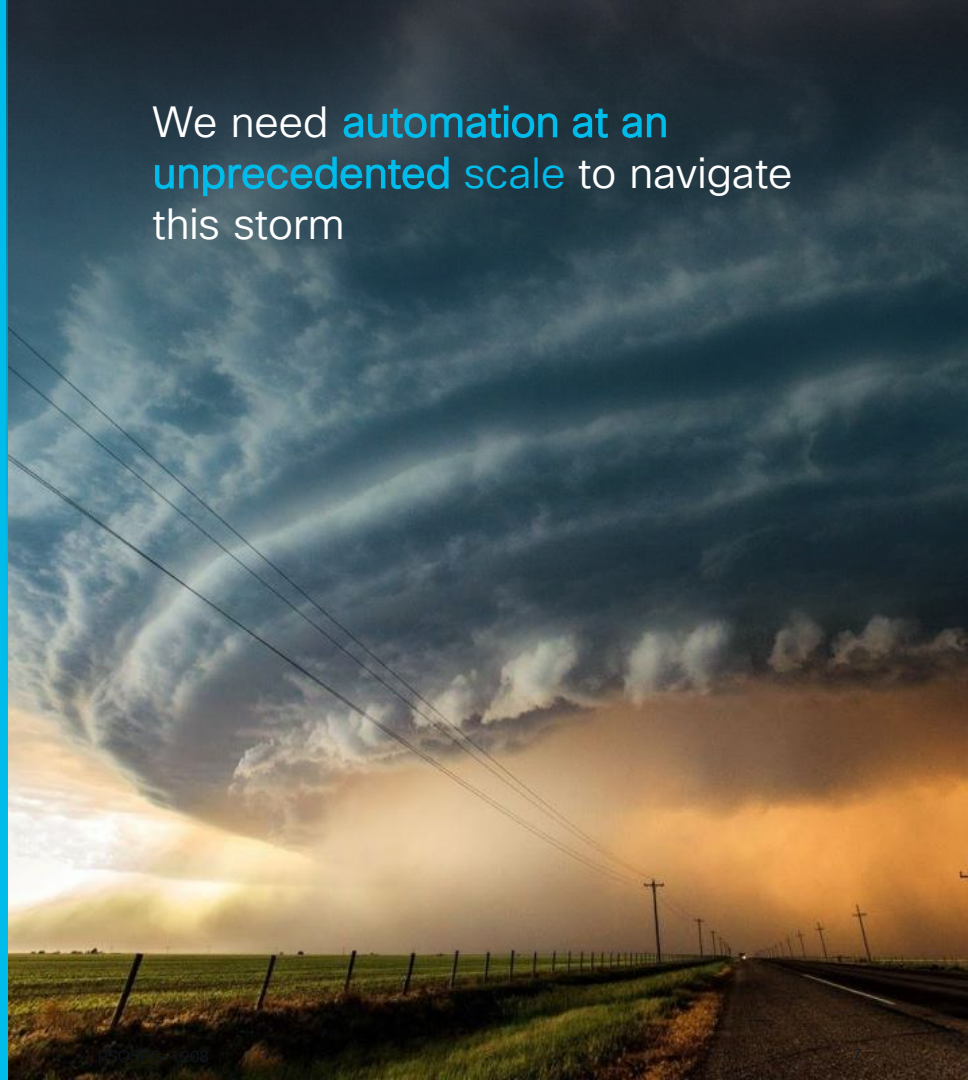
Operational insights + Knowledge = Decisions

Decisions + Automation tools = Actions

Service providers are in a perfect storm

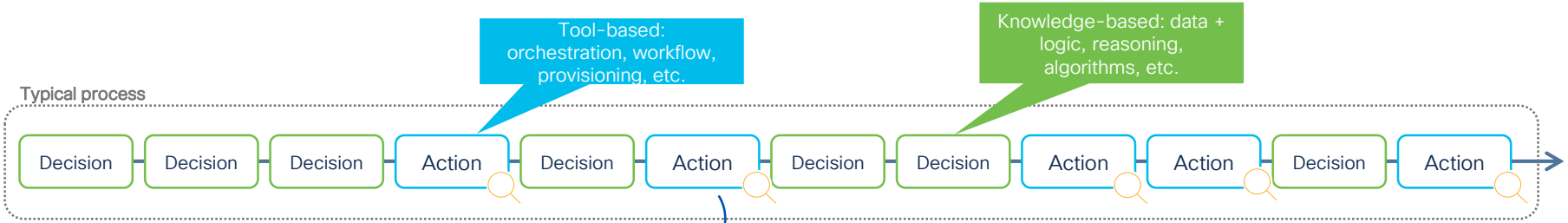
1. Networks are **more complex** than ever.
2. **Expectations** from the network are **higher** than ever: performance, reliability, customer experience, provisioning time, etc.
3. Human **resources are more limited** than ever.*
4. **OpEx** is a major contributing factor that challenges the business continuity of service providers.

*https://www.lightreading.com/operations/us-telco-jobs-are-disappearing



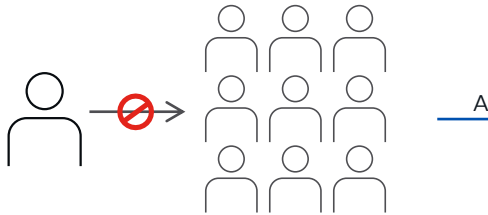
Navigating the perfect storm

Automation @ massive scale



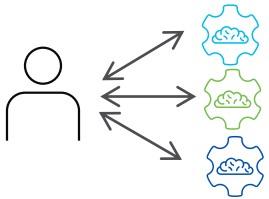
So far, automation has focused on actions

Decision-making constrains scale as humans become a bottleneck



Organizations can't just add engineers: can't find them and can't afford them

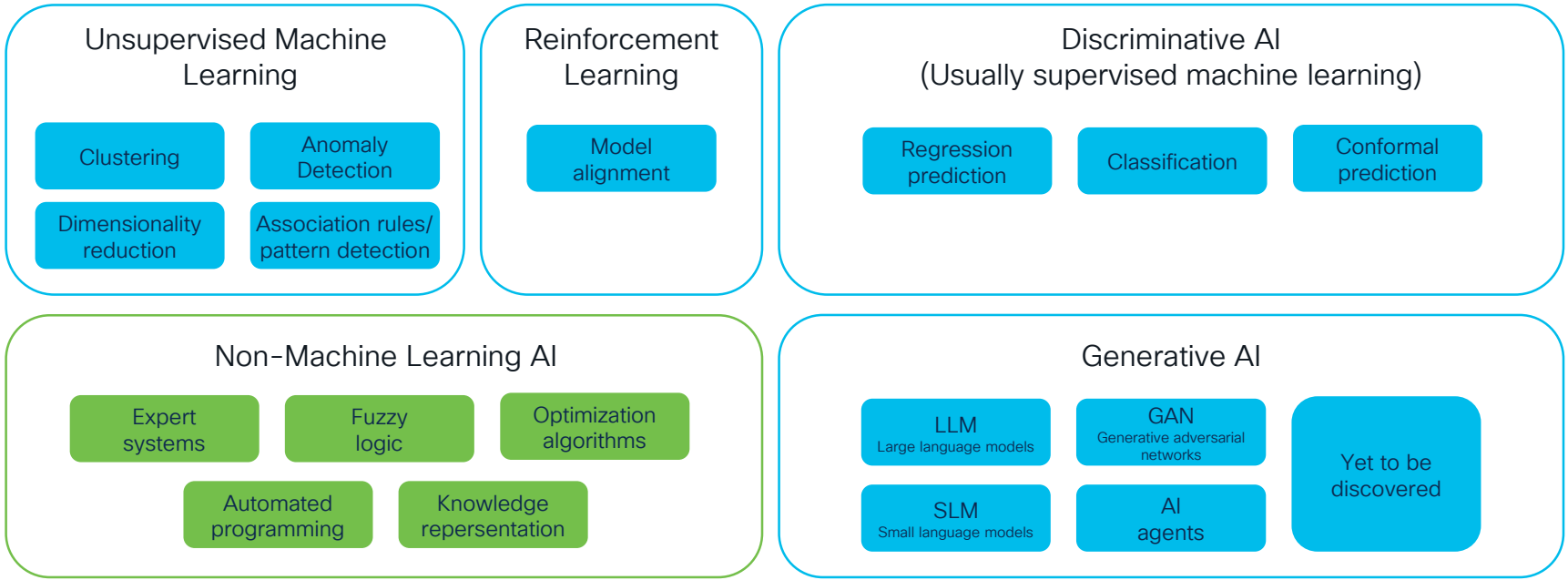
A better way



Dispatch intelligent AI agents with codified knowledge that can gather info, reason and make decisions

