(Mission 3)

AI & Data Innovation Mission

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AI & Data Innovation at TM Forum

Overview of the AI & Data Innovation Mission at TM Forum

The Industry Challenges being solved:

- Business challenges
- Technical Challenges: Why AI-enabled AN changes everything
  - ➢ *Legacy Industry OSS/BSS practices*
  - ➢ *Autonomous Domains*
  - ➢ *Governing Generative Agentic AI in ANL4+ Operations*

Member Value through AI & Data Innovation Mission:

- Strategic Plan and Mission Roadmap
- member-practitioner value through IA4AI Practitioner Communities

The impact so far – A few examples of AI in practice from our members

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AI & Data Innovation Mission at a Glance

VISION	To accelerate our industry to embrace AI safely and affordably at scale, to drive operational efficiency, accelerate service innovation, and enable smarter, more agile business models through the intelligent use of data insights			
PURPOSE	To accelerate the safe adoption of AI at scale by combining member resources to co-innovate and co-create best practices, standards, data architecture, ontologies, APIs, and proofs of concept that unleash the full potential of this powerful technology			
TARGET AUDIENCE	INFLUENCE & INSPIRE CEO, CFO, CCO, CRO	WIN OVER CDO, CIO, CTO, CNO, CSO CTIO, Chief Architect		ADD DAILY VALUE Data Scientist, Data Analyst, SW Developers
CORE ASSETS	Modern Data Architecture	**AI Framework** AI Canvas | AI Checklist | AI Model Contract & Data Sheet | Metadata-driven Automation | GenAI Framework | MAMA | Secure/Trustable AI | DT4DI/DTOps/DIOps | AIOps Lifecycle	**LLMs** Foundational Telecom LLMs for key Use-Cases: Production, Business Governance	**LLMOps** Prompt Engineering | Telco Open Data Services: Telco RAG Framework Fiduciary AI | (Semantic Layer Services)
MISSION STRATEGY	Build foundations to safely deploy AI at scale	Deliver Value to AI Practitioners and Telco supply chains	Use AI to drive improvements in Telco network and business operations	Build a modern data architecture and Foundational Open Data Services to support AI	Capability Development, Conformance and Verification Services

Research & Analysis → Innovation Engine → Collaboration Labs → Education & Conformance

Why AI changes everything: Business Challenges

What business challenges are we helping the member-company AI community solve?

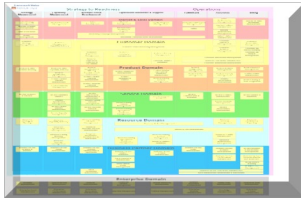| Business Challenges	AI-native Telco Solution Kits	Benefits

Greater vulnerability with AI-enabled Automation	**Secure and Sustainable AI-native Telco (SSAINT) DNA:**
	• Fiduciary AI (fully delegated AI)
	  • Secure AI
	  • Trustable AI
	  • Sustainable AI
	• Metadata-driven Automation
	  • Data Quality, Privacy and Sovereignty
		• Exploit AI effectively and safely through AI-ready digital maturity through ODA
		• Cost efficiencies through secure and sustainable AI-enabled autonomous operations
		• Industry-wide cross-value chain cooperation in tackling common challenges (e.g. Emissions reporting) through the adoption of standard components for accessibility and traceability of sovereign data

Low ROE and ROI	**RoE / Stakeholder Lifetime Value and ROI from AI in ODA** • A robust AI Canvas • Cognitive Experience-led evolution • Optimised learning in Telco LLMs • Semantic Layer Services for high performing Telecom LLMs • LLM-BSS/OSS integration at Run-time	• Genuine commercial value through the right build or buy decisions for AI • Higher customer lifetime value through experience-led governance of ODA effectiveness • Higher ROI from lower cost of AI implementation in end-to-end AI lifecycle management • Cost avoidance though a middle layer between LLM and legacy BSS/OSS
Single Digit growth	**AI-propelled Growth through Data Economies:** • Modern data architecture • Data democracy for Telecom AI usecases	• Agility in continuous innovation through improved data flows and accessibility of data • Accelerated Revenue growth from Data monetization opportunities from AI: balance the API economy with sufficient investment in building data economies for ANL4+ readiness • Functional ownership of Data Products

Why AI changes everything: Practitioner Challenges

Integration model changes from Processes ⇨ Delegation of responsibility / cooperating agents
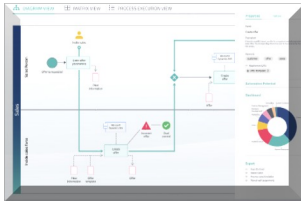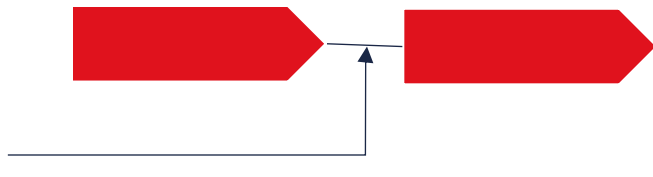
Task Centric Integration - Automation

