TM Forum

ANLAV Report

NBN Australia

Scenario: GB1503A – Service Assurance (Individual Services)
Maturity Level: Beta
Version: 2.0.0
Domain: Service Assurance / Fixed Wireless Access individual services (throughput)
Network: Australia
Date: 10/06/2026
Score: 4.00

ANLAV Report: NBN Australia
Executive Summary of Review Cycle - 10 June 2026

During the first validation cycle, NBN Australia provided detailed evidence that its Throughput Performance Management System (TPMS), built on Ericsson Managed Services, operates as an autonomous closed-loop service-assurance solution for the Fixed Wireless network.

The system autonomously translates service intents into executable task orders via an AI/LLM agent, performs real-time monitoring and AI/ML-based degradation prediction (CAT-Boost with automated model selection and retraining), analyses service impact, isolates root cause across network domains, generates and evaluates mitigation actions, and executes corrective measures with automated fallback and rollback without human intervention in the standard operational flow.

Validated scope is 4G LTE TDD. 5G is thinly evidenced (73 vs 38,400 tickets) and is a next-cycle item, and Experience is throughput-proxied. Read as an agentic AI closed loop - LLM reasoning agents over a product knowledge base, a self-learning prediction core, no human in the operational flow - all eight capabilities are confirmed at Option A, a validated Autonomous Network Level (ANL) of 4.00.

ANLAV Report: NBN Australia
Self-assessed scoring

Cognitive Activity	Service Capability	Weight	Questions	Option A	Option B	Option C	Option D	Industry Standard Reference	Sub-scenarios		
									Anomaly & Stability	Performance	Experience
									20%	40%	40%
Intent	Intent Translation & Fulfilment	10%	How does the System translate Service intents (e.g., throughput, latency, availability) into network actions and evaluate their fulfillment?	The System automatically generates Service Assurance objectives (e.g., throughput targets, latency bounds) and policy actions based on Service intents, entered/updated by Person. The System evaluates and presents intent fulfillment based on implementation effect, and informs if intent is not fulfilled.	The System processes intent using predefined rules and policies. Intent fulfillment evaluation is manually validated.	The System processes intent using templates and guided workflows. Intent fulfillment evaluation is manually validated.	Intent configuration and evaluation are entirely manual and based on human expertise.	3GPP TS 28.100 7.1.1 Intent handling: -Task A: control information generation and determination. -Task B: intent fulfilment evaluation.	A	A	A
Awareness	Service Performance Monitoring & degradation/outage detection	10%	How does the System monitor Service KPIs (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and detect performance degradation, outage or anomalies?	The System continuously monitors Service KPIs (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and detect performance degradation, outage or anomalies without human intervention.	The System continuously monitors Service KPIs (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and detect performance degradation, outage or anomalies based on predefined rules	Performance monitoring, Service degradation and anomaly / outage detection are determined based on human expertise		3GPP TS 28.100 7.1.1 Awareness: -Task C: information collection.	A	A	A
Awareness	Service Performance degradation Prediction	10%	How does the System predict Service degradation (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and SLA violation ?	The System uses self-learning AI Models to analyze Service KPIs (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and predicts SLA violations, without human intervention	The System uses dynamic rules (context-aware) or ML outputs to analyze Service KPIs (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and predicts SLA violations and may require human intervention (e.g. for	The System predicts SLA violations based on pre-defined rules.	SLA violation is manually detected and addressed based on performance reports.	3GPP TS 28.100 7.1.1 Analysis: -Task D: issues identification. -Task E: deterioration prediction.	A	A	A
Analysis	Service Degradation Impact Analysis	10%	How does the System identify and analyze the impact of Service degradation (e.g., throughput, latency, stability issues, experience deterioration,VoLTE/VoNR call drop rate) on user experience or SLA compliance?	The System identifies and analyzes the impact of Service degradation (e.g., throughput, latency, stability issues, experience deterioration, VoLTE/VoNR call drop rate) using self-learning AI Models without human intervention.	The System identifies and analyzes the impact of Service degradation (e.g., throughput, latency, stability issues, experience deterioration, VoLTE/VoNR call drop rate) using dynamic rules (context-aware) or ML Outputs and may require human confirmation to proceed	The System identifies & analyzes impact of Service degradation, based on predefined rules	Impact of degradation is determined based on human expertise.	3GPP TS 28.100 7.1.1 Analysis: -Task F: Network issue demarcation. The tasks of analyze the network issue and determine the network issue categories (e.g. weak coverage, high load, low throughput).	A	A	A
Analysis	Service Degradation Demarcation & Root Cause Analysis	15%	How does the System isolate the root causes of Service degradation by analyzing contributing factors within or across network domains (e.g., RAN, transport, core), covering performance, stability, and experience-related issues?	The System isolates and analyzes the root causes of Service degradation by evaluating contributing factors within or across network domains using self learning AI Models, without human intervention.	The System isolates and analyzes the root cause of Service degradation using Dynamic Rules (context-aware) or ML Outputs and may require human intervention	The System isolates & analyzes performance degradation Root Cause, based on predefined rules	Performance data and alarms are manually analyzed to determine the root cause.	3GPP TS 28.100 7.1.1 Analysis: -Task F: Network issue demarcation. The tasks of analyze the network issue and determine the network issue categories (e.g. weak coverage, high load, low	A	A	A
Analysis	Solution Generation	15%	How does the System generate solutions to address Service degradation (performance, stability, or experience) based on root cause analysis?	actions (towards specific user group, service type and Apps) to address Service degradation and continuously learns from past resolutions using AI Models, without human intervention.	The System generates corrective actions using dynamic rules (context-aware) or ML Outputs and may require human confirmation	The System suggests corrective actions based on pre-defined rules.	Solutions are manually created based on human expertise	3GPP TS 28.100 7.1.1 Analysis: -Task H: solutions analysis.	A	A	A
Decision	Solution Evaluation & Decision making	20%	How does the System evaluate solutions and decide on the optimal solution to implement ?	The System evaluates multiple remediation options, analyzes risk and trade-offs, and selects the optimal solution using self learning AI Models, without requiring human decision-making.	The System evaluates remediation options, recommends the optimal solution to be executed using Dynamic rules (context-aware) or ML Outputs and may require human approval	The System evaluates remediation options, recommends the optimal solution to be executed based on pre-defined rules. Option selection is made by Human	Remediation options, risk assessment and selection of appropriate solutions are manually done	3GPP TS 28.100 7.1.1 Decision: -Task I: solutions evaluation and determination.	A	A	A
Execution	Solution Implementation	10%	How does the System implement solution and apply fallback mechanisms in case of solution failure?	The System implements the selected corrective action and triggers fallback mechanisms in case of failure, without human intervention	The System applies corrective action and fallback mechanisms using pre-defined rules, based on human approval.	Implementation and fallback handling of the corrective action are manually executed		3GPP TS 28.100 7.1.1 Execution: -Task J: solutions execution.	A	A	A