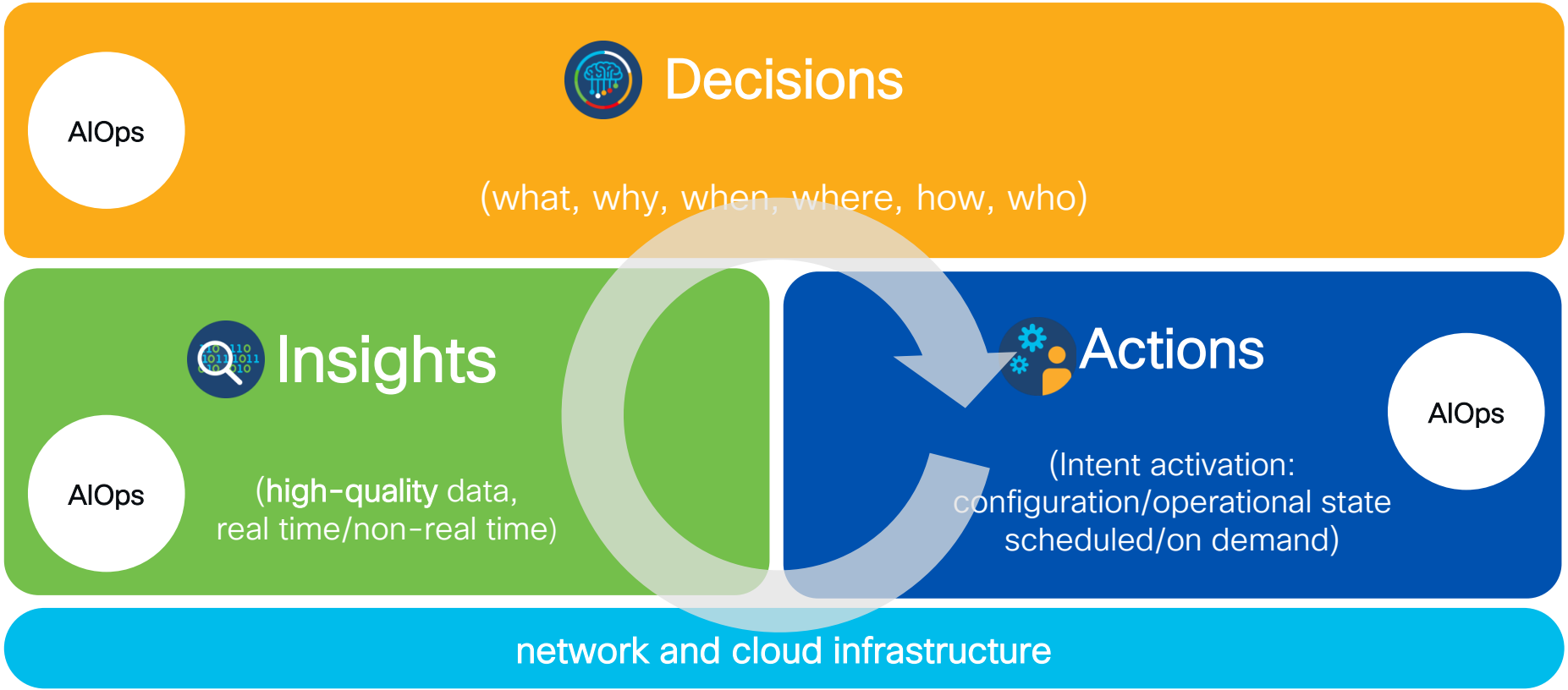
- More decisions
- Better decisions
- Faster decisions

What do we mean when we say AI?

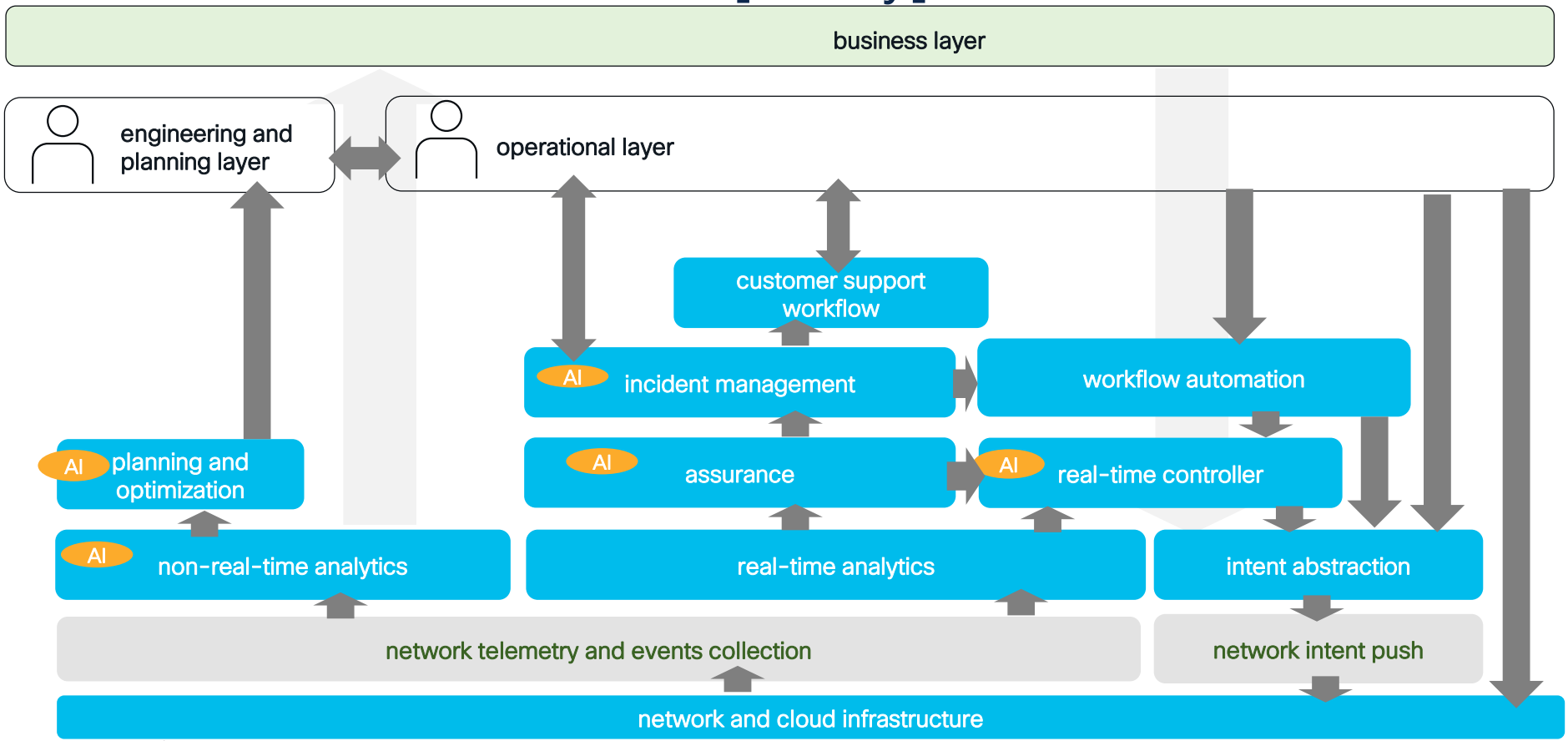


A successful approach will draw from any or all of these—matching tool to task

Automation architecture. Foundational blocks.