Business
Process
Framework

Business
Process
Flows

Imperative
APIs
between
Process tasks

Control and data flow identical

Autonomous Centric Integration - Autonomy Level 4

Intent Negotiation

Delegation

AN Architecture
Concepts and definitions

- Customer Portal
- Marketplace
- Business Portal
- Contract
- **Business Operation**
- Business Intent Manager
- Operations Portal
- Orchestration
- **Service Operation**
- Service Intent Manager
- Assurance
- AD1 Intent Manager
- AD2 Intent Manager
- **Resource Operation**

› Definition of intent

› Operation principles

› Intent management function

› Interactions with other domain functions

› Autonomous Domains make Delegated Decision at run – time using AI

Co-operation

Intent Negotiation

Data exchange (sensor)

Control and data flow separate
⇨Intent and Data become First class concepts
⇨Intent API and Open Data Services (Data Mesh API) flows

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Why AI changes everything: Practitioner Challenges

AI-propelled growth solutions need Data Economies / access to Data is needed for Autonomous Domains

- **Modernisation of Data Architecture**
  - TR319

- **Democratisation of Data**
  - Many Producers
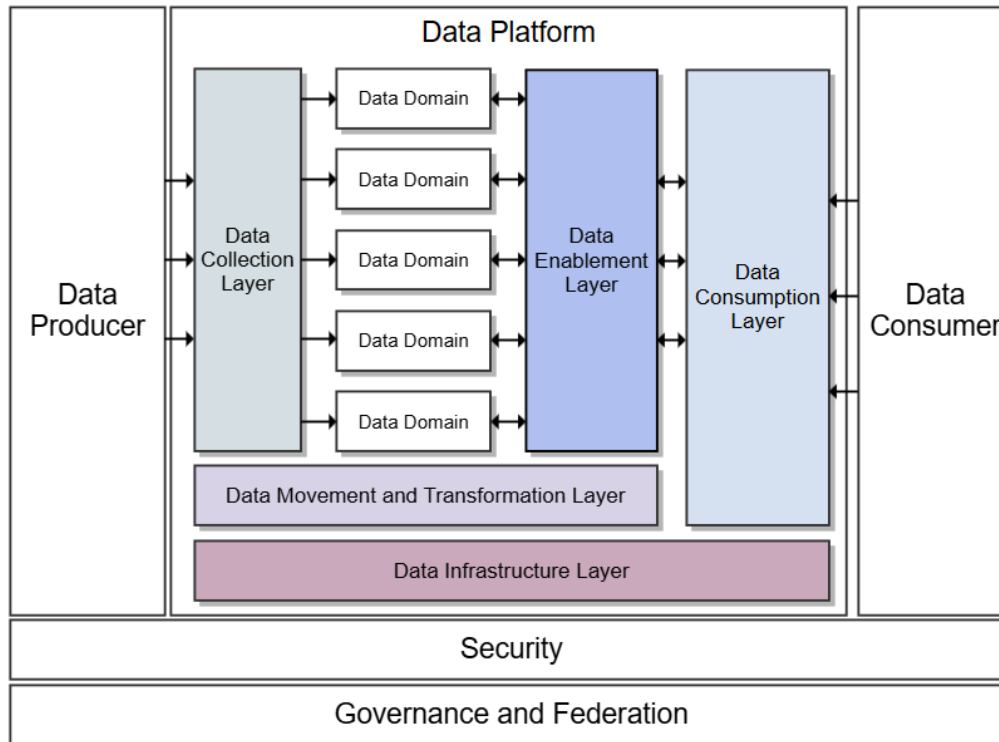 - Many Consumers

- **Data Services**
  - Discovering information and data
  - Moving data from Producers to Consumer
    - Streaming
    - Transactional Queries
    - Digital Twins (Knowledge Graphs)

- **Privacy, security & governance of data**

- **Implementation**
  - TMF 688 Event Management API
  - Topology Graph API TMF686
  - Self Service Data Platform Components

Why AI changes everything: Practitioner Challenges
Beyond OSS / BSS - The role of AI Agents in the implementation of AN level 4

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TMF921 Intent Mngt API
TR290/1/2/3/4 Intent Ontologies
MDA Self Service Data Platform

Intent-driven…

F3

TMF921 Intent Mngt API
TR290/1/2/3/4 Intent Ontologies
MDA Self Service Data Platform

K3

Intent Management

Domain Intelligence

| Knowledge Governance | Knowledge Optimization | Knowledge Base |

Domain Control Loop Management

| Awareness | Analysis | Decision | Execution |

"AADE" Control Loop
MAPE-K inspired

TMF921 Intent Mngt API
TR290/1/2/3/4 Intent Ontologies
MDA Self Service Data Platform

NE SI

Autonomous Domain

Ref: iee-review96.pdf

Intelligent Agents

- Concept emerged in 90's
- Candidate for realising Autonomous Domains with Intent handler
- Key Characteristics:
  - Autonomy: agents perform the majority of their problem-solving tasks
  - Social ability: interact, with other software agents and humans
  - Responsiveness: perceive their environment and respond in a timely fashion to changes
  - Proactiveness: agents should not simply act in response to their environment, they should be able to exhibit opportunistic, goal-directed behaviour and take the initiative where appropriate.

