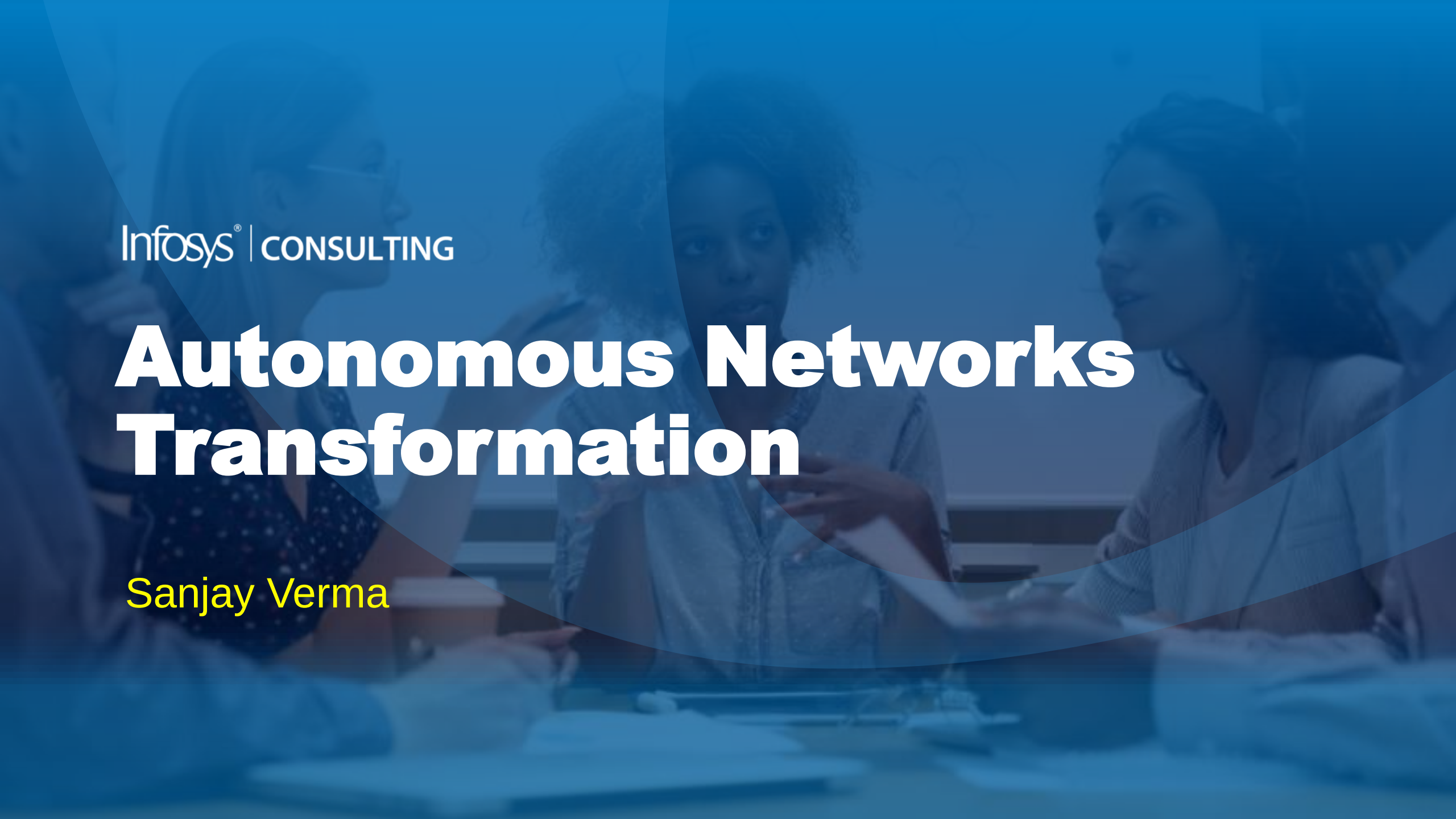

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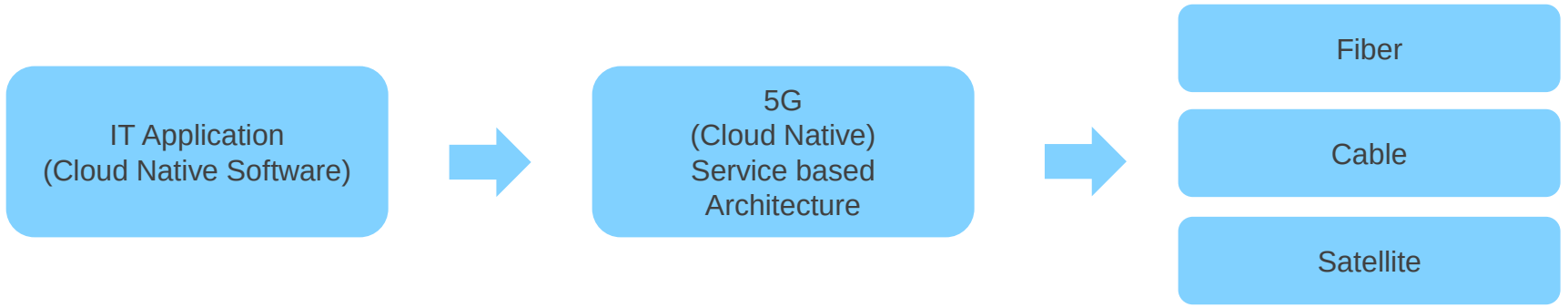
Autonomous Networks Transformation

Sanjay Verma

Autonomous Network (AN)



Autonomous Network – TM Forum Research Report

CSPs globally are prioritizing "AI driven Network" investments for improving Autonomous Network Maturity Level

Scope Priority
Where should it be applied?