Functional architecture [today]



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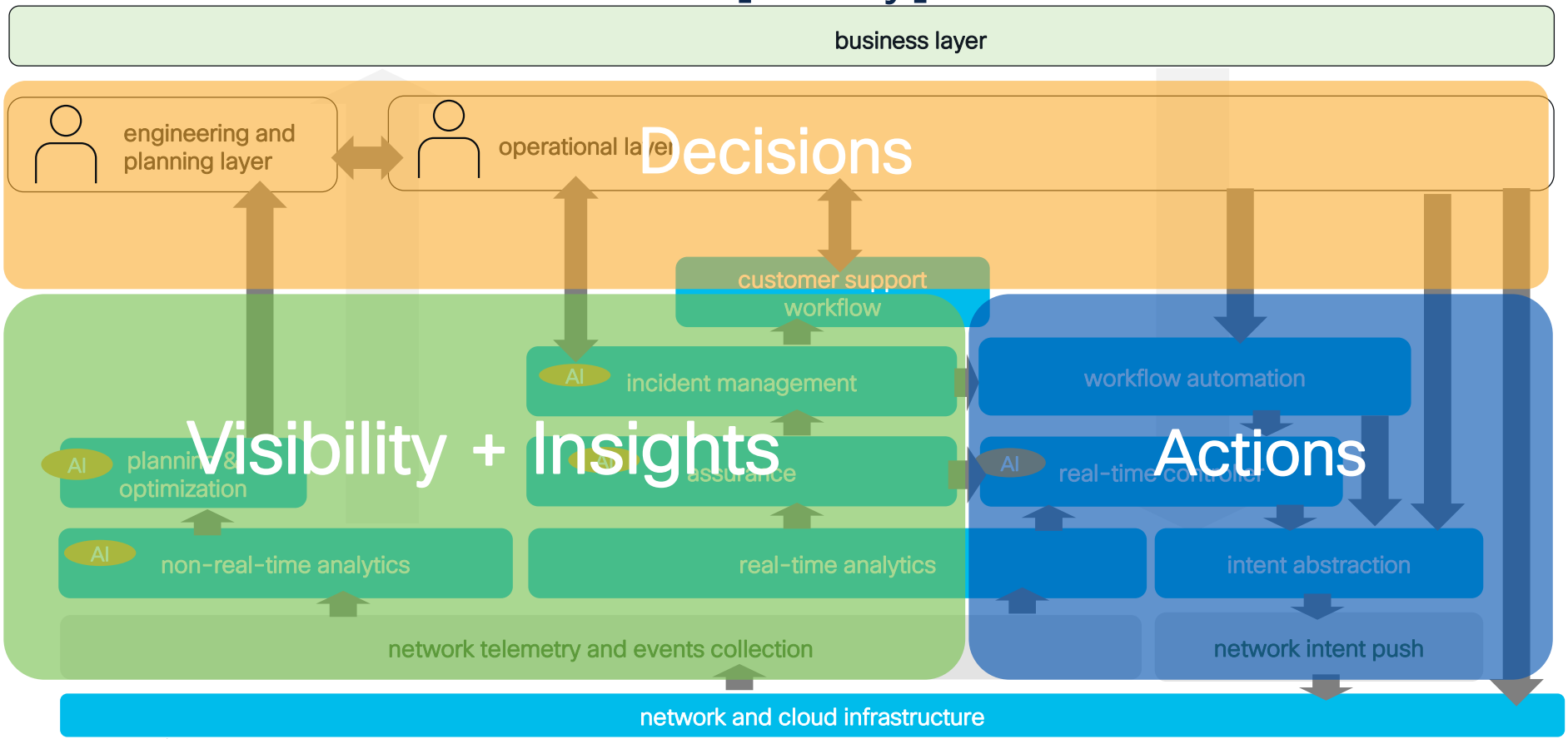

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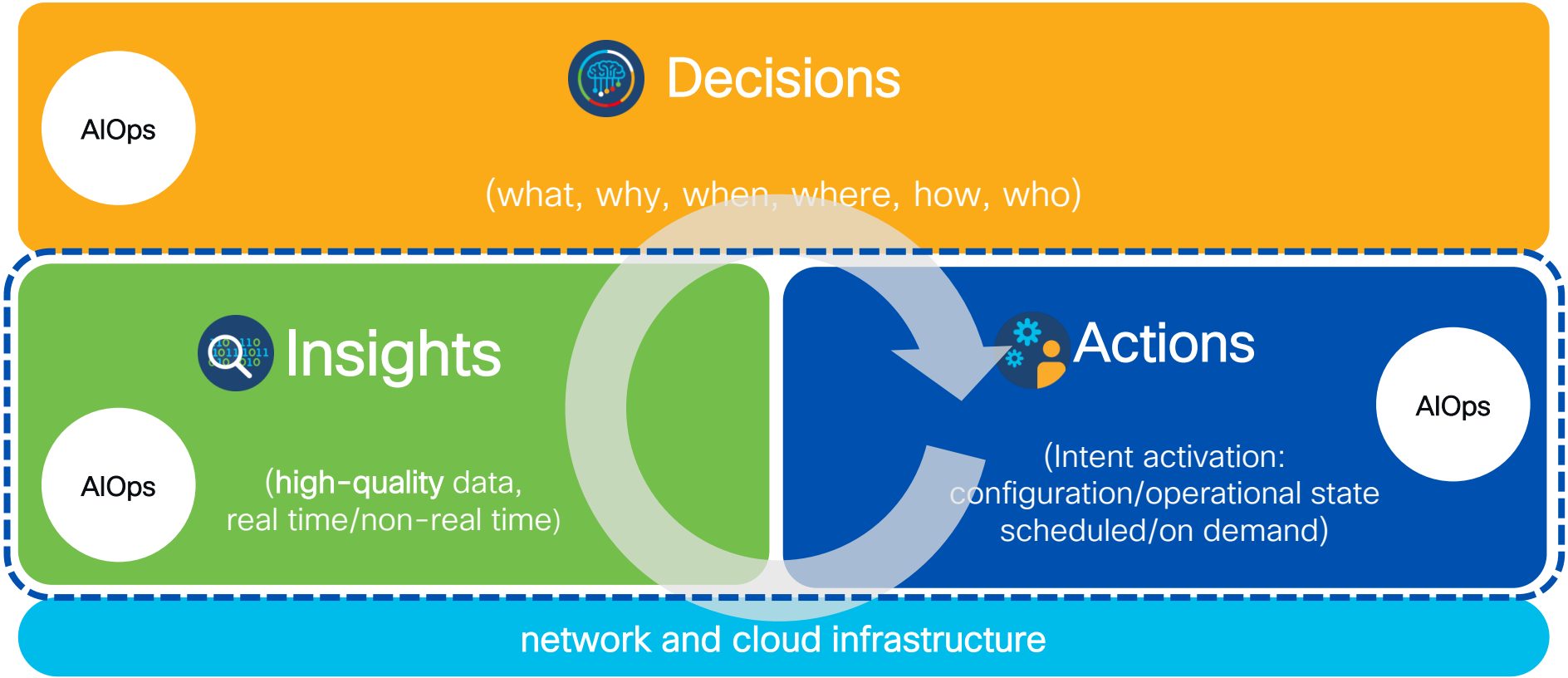