ANL4+ Intelligent Agents

- Realize Autonomous Domain Control Loop - covering AADE
- Decision making Powered by AI technologies
- Support Intent - both fully delegated and negotiated with peer entities
- Exchange Information, Knowledge and Data
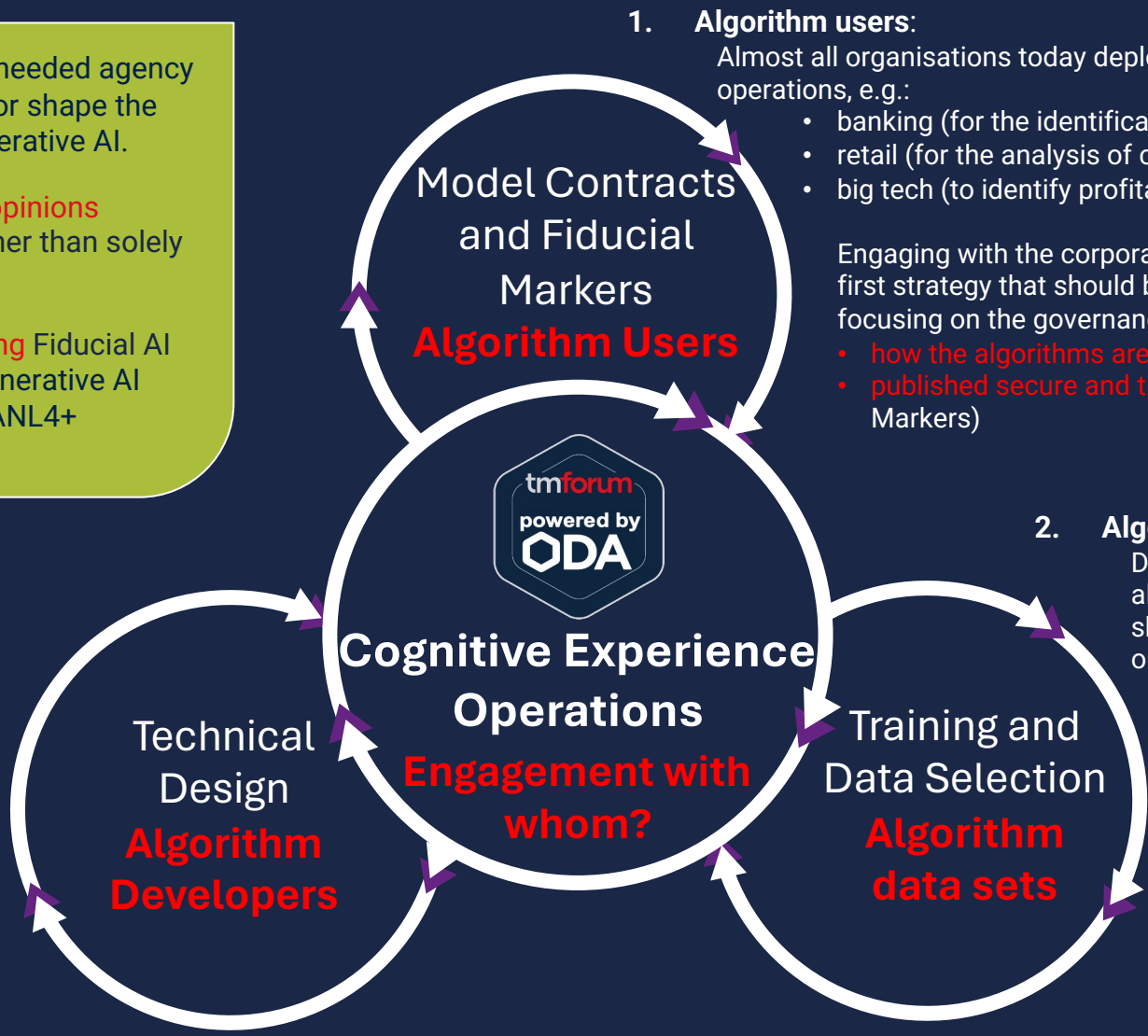- Maintain / Publish Fiducial Markers inform Security and Trust KPIs

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Why AI changes everything: Practitioner Challenges
Stakeholder Engagement lies at the core of governing Fiducial Agentic AI

Organisations and their leadership can regain much-needed agency by constructing engagement strategies to influence or shape the outputs generated by Agentic AI, which uses the generative AI.

Agentic AI's ability to create information and shape opinions requires it to be conceptualised as a stakeholder rather than solely as a technology only.

The Open Experience Index is useful for the Governing Fiducial AI Agents – helping Operators to manage delegated generative AI Agents not only as tool but also as a stakeholder in ANL4+ Cognitive Experience Operations (CEO)

Model Contracts and Fiducial Markers
Algorithm Users

Cognitive Experience Operations
Engagement with whom?