1	**Service Assurance**	**62%**
2	**Service Delivery**	**62%**
3	**Quality Optimization**	**45%**
4	Network Deployment	35%
5	Planning and Design	27%
6	Troubleshooting	26%
7	Energy Usage Optimization	24%
8	Network Changes	22%
9	Complaint Handling	17%

Business Objectives
What are Expected Outcome?

1	**Improved Customer Satisfaction& Experience**	**71%**
2	**Simplify O&M and Improve Efficiency**	**62%**
3	**Agile Service Delivery & Monetization**	**55%**
4	Increase Resource Utilization	55%
5	Reduce O&M Costs	53%
6	Closed-Loop Ops	41%
7	Network as a Service	33%
8	Proactive Service	26%
9	Optimization	21%
10	Energy Savings Partner Management	10%

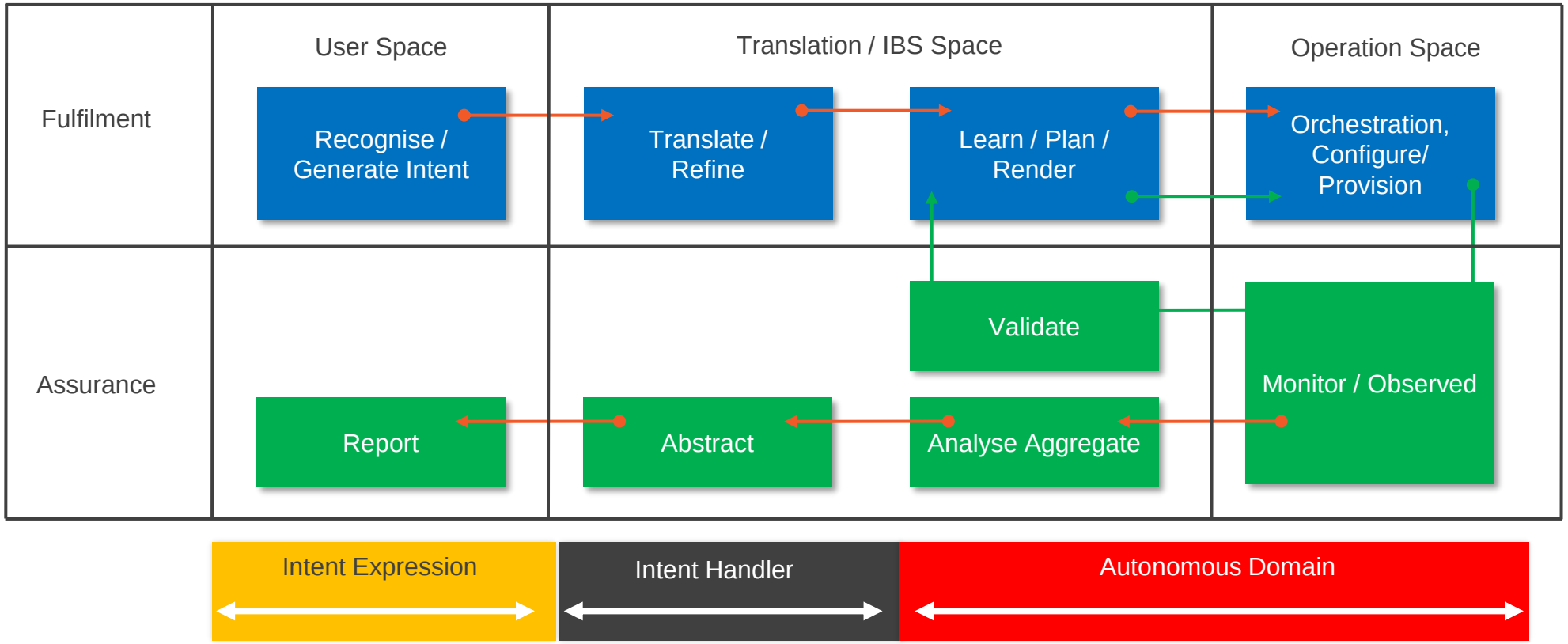
Operations Benefits
Which Operational KPIs benefit most?

1	**O&M Cost Reduction**	**57%**
2	**Network/Resource Utilization**	**38%**
3	**Ratio of Manual Work**	**27%**
4	Service Provisioning	27%
5	Fault Handling	26%
6	QoE Monitoring & Diagnosis	21%
7	Operation Duration	21%

Top Challenges
What are key Constraints?