Foundational building blocks

Insights

Skylight Analytics
Proactive insights

Trust Insights
Proactive integrity tracking

CNC
Service and transport health

ThousandEyes
Proactive internet insights

CNC
Infrastructure health

splunk>
Log and metric insights

Actions

Crosswork Workflow
Low-code automation workflow

CNC
IP domain controller

EPNM
EMS, device lifecycle management

NSO
Service orchestration

CHC
Hierarchical controller

CONC
Optical controller

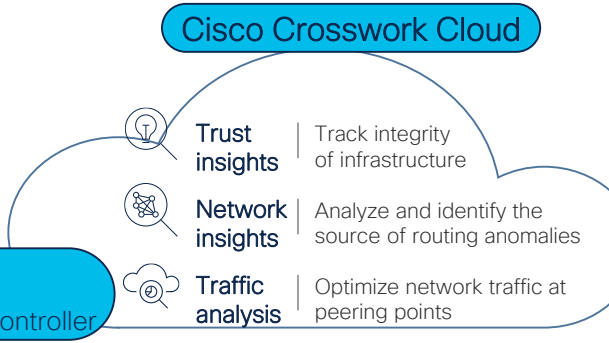
Cisco Crosswork Automation portfolio

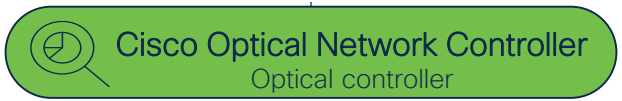
Crosswork Workflow
Low-code automation workflow

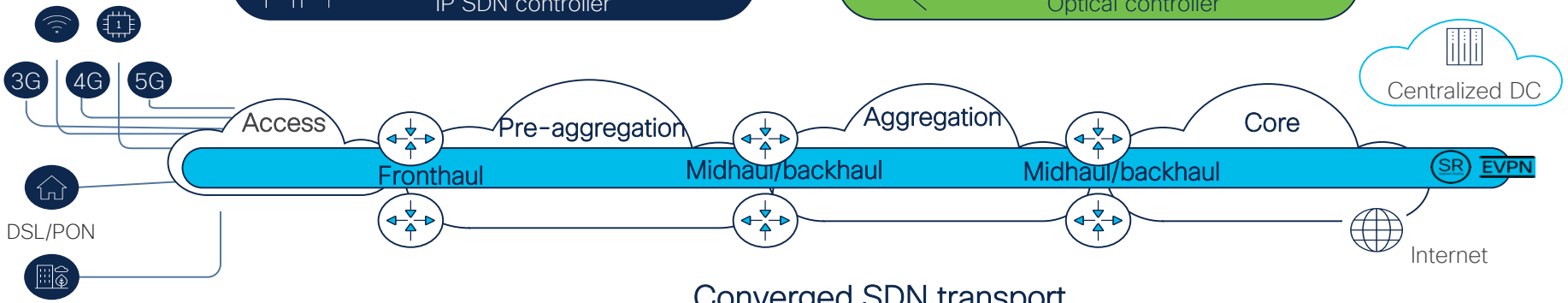
NSO
Service orchestration

EPNM
EMS, device lifecycle management

WAN Automation Engine
Capacity planning tool

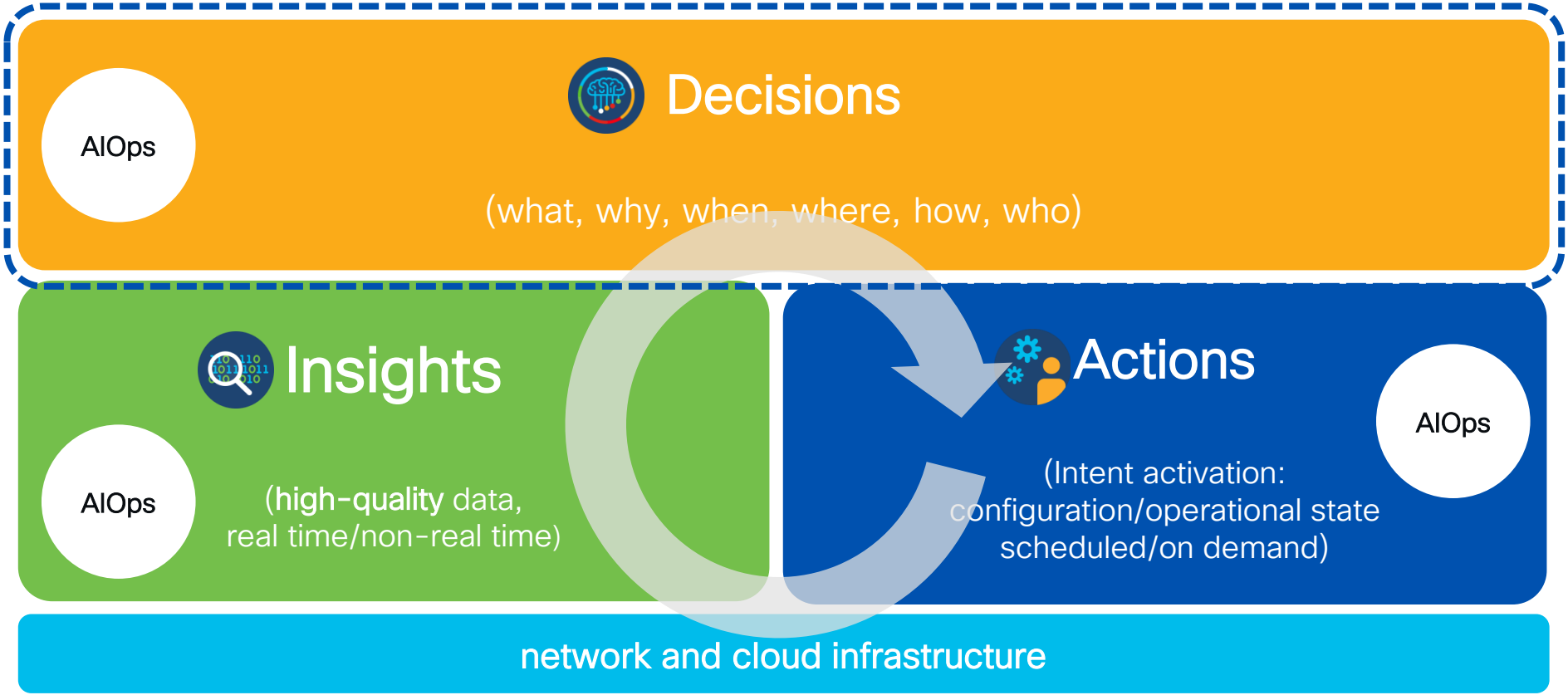






Converged SDN transport

Automation architecture. Foundational blocks.



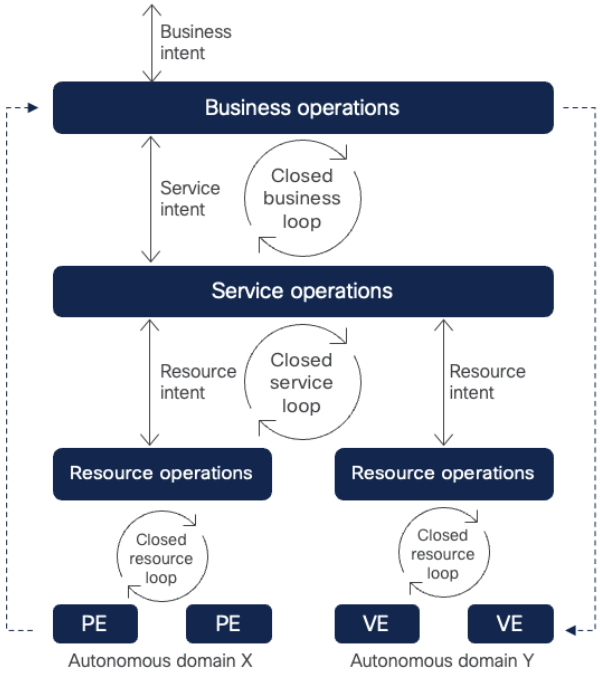
TMF: Autonomous networks framework

tmforum Autonomous networks evolution

Level definition	L0: Manual operation & maintenance	L1: Assisted operation & maintenance	L2: Partial autonomous network	L3: Conditional autonomous network	L4: High autonomous network	L5: Full autonomous network
Execution	P	P/S	S	S	S	S
Awareness	P	P	P/S	S	S	S
Analysis	P	P	P	P/S	S	S
Decision	P	P	P	P/S	S	S
Intent/ experience	P	P	P	P	P/S	S
Applicability	N/A	Select scenario				All scenarios