Technical Design
Algorithm Developers

Training and Data Selection
Algorithm data sets

1. **Algorithm users**:
   Almost all organisations today deploy algorithms across their operations, e.g.:
   - banking (for the identification of customer risk),
   - retail (for the analysis of customer habits or preferences), or
   - big tech (to identify profitable new market opportunities).

   Engaging with the corporations deploying algorithms is the first strategy that should be adopted for Agentic CEO, focusing on the governance of:
   - how the algorithms are used (AI model contracts)
   - published secure and trustable AI Markers (Fiducial Markers)

2. **Algorithm data sets**:
   Data sets play a crucial role in algorithm training, significantly shaping how algorithms develop outputs over time.

   The second engagement strategy for Agentic CEO should focus on:
   - identifying or providing appropriate training sets for new algorithms; or
   - persuading developers on the advantages and disadvantages of specific data set use.
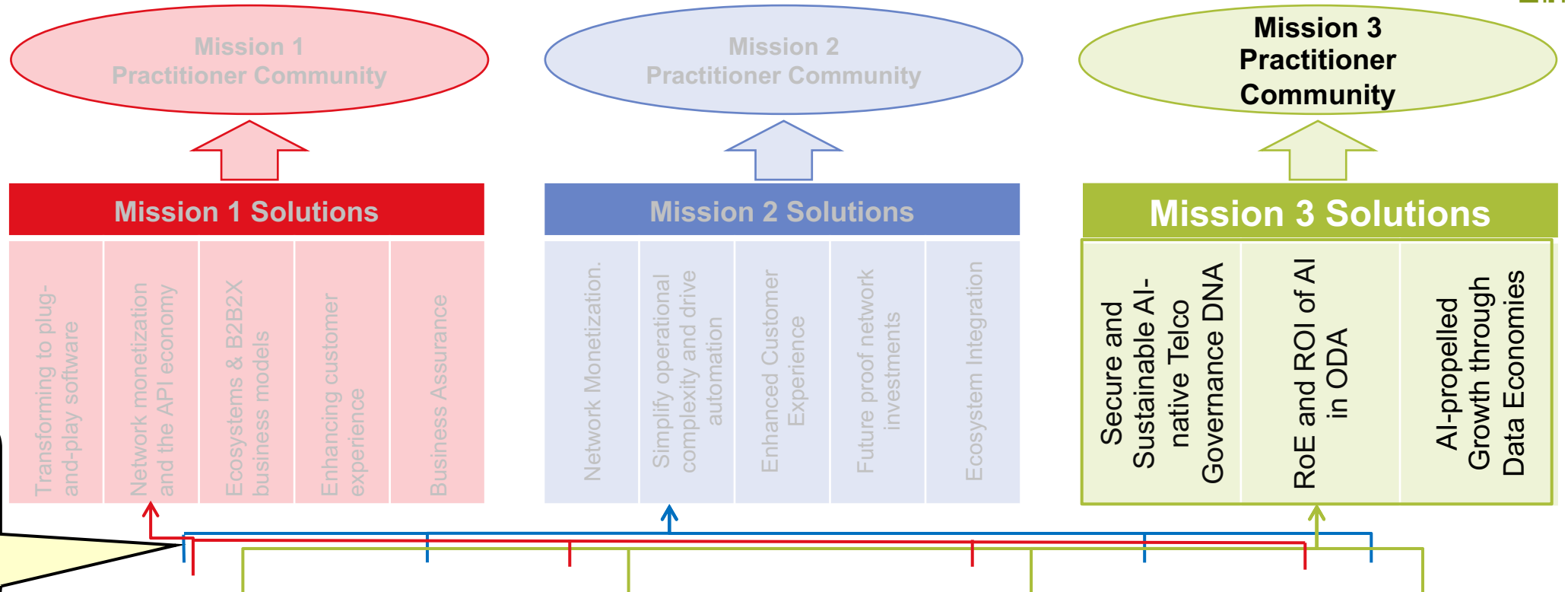
3. **Algorithm developers:**
   Whether algorithms are created directly by humans, or by algorithms created by humans to write new algorithms, human programming ingenuity lies at the heart of what algorithms are able to do.

   Similar to work done to influence, inform , and shape policy development, Corporations or individuals can seek to engage with developers before what is created, or iteratively as the process of writing the algorithm is undertaken - focusing on the technical design.