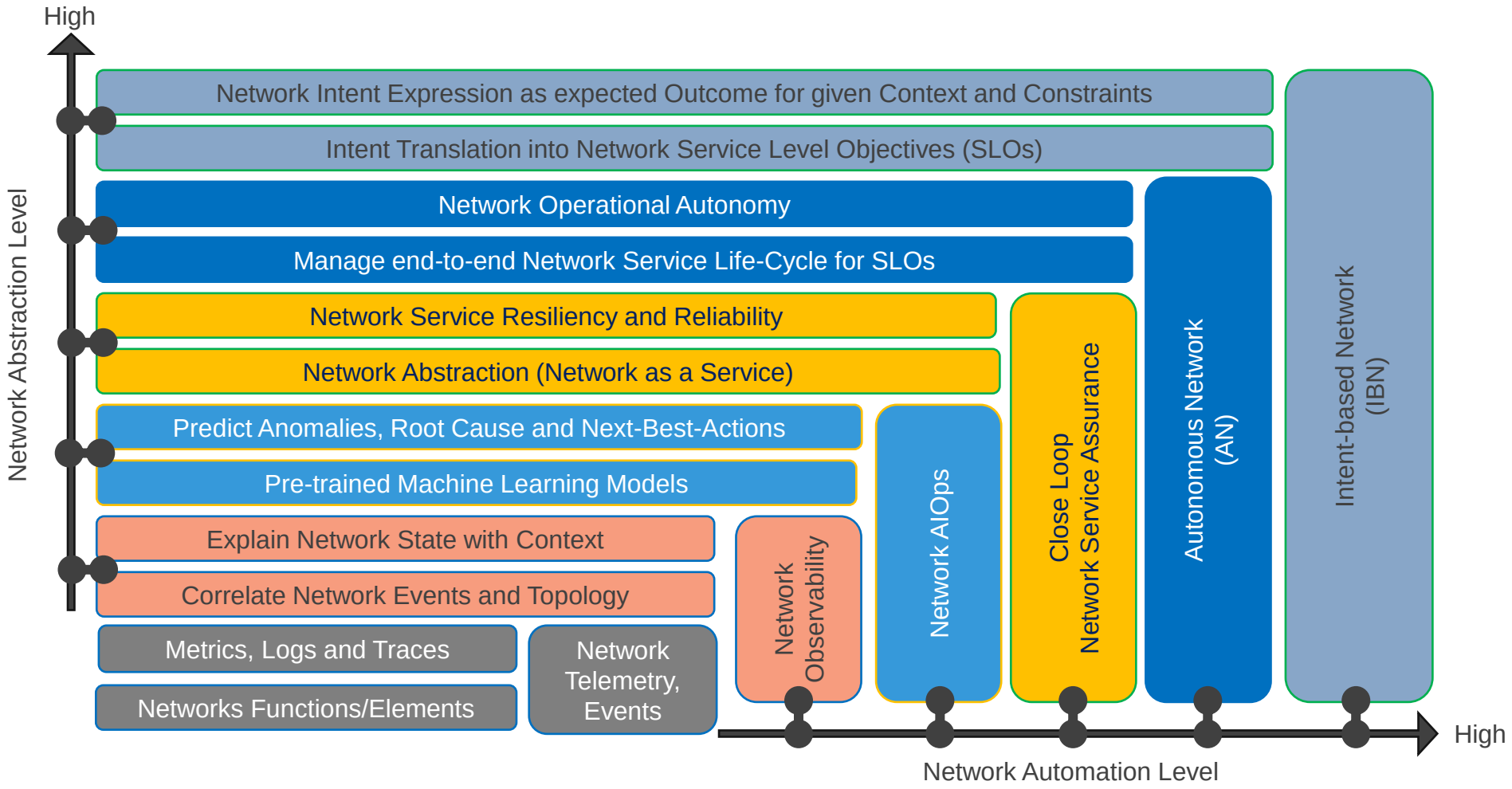
1	**Integration Challenges across different layers**	**58%**
2	**End-to-End Architecture Design & Roadmap**	**45%**
3	**Skills & Capabilities Gap**	**43%**
4	Lack of Methodology	41%
5	Evaluation Tools	36%
6	Maturity of Required Technology	35%
7	Misaligned Process	32%
8	Optimization & Network	25%
9	Upgrade Clarity of Business Objective Strategic Vision & Planning Maturity of Industry Standards	19%