P: Person/Manual

S: System/Automatic



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Decision	P	P	P	P/S	S	S
Intent/ experience	P	P	P	P	P/S	S
Applicability	N/A	Select scenario				All scenarios

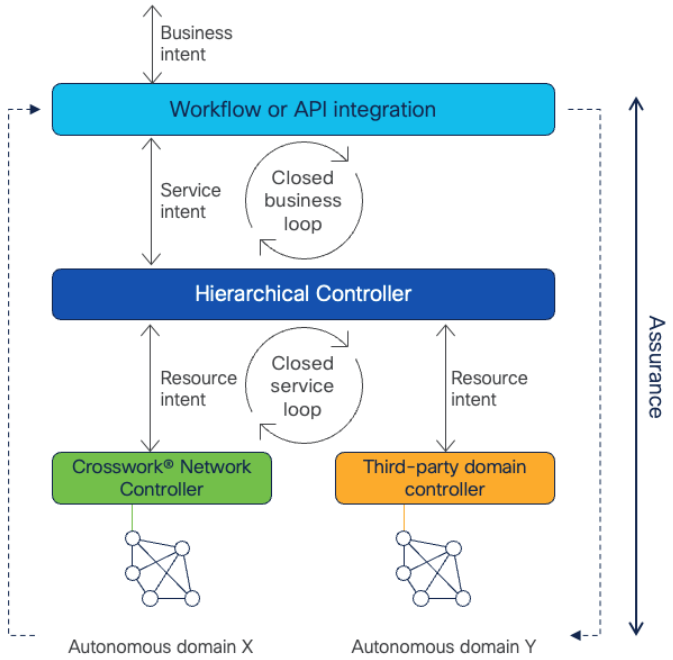
Actions

Visibility + Insights

P: Person/Manual

S: System/Automatic

AN framework and crosswork



Crosswork SDN controller suite

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Actions

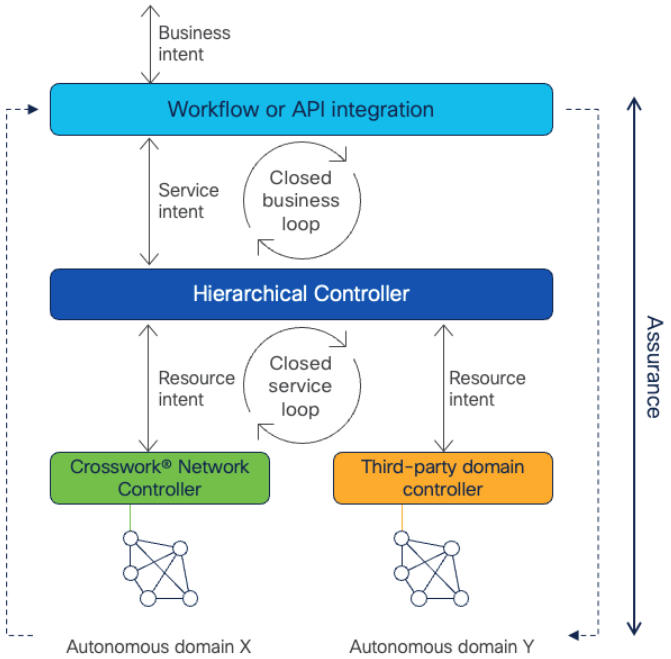
Visibility + Insights

Decisions

P: Person/Manual

S: System/Automatic

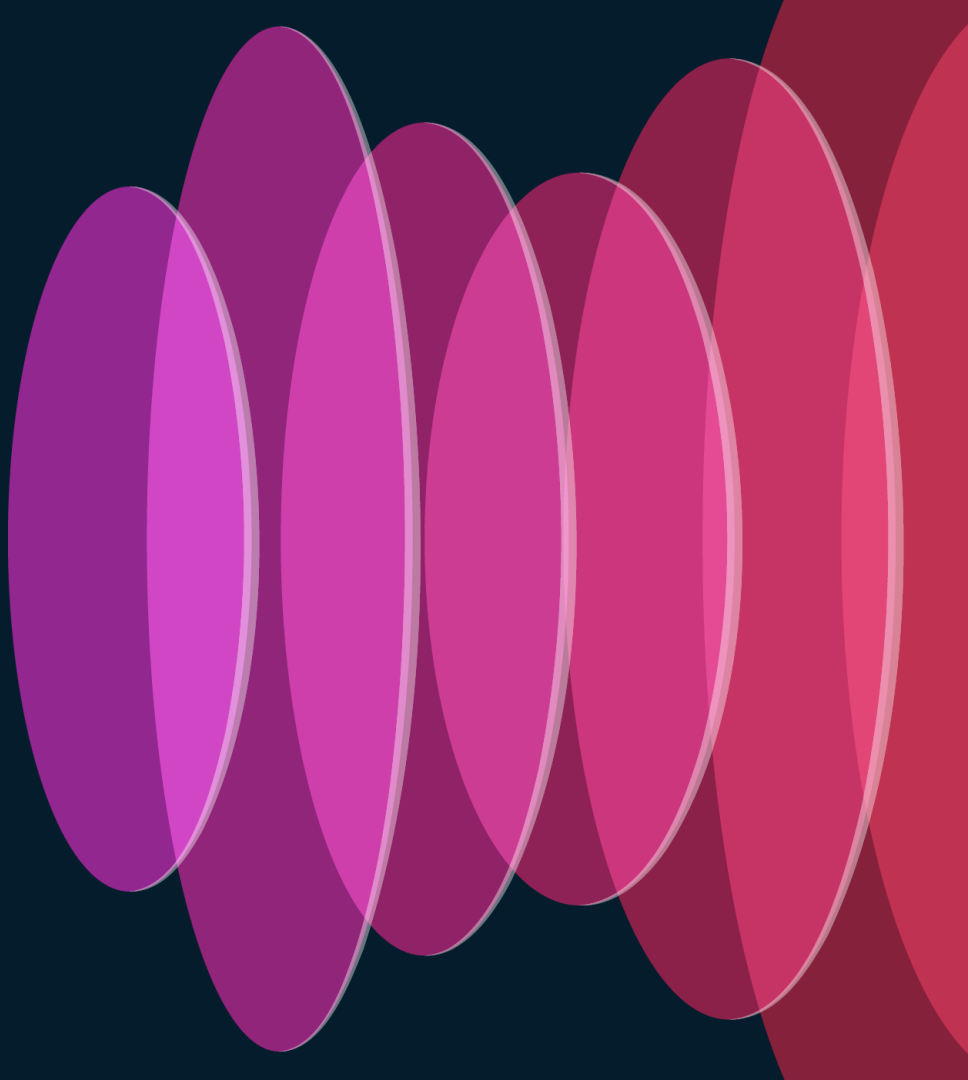
AN framework and crosswork



Crosswork SDN controller suite

From reactive to proactive AIOps

Augmenting network engineers with AI-powered decisions across the entire network lifecycle



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Reactive and proactive

Proactive

- Non-real-time telemetry
- Non-real-time operational insights
- Deep anomaly surfacing
- Risk mitigation
- Optimization and alignment
- Better decisions

drives

fails

Reactive

- Real-time telemetry
- Real-time operational insights
- Real-time anomaly detection
- Correlation to eliminate noise
- Root-cause analysis and remediation