It is important to correctly identify the persons, functions or organisations involved in the creation or use of AI Agents
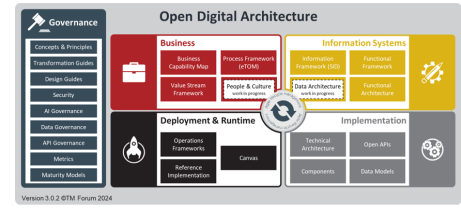Organisations might consider therefore establishing stakeholder engagement plans in the three distinct areas above

Missions Create Solutions for Practitioner Communities

Mission 1 Practitioner Community

Mission 2 Practitioner Community

Mission 3 Practitioner Community

Packaged solutions (to business challenges)

Mission 1 Solutions

- Transforming to plug-and-play software
- Network monetization and the API economy
- Ecosystems & B2B2X business models
- Enhancing customer experience
- Business Assurance

Mission 2 Solutions

- Network Monetization.
- Simplify operational complexity and drive automation
- Enhanced Customer Experience
- Future proof network investments
- Ecosystem Integration

Mission 3 Solutions

- Secure and Sustainable AI-native Telco Governance DNA
- RoE and ROI of AI in ODA
- AI-propelled Growth through Data Economies

> Missions create packaged **solutions** from all our knowledge, products and content to help **practitioners** in our **mission communities** solve their day-to-day **business challenges**

Knowledge, Products, Content

Explore	Ideate & experiment	Co-create	Scale
Research & Analysis	Innovation Engine	Collaboration Labs	Education & Conformance

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The Member Value Opportunity for AI Practitioners:

IA4AI Communities of Practice
For Telco AI Practitioners:

CSPs: Contribute Use-cases & Industry Requirements

Solution Providers: Delivery Motivation

Open Production AI Practitioners	• Network Ops • Service Ops
Open Business AI Practitioners	• Customer Ops • Stakeholder Value Mgt • Product Ops • Partner Ops
Open Governance AI Practitioners	• Std. Telco Regulatory Ops • Trustable AI • Sustainable AI • Secure AI

(The three Practices above are proposed as the startup pilot communities based on outcomes from ideation workshops held with a small quorum of members… these are expected to change according community member inputs over time)

Channels

- Research and Media
- Innovation Engine (Pioneer Hubs, & Catalyst PoCs)
- Collaboration Projects (ODA Products)
- TM Forum Products

What AI Practitioner Communities achieve through each channel

- Market insights
- Relevant and engaging Blogs
- Enriched Reports and Newsletters
- Ideas for Catalyst POCs
- Innovation Hub – Relevant Solution Innovations
- Enrichment of Whitepapers
- Deliver Applicable Frameworks
- Right Architecture & Design Patterns
- Enriched and relevant Training
- Standards in vital core services for Telco

Research & Analysis — Explore

Innovation Engine — Ideate & experiment

Collaboration Labs — Co-create

Education & Conformance — Scale
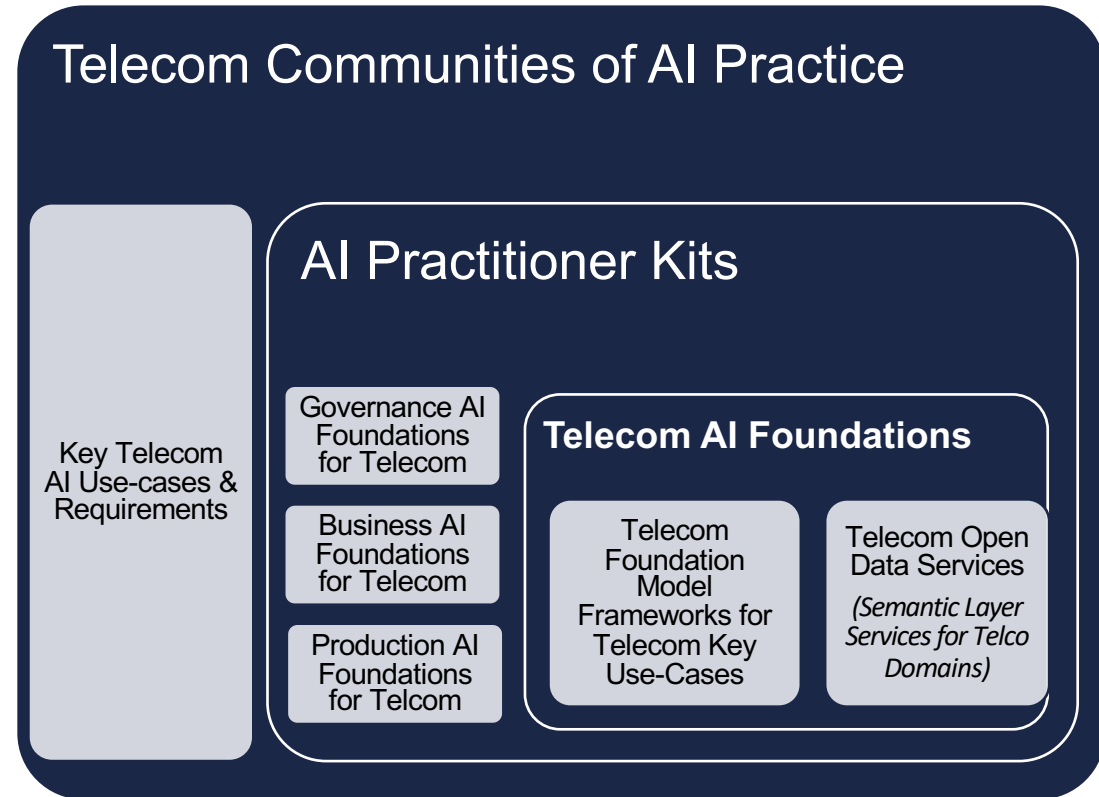
SHARED SERVICES & EVENTS: Monthly Deep-dives into Industry & Regional Requirements, Playbooks & Project Awareness GAFs