Beginning of Intent based Autonomous Network Concept

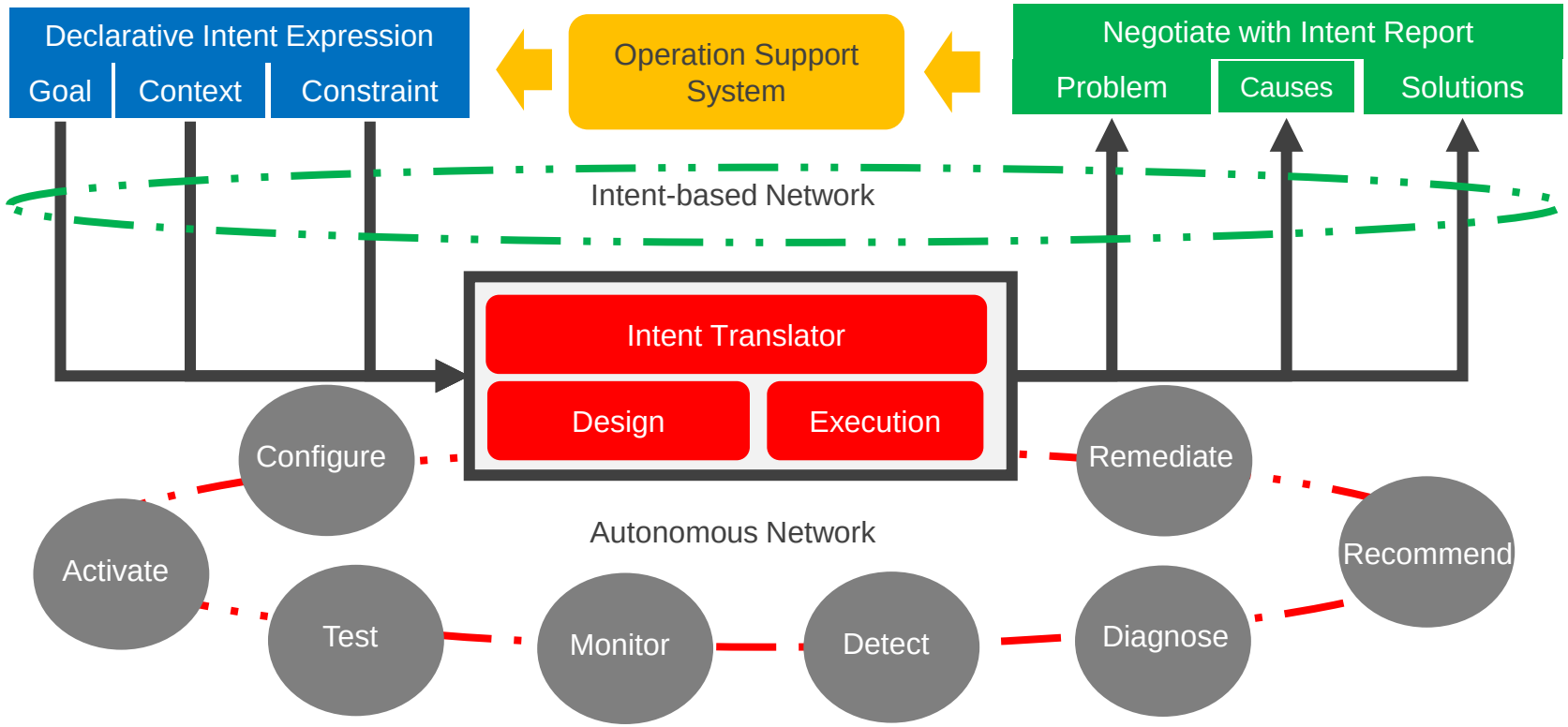


Source: IETF RFC 9315

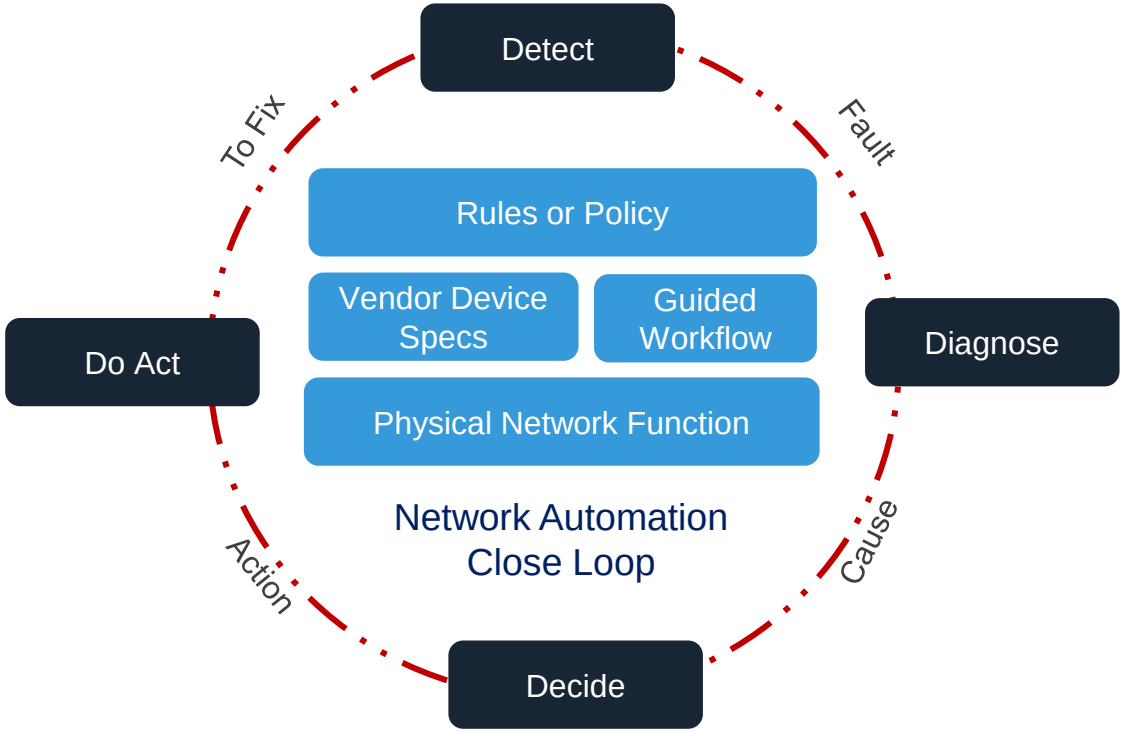
Autonomous Network related Buzzwords…

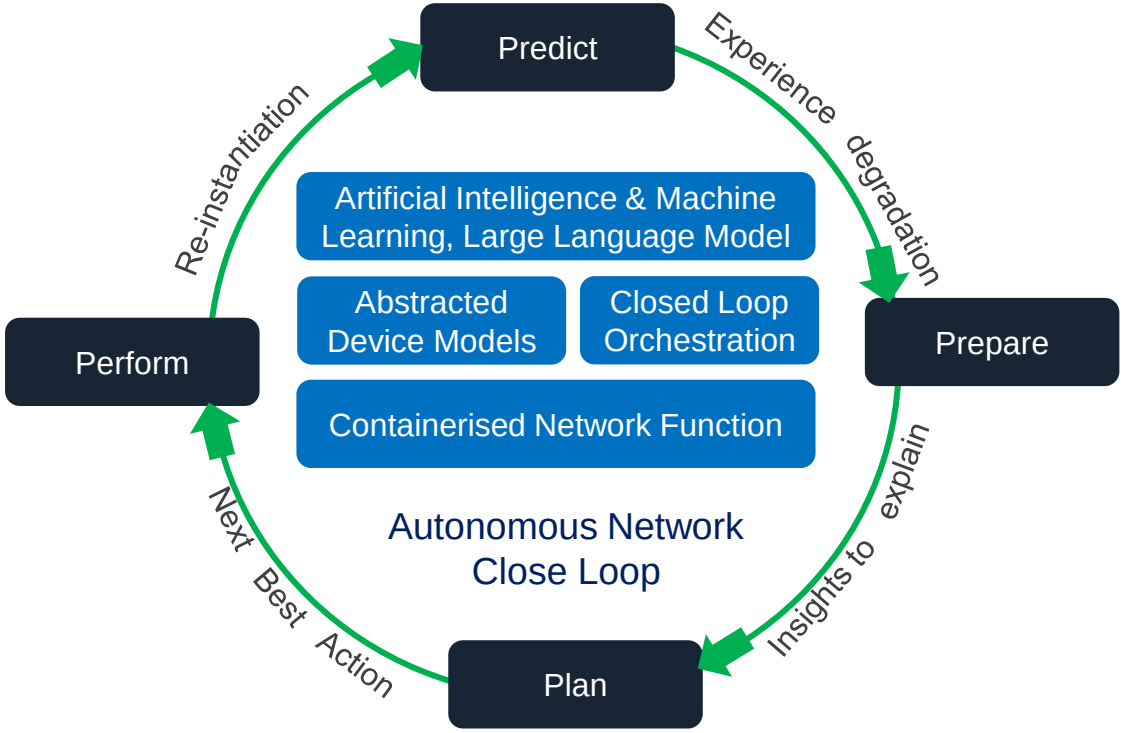


Intent based AN – Transforming Interaction & Incident Operations



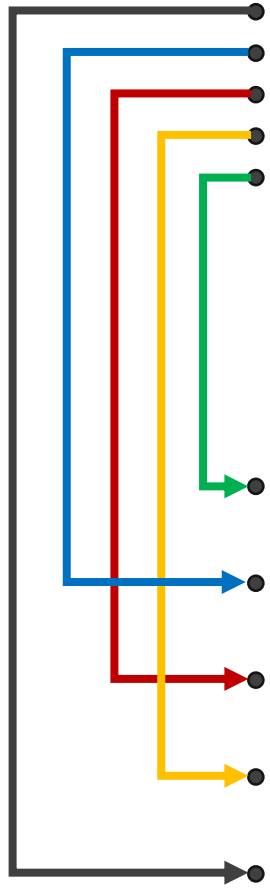
Automation is not Autonomous…





AN Maturity Levers defined for Telcos

Autonomous Levels	L0: Manual Operation & Maintenance	L1: Assisted Operation & Maintenance	L2: Partial Autonomous Networks	L3: Conditional Autonomous Networks	L4: High Autonomous Networks	L5: Full Autonomous Networks
Execution	P	P/S	S	S	S	S
Awareness	P	P/S	P/S	S	S	S
Analysis	P	P	P/S	P/S	S	S
Decision	P	P	P	P/S	S	S
Intent/Experience	P	P	P	P	P/S	S



Operational Capability	L-0	L-1	L-2	L-3	L-4	L-5
	Automation		Hyper Automation		Autonomous	
1. Intent / Experience Declare Objectives	Operation KPIs (at Network Operation level) *Managed by Human*		Network SLO, SLA (at Network Service level) *Managed by Human*		Intent Expression (at Network Experience Level) *Managed by Systems (and sometime Human)*	
2. Awareness Detect deviation	Use static rules *to create new events, plan, requirements*		Use programable policies *to create new events, plan, requirements*		Use ML models *to create new policies, event, plan, requirements*	