MTBF*

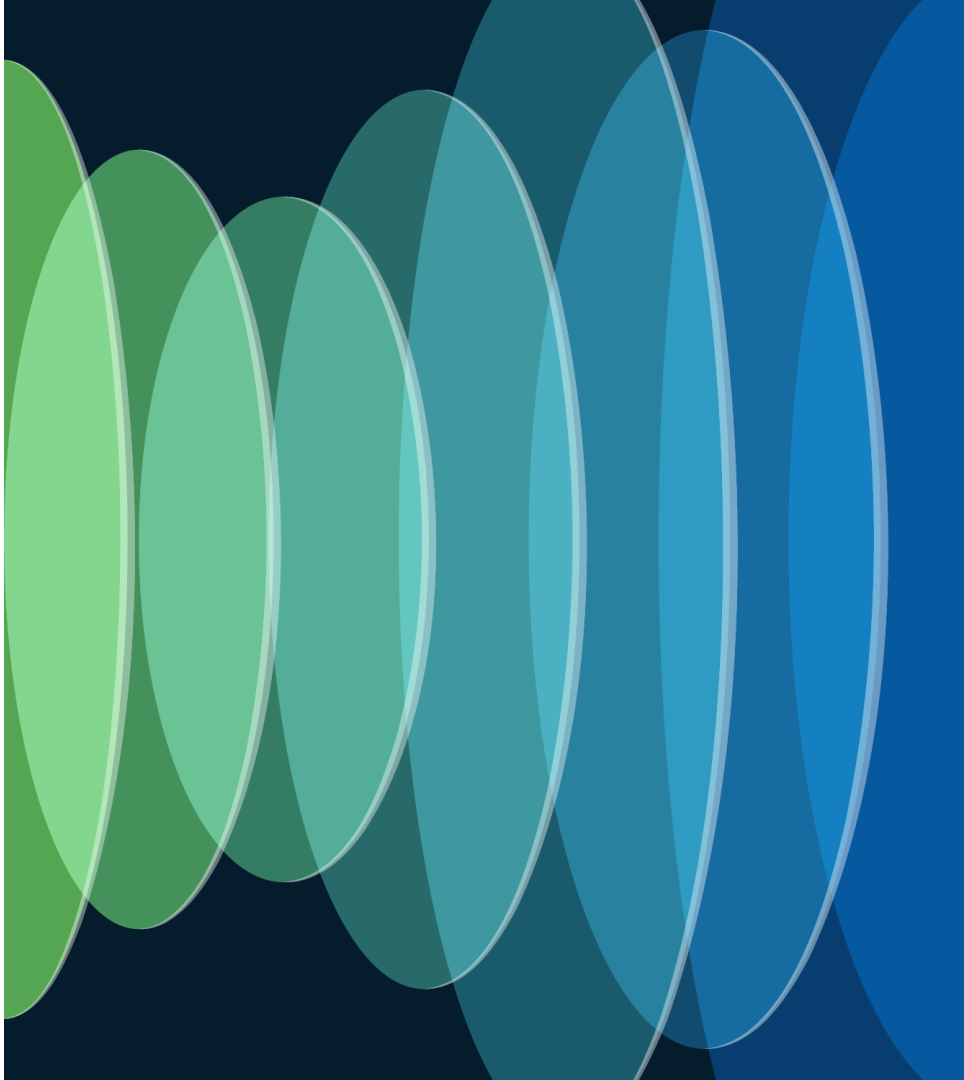
MTTD, MTTI, MTTR**

Customer experience

*MTBF = Mean Time Between Failures

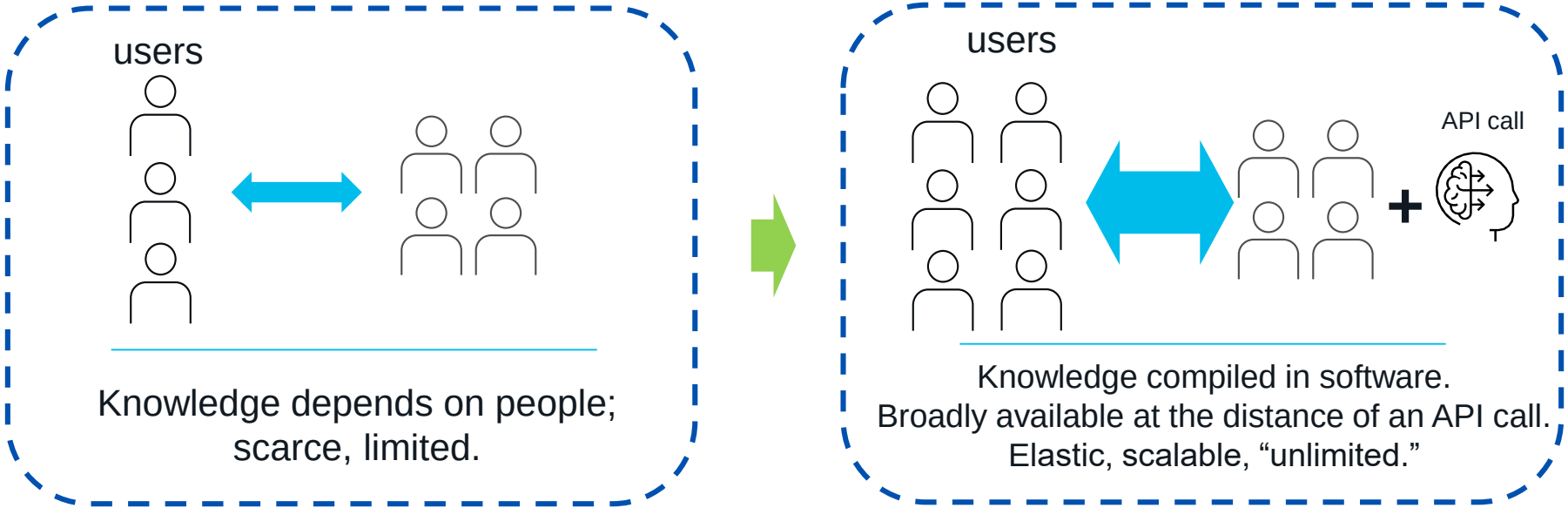
**MTTD = Mean Time to Detect
MTTI = Mean Time to Identity
MTTR = Mean Time to Repair