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Capability Area	Capability	Score Claimed	Score Validated	Provided Evidence	TMF (GB1503A) requirements	Questions
Intent	Intent Translation & Fulfilment	A	**A**	An AI/LLM agent (Athena AI) captures the user's natural-language intent and auto-generates an executable JSON task order against the product knowledge base: intent, target nodes, throughput conditions (DL 25000 / UL 5000), feature activation (AtmoDuctInterferenceReduction, CXC4012256) and 15-min ROP. Each cell-level intent is registered in the TPMS database with task-status feedback; fulfilment is tracked via per-cell UE-throughput improvement (Slides 11-14).	For Option A: The System automatically generates Service Assurance objectives (e.g., throughput targets, latency bounds) and policy actions based on Service intents, entered/updated by Person. The System evaluates and presents intent fulfilment based on implementation effect. For Option B: The System processes Intent using predefined rules and policies. Intent fulfilment evaluation is manually validated.	Confirmed at Option A. The LLM agent translates free-form intent into an executable task order and the fulfilment loop is registered and measured per cell.

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Capability Area	Capability	Score Claimed	Score Validated	Provided Evidence	TMF (GB1503A) requirements	Questions
Awareness	Service Performance Monitoring & degradation Detection	A	**A**	The Task / Expertise-Reasoning agent continuously collects KPI, PM and CM data into the data lake and detects degradation and anomalies in real time, without human intervention; results are stored for the downstream agents, covering all three sub-scenarios in one process. The Key Notes for Fixed Wireless provide the interpretive criteria the agent applies over live counters (Slides 15-17).	For Option A: The System continuously monitors Service KPIs (throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and detects performance degradation, outage or anomalies without human intervention. For Option B: The System monitors Service KPIs and detects performance degradation, outage or anomalies based on predefined rules	Confirmed at Option A. Detection runs autonomously via the reasoning agent over the data lake, with no human in the loop.

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Capability Area	Capability	Score Claimed	Score Validated	Provided Evidence	TMF (GB1503A) requirements	Questions
Awareness	Service Performance degradation Prediction	A	**A**	A self-learning framework runs a CAT-Boost classifier plus an ensemble auto-selected by RMSE / MAE, retrained on the full dataset, used to flag degradation risk about one hour before a throughput threshold is breached, without human intervention. Triple Exponential Smoothing acts as the classical fallback (Slides 18-19).	For Option A: The System uses self-learning AI Models to analyze Service KPIs and predicts SLA violations, without human intervention. For Option B: The System uses dynamic rules (context-aware) or ML outputs to analyze Service KPIs and predicts SLA violations and may require human intervention (e.g. for model re-training).	Confirmed at Option A. Genuinely self-learning forecasting with automated model selection and retraining.