3. Analysis Diagnose Cause, Alternate Options	Use Instruction Sets *Leverage procedure, human experience, system reports for finding causes, solutions*		Use Data Analytics *Leverage data correlation insights for cause analysis and solution discovery*		Use ML Models *Leverage ML for identifying causes and suggesting possible next-best-actions (solution)*	
4. Decision Decide Final Solution	Use Standard Operating Procedure (SOP) *to finalise the solution from available options*		Use Policy along with Data Insights *To weigh the solution options*		Use ML Models and Digital Twin *Simulate options to finalise effective solutions*	
5. Execution Do act by execution (or implementation)	Use Guiding workflow *remediation process has human embedded in the loop for doing tasks*		Use human designed Orchestration *remediation process has human designed Orchestration*		Use AI rendered Orchestration *Remediation process has human for overseeing AI designed Orchestration*	

Journey of the Telecom Sector Towards AN

Current state

- A large majority of telcos ~**84% are either at Level 1 or Level 2 autonomy** for their overall networks
- Most of the telcos **~61%** aspire to reach at least Level 3 autonomy by 2028
- Only **1% expect to attain Level 5 and 16% to attain Level 4** overall (including operations) by 2028
- **Most of the autonomous networks use cases are at the POC** (proof of concept) / pilot stage
- Telcos expect to **invest $87mn** on average in autonomous networks over the next five years