The big disruption



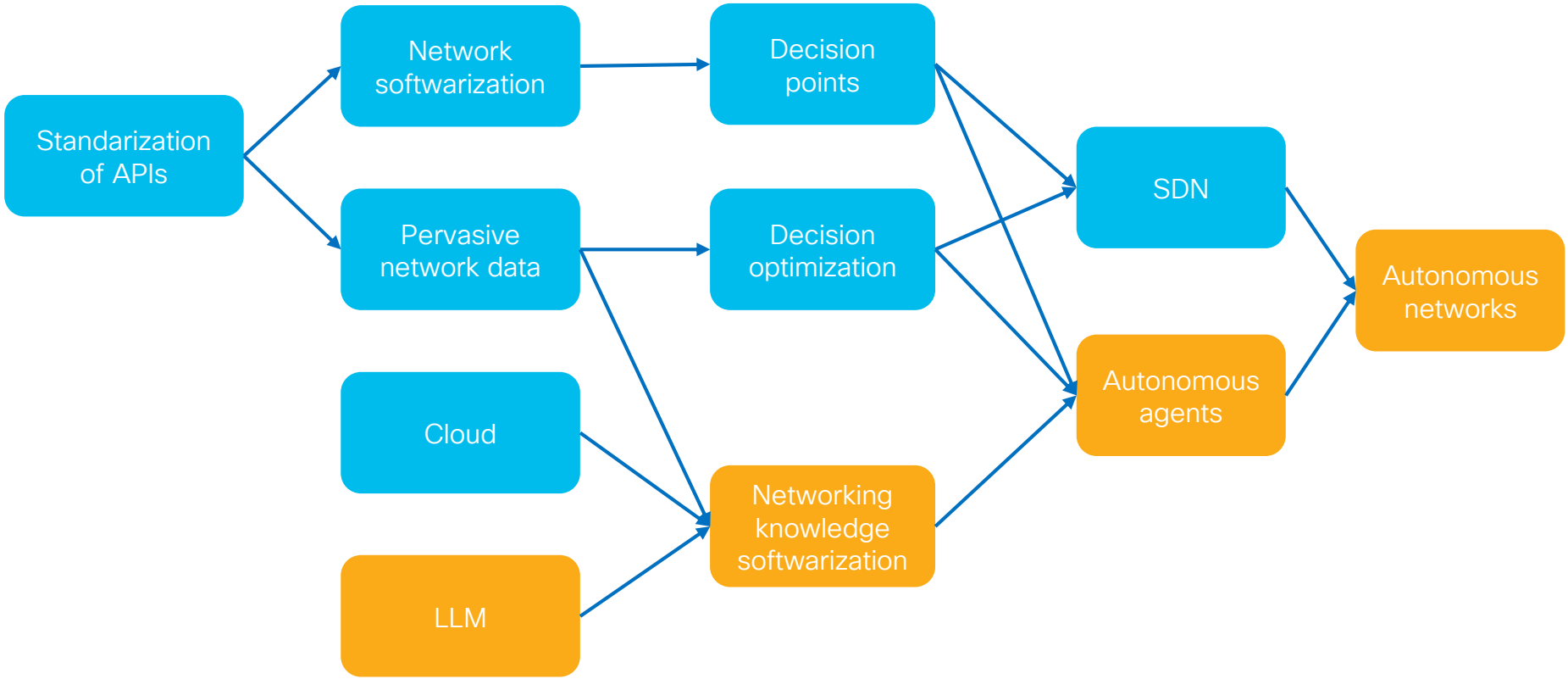
Knowledge automation

Knowledge: Justified true belief. It encompasses the **information**, **understanding**, and **skills** that individuals acquire through **experience, education**, and **perception**. The concept implies a comprehension of facts, truths, or principles as they relate to a particular domain. Knowledge involves the cognitive process of perceiving, recognizing, and **understanding relationships** between pieces of information.

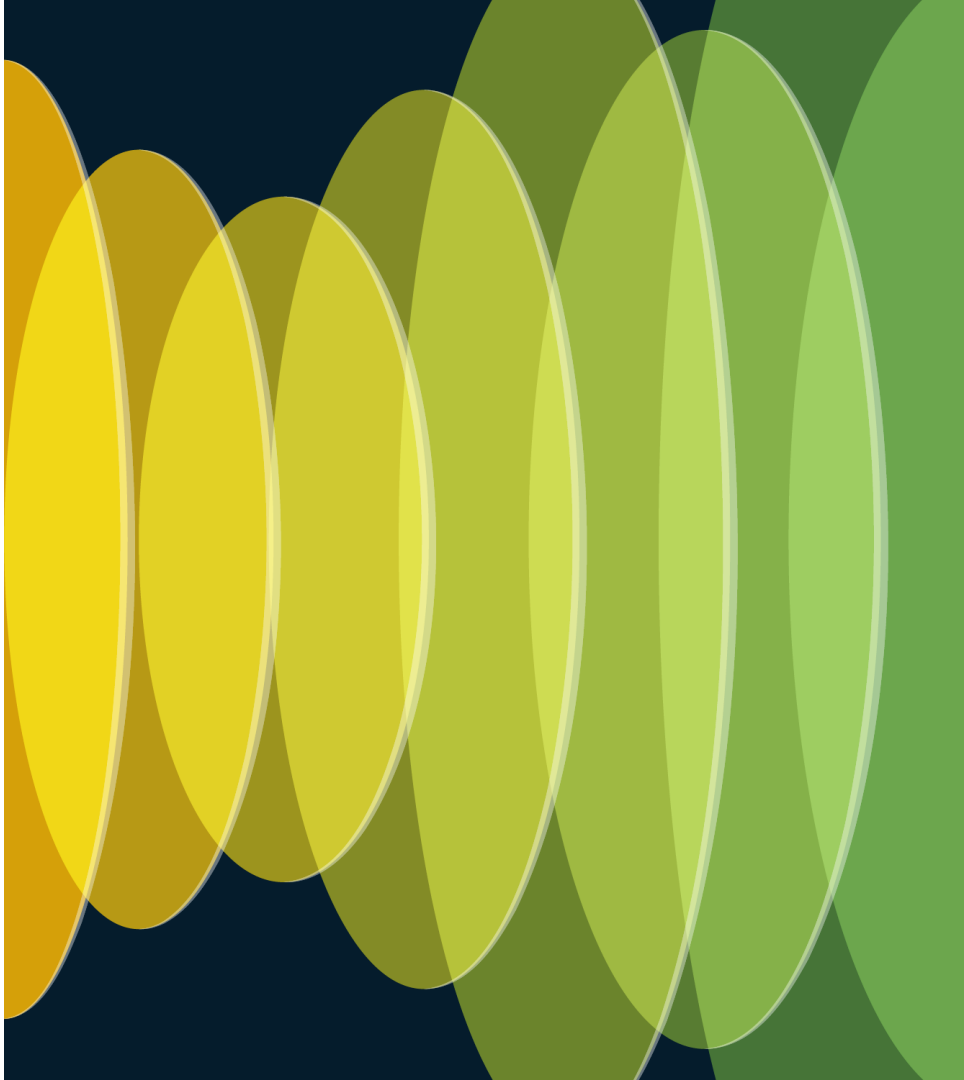


The LLMs are huge “knowledge compilers”

From SDN towards the Autonomous Network



The next network automation frontier: **Autonomous agents**



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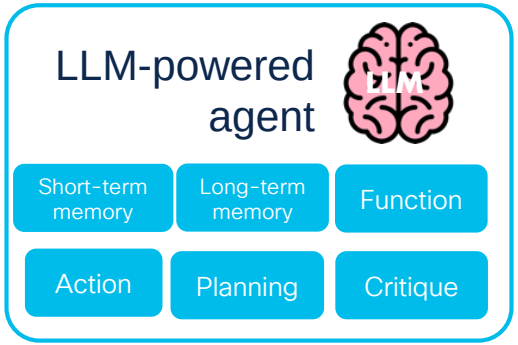
LLM-powered autonomous agents

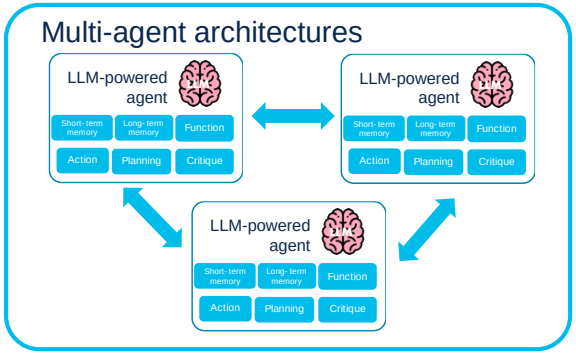
From

LLM

To



Into



Imperative/prescriptive

Task execution:

- Generate text
- Summarize text
- Translate text
- Q&A

Intent based/descriptive

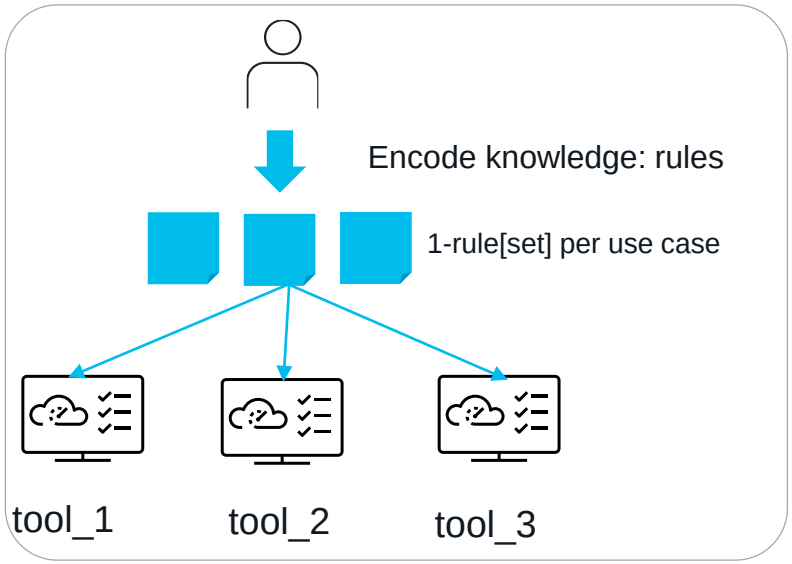
- Complex problem solver
- Self-planned
- Autonomous execution