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AI Practitoner **Communities**

Inspire & Influence *The decision makers - they control resources and funding required to build and execute*	• CEO • CFO • CCO • CRO
Win Over *Key stakeholders – they need to be convinced of the value to invest in building and adopting Telecom AI Standards*	• CDO, CIO, CTO, CNO, CSO • CTIO, Chief Architect
Add Daily Value *The builders – the people who use the Mission's output every day, and make the ideas a reality*	• Data Scientist • Data Analyst • Developers

Telecom Communities of AI Practice

Key Telecom AI Use-cases & Requirements

AI Practitioner Kits

Governance AI Foundations for Telecom

Business AI Foundations for Telecom

Production AI Foundations for Telcom

Telecom AI Foundations

Telecom Foundation Model Frameworks for Telecom Key Use-Cases

Telecom Open Data Services *(Semantic Layer Services for Telco Domains)*

Leaders and specialist professionals charged with implementing near and longer-term value from all kinds of AI in their business and extracting maximum value from their data.

IA4AI Communities of Practice: Short-term timeline

- COGA – Community for Open Governance AI Practitioners
- COPA – Community for Open Production AI Practitioners
- COBA – Community for Open Business AI Practitioners

Communities of Practice Workshops

- *Jan 2025 onwards*
  - Prioritisation of:
    - Curation of common industry usecases
    - open standards required and supported needed across all channels
  - Key areas of cooperation on standards adoption relating to AI-native Telecom

Official start of Manifesto delivery:

- *From 01 July 2025*
  - Requirements refinement
  - Channel Delivery motivations
  - X-Channel Alignment Deep-Dives:
    - WBS, channel allocations and interdependencies
    - Consolidated Solution pack reviews and approvals for Publication

Awareness campaign and Registration of Interest

- *From 01 December 2024*

Join an AI Practitioner Community

- *From 2nd Jan 2024*
  - Call for CSP Community Champions
  - Call for Use-case Requirements

Launch of Community Manifestos

- *DTW 2025*
  - Commitment on shared areas of cooperation

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Summary of what AI Practitioners need to do

Quid necesse est mutare?
What needs to change ?

Quid necesse est mutare?
What needs to change ?

AI-enabled Autonomous Networks:
- Changes integration process
- Agents allow transition from Process Centric to ⇨⇨ Autonomous Centric Integration

- Specify Requirements to support the transition from Level 2-3 humans in the loop / copilots to Level 4-5 Humans on-the-Loop / fully empowered AI Agents
  - Evolving from Task centric integration ⇨⇨To delegation and cooperation between AN Domains realised as Agents
  - Optimised selection and performance of Empowered AI technologies for ODA Domains.
  - Build Data Economies to support the Democratisation of Data for faster innovations and effective AI decision-making
  - Embedding into ODA AI Governance components and Telecom Ops Components to support LLMOps
  - Understand common AI Usecases:
    - IG1355 AIOps Top Use Cases v2.0.0 - AI Operations (AIOps)
    - IG1369 GenAI Use Cases v1.0.0 - Autonomous Networks Project
    - IG1373 AN Use Cases: A Guide to Self-Healing and Closed-Loop Automation v1.0.0 - Autonomous Networks Project
    - IG1310C DT4DI Top Use Cases v7.0.0

- Create ODA Components supporting these concepts

- Deep-dive into Telecom Domain AI solution kits / playbooks

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Usecase: Complaint Handling AI Agent for Core Network – China Mobile Zhejiang
TM Forum catalyst project C24.0.628 LOKI – LLM O&M Knowledge Integrator