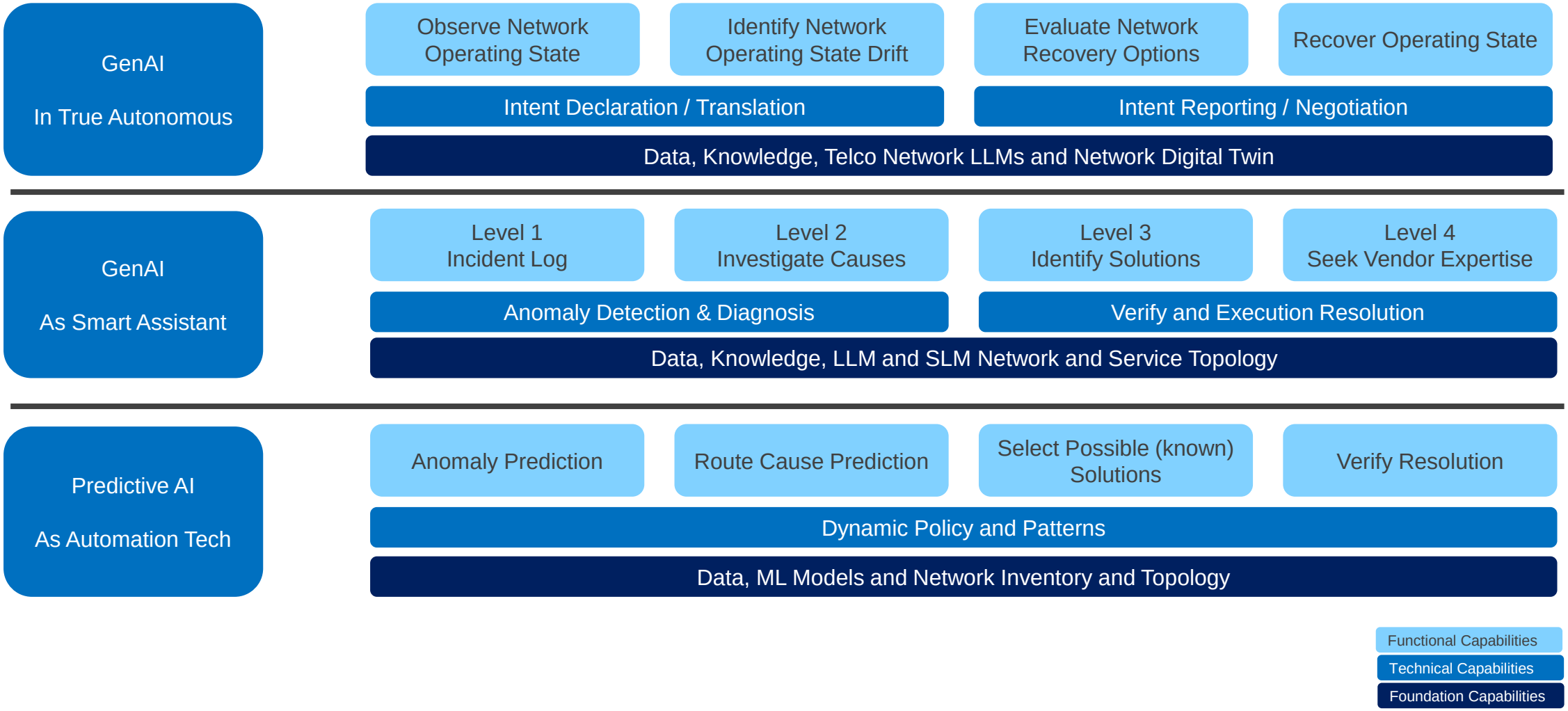
Key challenges faced

- Telcos have cited employee mindset, integration issues, and data sovereignty concerns as top challenges hindering adoption
- 50% of telcos have a roadmap that covers only the next 1-2 years
- Only one in five telcos (15%) has a comprehensive autonomous networks transformation strategy with well-defined goals and target timelines
- Fewer than one in five organizations (15%) has appointed a dedicated leader for autonomous networks, and 31% are in the process of finding one

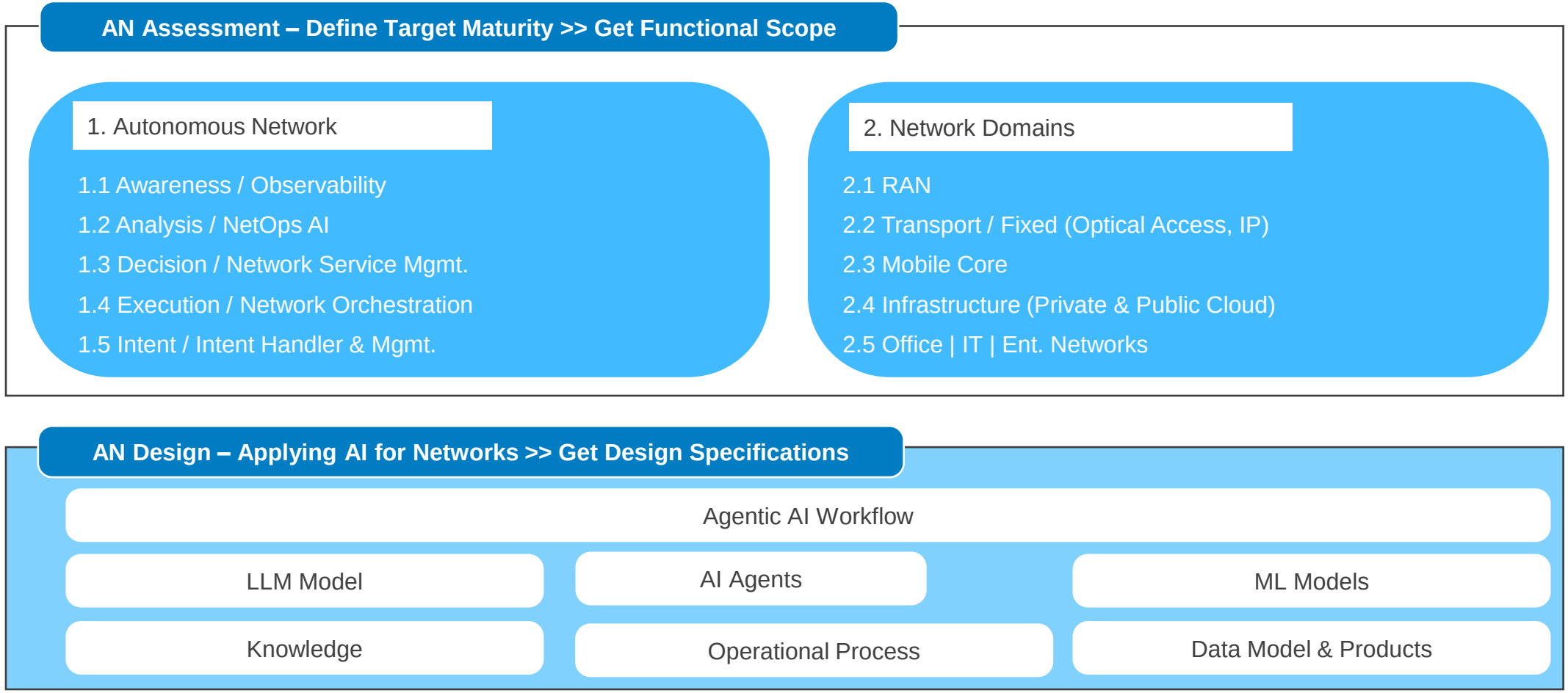
Status of CSPs AN level (TM Forum)– current and future (2028)