Intent based/descriptive

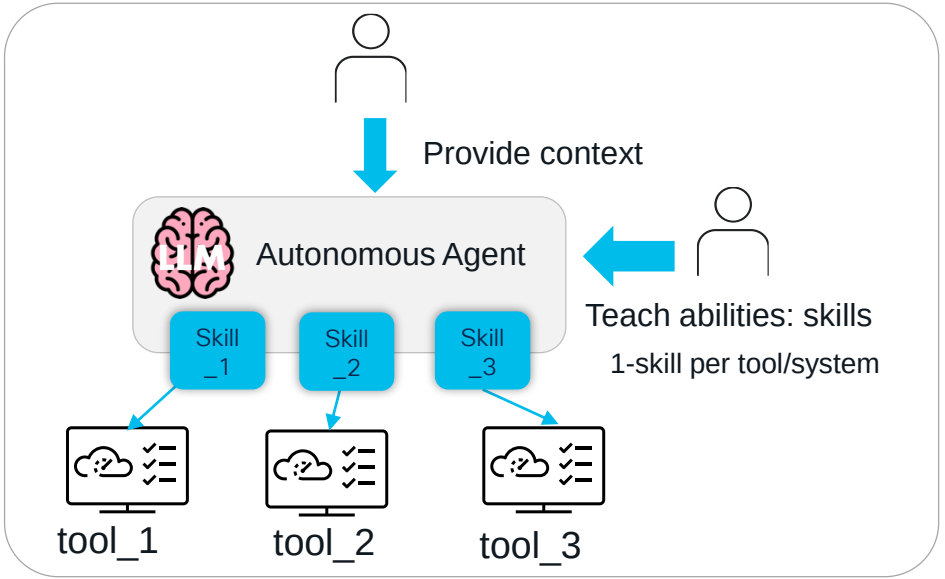
- More complex problem solver
- Swarm intelligence
- Specialization
- Collaborative

Rethinking network operation

"Give a man a fish, and you feed him for a day. Teach a man to fish, and you feed him for a lifetime."



- Low scale: 1s/10s of closed–loop use cases
- Knowledge encoded in rules -> invest in rules
- Each rule-set associated with one use case.
- Static, limited.
- L2/L3 – Autonomous Network Levels



- Large scale: 100s/1000s of closed–loop use cases
- Knowledge compiled in LLM.
- Context tailores LLM responses.
- Skills enable Agent to interact -> invest in skills
- Dynamic, autonomous, extensible
- L4/L5 – Autonomous Network Levels

AIOps implementation journey

1 Actions

- **Strengthen** automation framework
- Controller, intents, workflows

2 Insights

- **Expand** scope from reactive to proactive and preventive

3 Decisions

- **Explore** the potential of GenAI
- **Redesign** operations with autonomous agents

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- **Crosswork Workflow** — Low-code automation workflow
- **NSO** — Service orchestration
- **CNC** — IP domain controller
- **CHC** — Hierarchical controller
- **EPNM** — EMS, device lifecycle management
- **CONC** — Optical controller
- **Skylight Analytics** — Proactive insights
- **ThousandEyes** — Proactive internet insights
- **Trust Insights** — Proactive integrity tracking
- **CNC** — Infratructure health
- **CNC** — Service and transport health
- **splunk>** — Log and metric insights
- **Crosswork planning** — Planning decisions
- **Optimization engine** — Real-time optimization

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- Attend the interactive education with DevNet, Capture the Flag, and Walk-in Labs
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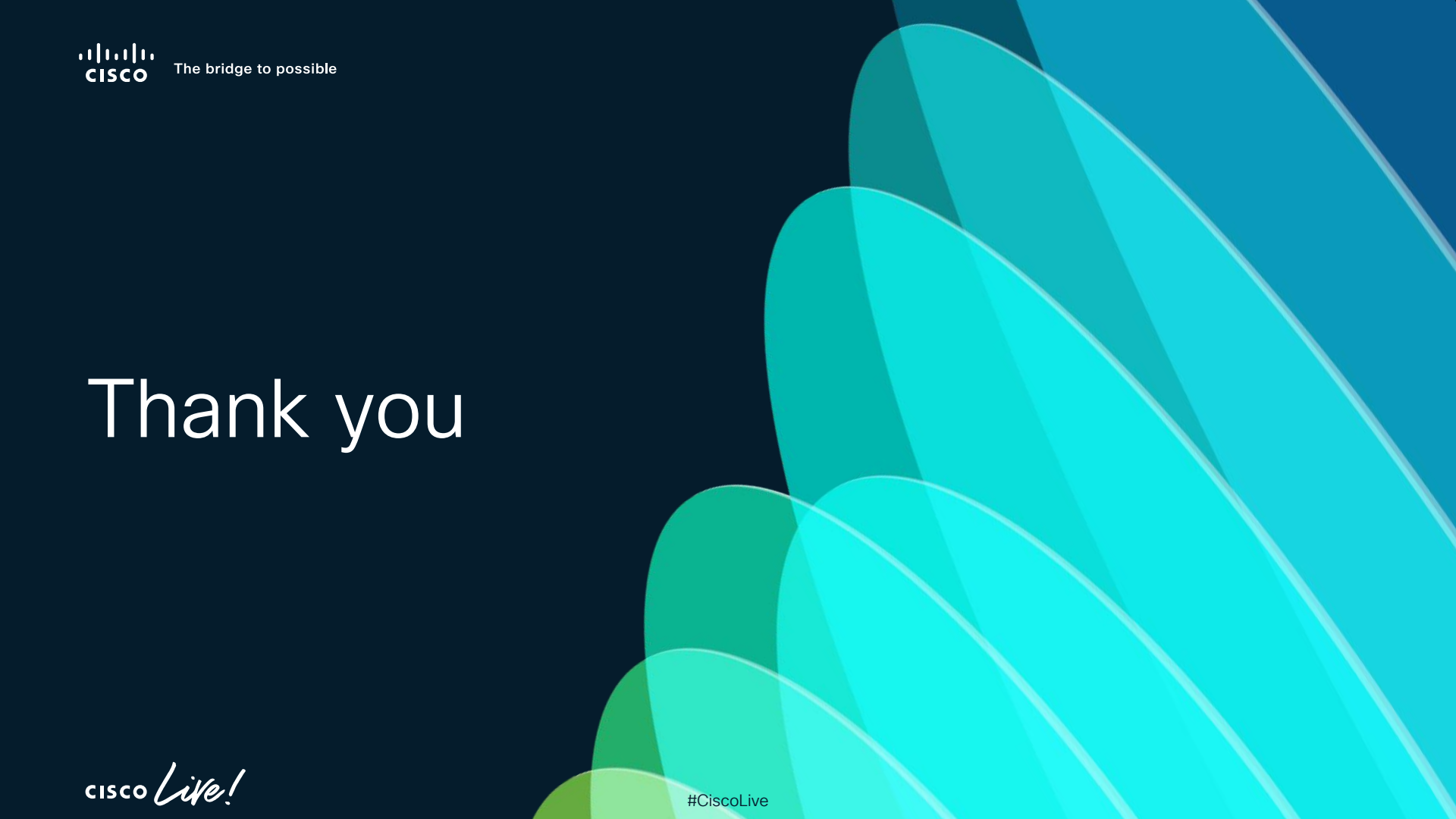
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