Problem statement and Value Proposition

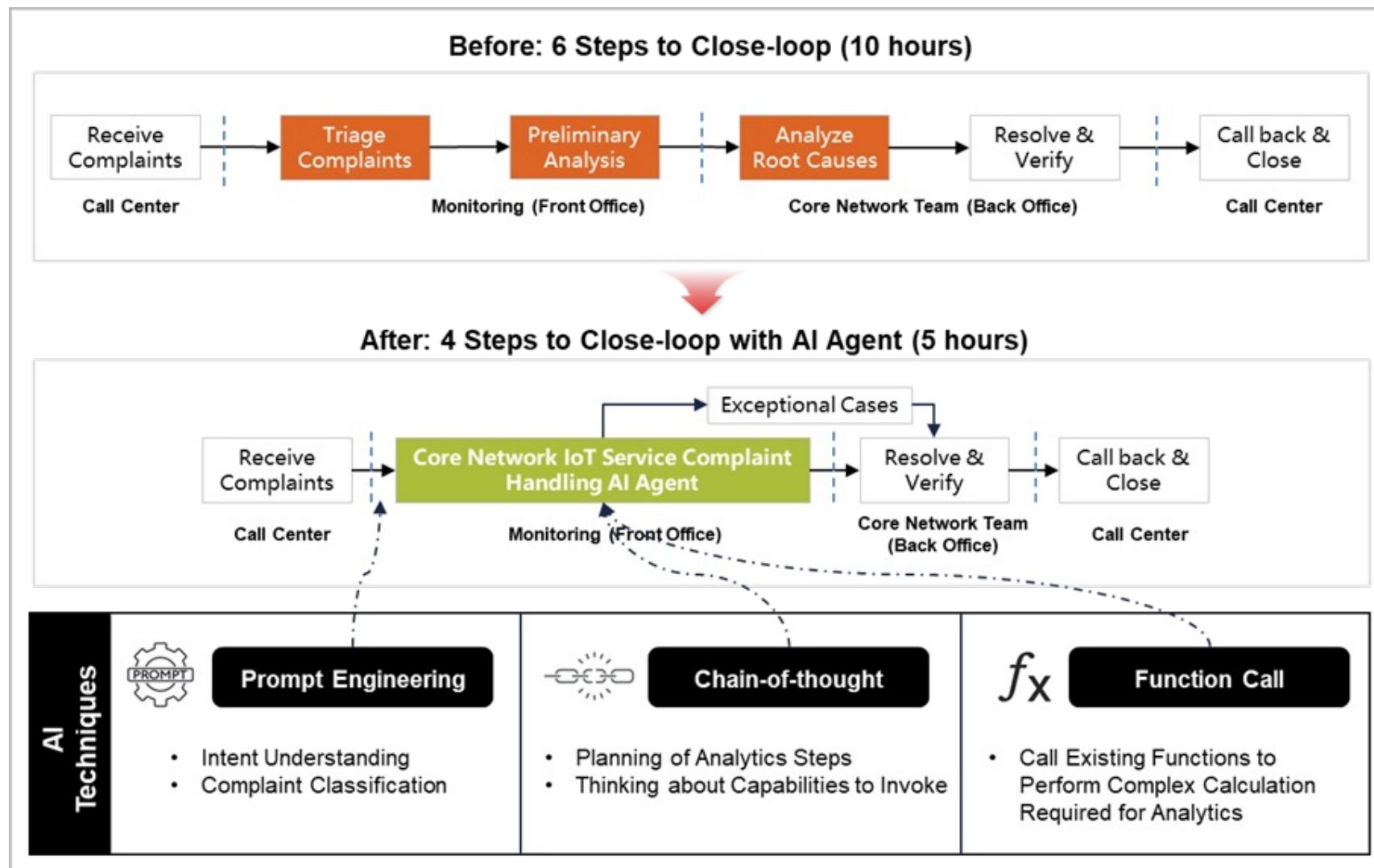- **Complex networks, devices & policies:**
  - Multiple RATs connecting thousands of IoT device types – each with its own policies, e.g. whitelist URL, customised configuration in core networks.

- **High dependence on experts for 80% of classification:**
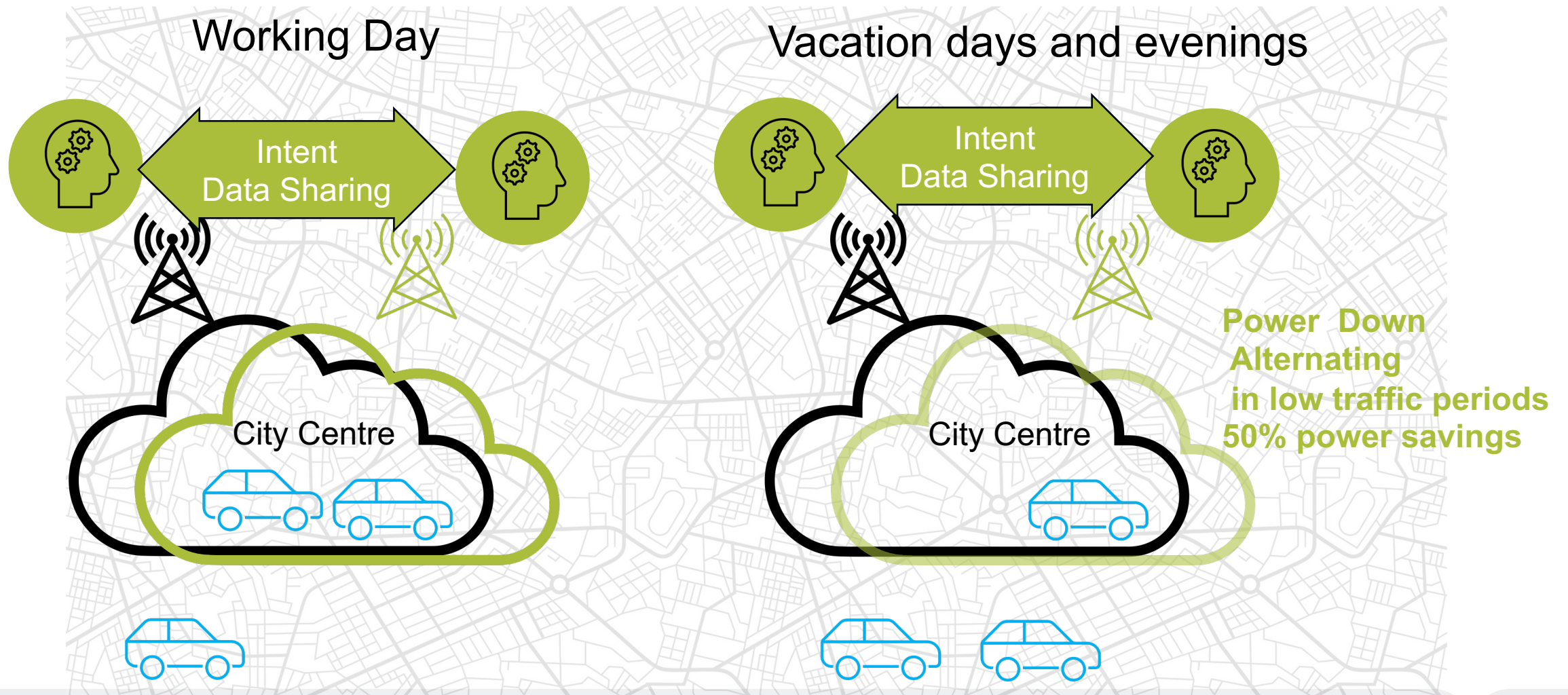 - High complexity often required multiple experts with different skills and experiences.