Percent of telcos in the category	L0: Manual operation and maintenance	L1: Assisted operation and maintenance	L2: Partial autonomous networks	L3: Conditional autonomous networks	L4: Highly autonomous networks	L5: Fully autonomous networks
End-2023	9%	42%	42%	6%	1%	0%
End-2028 (projected)	0%	8%	31%	44%	16%	1%

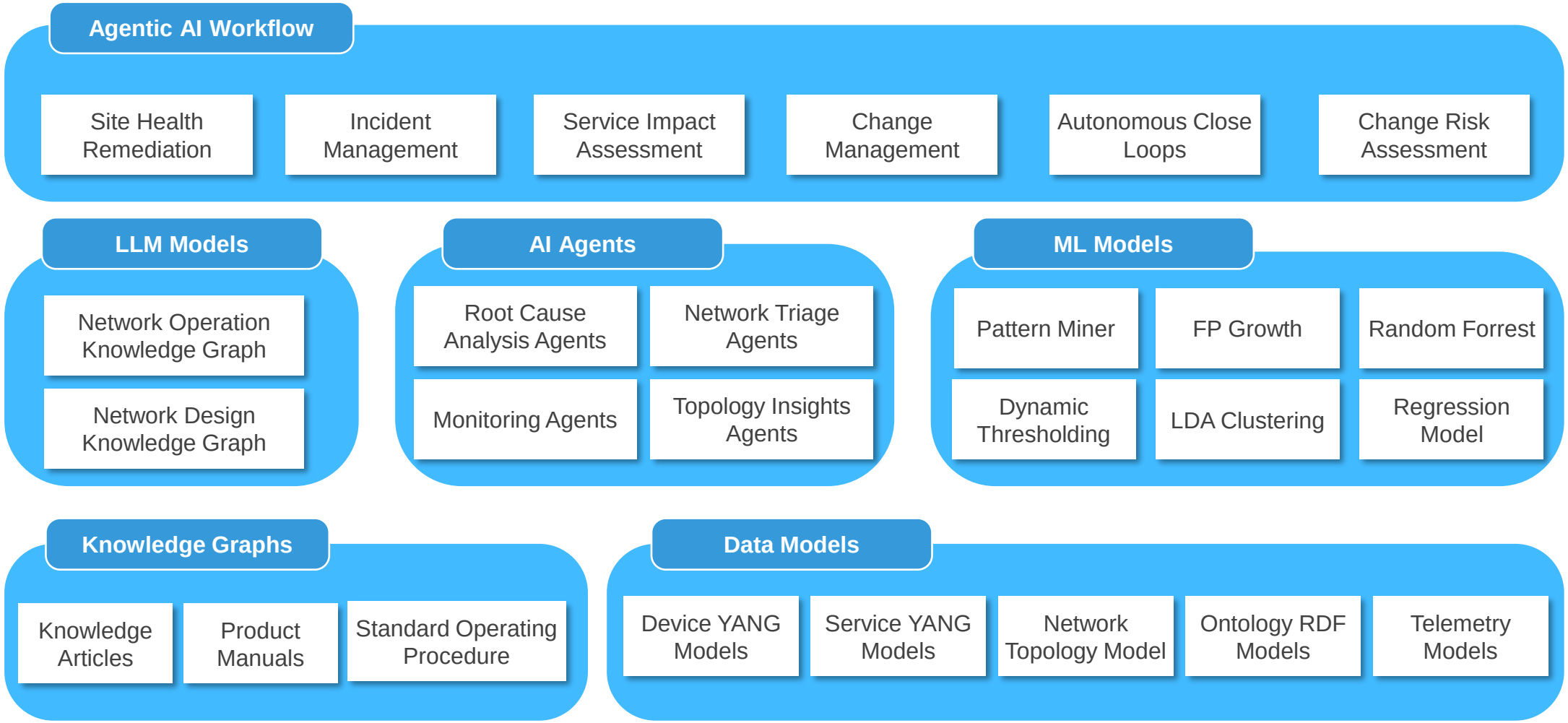
AI and Gen AI role in Autonomous Network



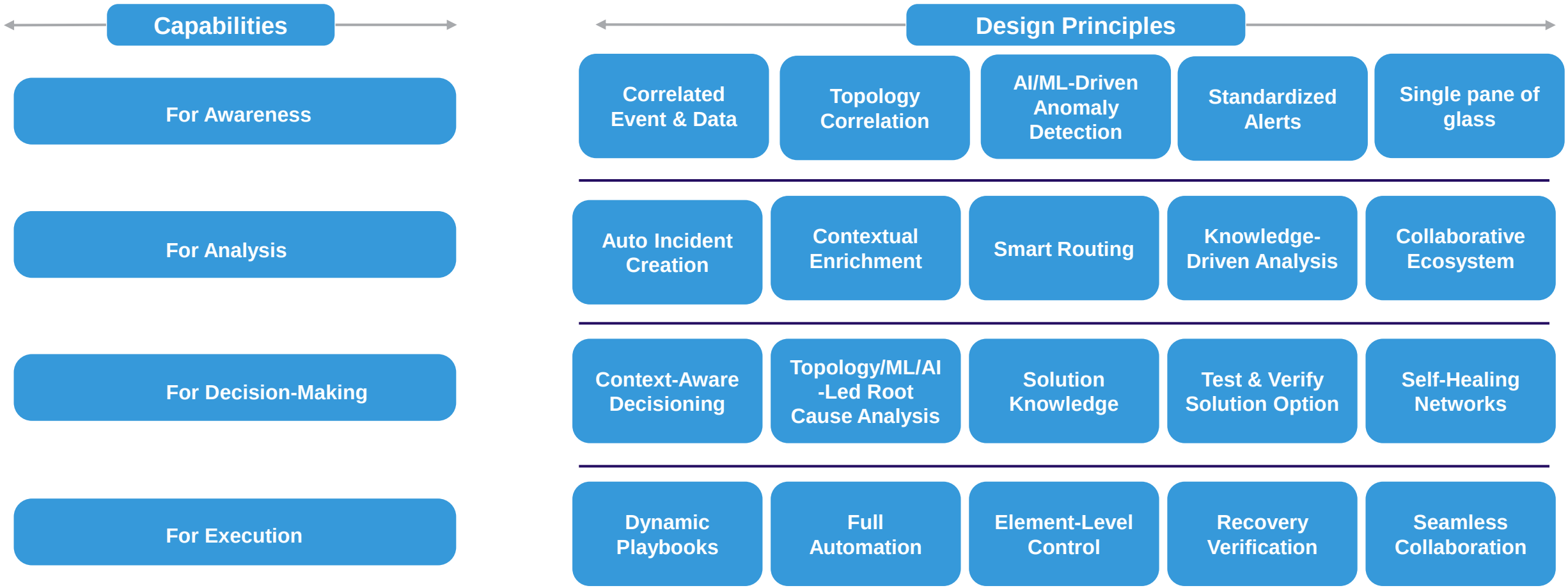
AI Techniques for improving Network Automation Maturity Level



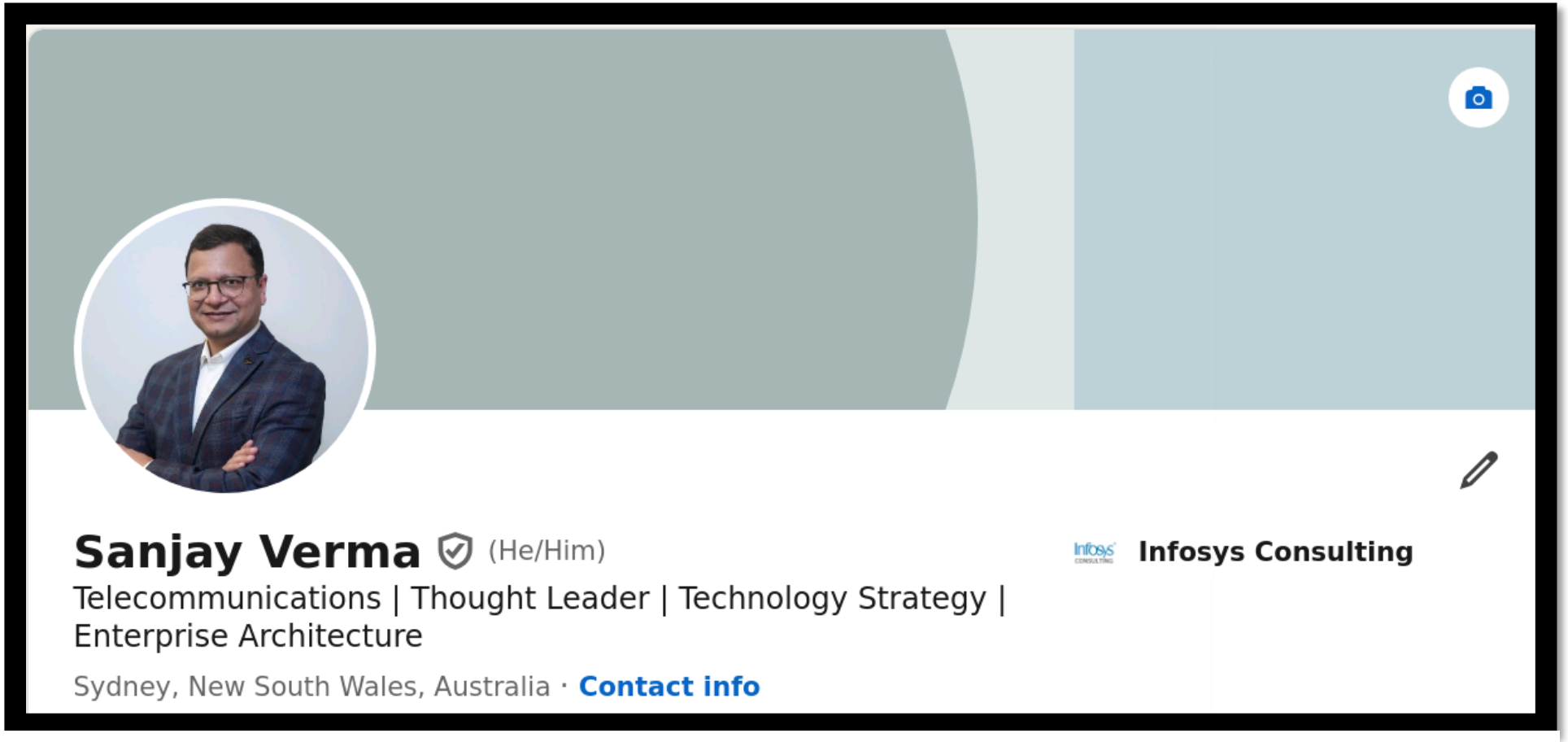
Building Block for AI Driven Network Operation Automation



Emerging Design Principles for AI Driven Autonomous Network



Let’s connect, collaborate and create…



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