- **Low automation rate (33%):**
  - Complaints analysis took alot of effort to summarize, program and configure the rules into O&M systems.

Before: 6 Steps to Close-loop (10 hours)

Receive Complaints → Triage Complaints → Preliminary Analysis → Analyze Root Causes → Resolve & Verify → Call back & Close

Call Center | Monitoring (Front Office) | Core Network Team (Back Office) | Call Center

After: 4 Steps to Close-loop with AI Agent (5 hours)

Receive Complaints → Core Network IoT Service Complaint Handling AI Agent → (Exceptional Cases) → Resolve & Verify → Call back & Close

Call Center | Monitoring (Front Office) | Core Network Team (Back Office) | Call Center

AI Techniques

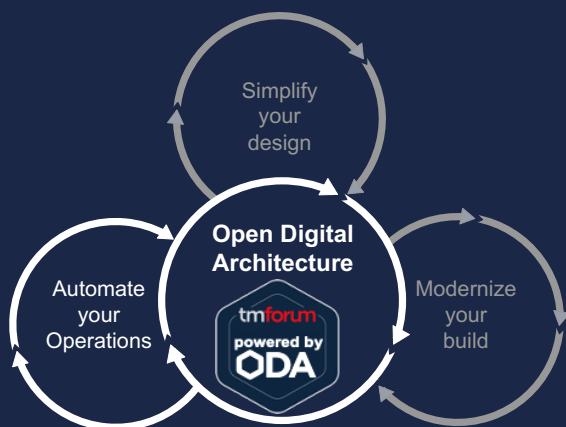| Prompt Engineering	Chain-of-thought	Function Call
• Intent Understanding • Complaint Classification	• Planning of Analytics Steps • Thinking about Capabilities to Invoke	• Call Existing Functions to Perform Complex Calculation Required for Analytics

Intelligent Agents: RAN energy saving use case

Inspired by RAN! Reinforcing Autonomous Networks: AI-empowered digital twin for optimization

Working Day

Intent
Data Sharing

City Centre

Vacation days and evenings

Intent
Data Sharing

City Centre

Power Down
Alternating
in low traffic periods
50% power savings

Industry examples: Delivering Successes through AI

China Mobile IT has employed WISE, an AI-powered platform to deliver successful decision-intelligence-driven marketing campaigns. In doing so, they have increased their conversion rate of 26.27% - four times higher than the general push SMS message campaigns.

Orange's AI-driven **intelligent conversation analysis** extracts essential acoustic indicators from audio conversations and filters conversations based on predefined thresholds. For example, a silence rate of more than 30% may indicate a need for corrective action with agents or information systems. This automation addresses 100% of all calls to improve call centre service quality continuously and frees up to 80% of valuable time to enhance the overall user experience and retention rates.

Balancing growing demand with top-tier network services:

Singtel's 5G Concert Pass service trial at the recent Taylor Swift concert in Singapore provided concert-goers with 1.5 times faster connectivity on 5G, supported by AI for dynamic network traffic management to prevent congestion and ensure consistent performance, even during high traffic times, through efficient use of network resources.

To meet the growing demand for mobile data, NTT Docomo has significantly improved the efficacy of its network operations through an AI-based spectrum management system.

NTT DATA claims a 30% cost reduction for managing network services through its AI-enabled layered approach. This is already applied in telcos such as Telefónica's Brazilian operating business Vivo, which was a case study at *DTW24*.