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Capability Area	Capability	Score Claimed	Score Validated	Provided Evidence	TMF (GB1503A) requirements	Questions
Analysis	Service Performance degradation Impact Analysis	A	**A**	The Expertise / Reasoning Impact-Analysis agent autonomously quantifies service impact from detected and predicted degradation, current and historical KPIs and the product knowledge base (the ml-agent Ericsson documentation corpus), producing per-cell impact labels (thp / interference / pktloss performance). No human confirmation in the flow; the thresholds in the Summary Table are illustrative within the agent's reasoning (Slides 20-21).	For Option A: The System identifies and analyzes the impact of Service degradation using self-learning AI Models without human intervention. For Option B: The System identifies and analyzes the impact of Service degradation using dynamic rules (context-aware) or ML Outputs and may require human confirmation to proceed.	Confirmed at Option A. An AI reasoning agent over a product knowledge base and ML prediction data, operating without human confirmation in a zero-touch loop.

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Capability Area	Capability	Score Claimed	Score Validated	Provided Evidence	TMF (GB1503A) requirements	Questions
Analysis	Service Performance degradation Demarcation & Root Cause Analysis	A	**A**	The Expertise / Reasoning Fault-Analysis agent isolates root cause across domains (external interference, atmospheric ducting, mobility, hardware) using KPI, configuration, inventory and alarm data plus the product knowledge base, producing a per-cell ducting_status determination. The Demarcation Criteria sit inside the agent's RCA processing logs and cite knowledge-base sources; no human confirmation (Slides 22-23).	For Option A: The System isolates and analyzes the root causes of Service degradation by evaluating contributing factors within or across network domains using self-learning AI Models, without human intervention. For Option B: The System isolates and analyzes the root cause of Service degradation using Dynamic Rules (context-aware) or ML Outputs and may require human intervention.	Confirmed at Option A. The agent evaluates contributing factors across network domains and derives a per-cell root-cause output, matching the Option A description.

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Capability Area	Capability	Score Claimed	Score Validated	Provided Evidence	TMF (GB1503A) requirements	Questions
Analysis	Solution Generation	A	**A**	The Synthesize agent autonomously generates optimal mitigation solutions from RCA results, performance prediction (CAT-Boost), cell configuration, historical KPI and the product knowledge base, producing per-cell staged mitigation actions (mitigation_action_1-5) that vary by cell. No manual intervention in the flow (Slides 24-25).	For Option A: The System generates corrective actions (towards specific user group, service type and Apps) to address Service degradation and continuously learns from past resolutions using AI Models, without human intervention. For Option B: The System generates corrective actions using dynamic rules (context-aware) or ML Outputs and may require human confirmation.	Confirmed at Option A. Solutions are synthesised per cell from RCA, prediction and historical inputs, not a single static playbook applied uniformly.

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Capability Area	Capability	Score Claimed	Score Validated	Provided Evidence	TMF (GB1503A) requirements	Questions
Decision	Solution Evaluation & Decision making	A	**A**	The Evaluation agent autonomously evaluates multiple solution options with a documented risk / trade-off chain (symptom to causal chain to validation to fix to expected outcome), drawing on historical mitigation and rollback data (mitigation_apply_celldata_history and rollback_history). It selects the network-appropriate action, classifies the sub-scenario and notifies the external ticketing system, with no human approval in the flow (Slides 26-29).	For Option A: The System evaluates multiple remediation options, analyzes risk and trade-offs, and selects the optimal solution using self-learning AI Models, without requiring human decision-making. For Option B: The System evaluates remediation options, recommends the optimal solution to be executed using Dynamic rules (context-aware) or ML Outputs and may require human approval.	Confirmed at Option A (highest-weighted capability, 20%). Multi-option evaluation with risk / trade-off analysis and history-informed selection, executed without human decision-making..

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Capability Area	Capability	Score Claimed	Score Validated	Provided Evidence	TMF (GB1503A) requirements	Questions
Execution	Solution Implementation	A	**A**	The Scripting agent auto-generates Ericsson CLI from production knowledge (CPI) and exports the command file to ENM for execution; a closed loop triggers fallback / rollback on execution failure or when interference is no longer detected, without human intervention. Auto-feedback and rollback evidence confirm the closed loop (Slides 30-32).	For Option A: The System implements the selected corrective action and triggers fallback mechanisms in case of failure, without human intervention. For Option B: The System applies corrective action and fallback mechanisms using pre-defined rules, based on human approval	Confirmed at Option A. Autonomous execution with automated fallback / rollback and no human approval in the flow.

NBN Australia Response:

Thank you

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Service Assurance

Individual Service - Throughput Performance Management System (TPMS)

AI-driven closed-loop service assurance for Australia's NBN Co. Fixed Wireless network

Background

Service Assurance is for Australia's NBN Co.'s Fixed Wireless Network

- End-user throughput demands have increased significantly, requiring more complex networks.
- Traditional service assurance models are reactive and labour-intensive.
- AI enables intent-based automation, predictive analysis, and automatic closed-loop control.
- The TPMS solution introduces Intent-Based Operations (IBO), aligned with TM Forum's AI-driven closed-loop automation principles

Solution Scope Description

Deployment context:

- The solution is deployed in the NBN Co.'s Fixed Wireless (FW) network, which operates as a Non-Standalone (NSA) 4G/5G TDD network delivering fixed-wireless data and voice services across a continent-scale network spanning regional and rural Australia.

Network architecture and current operation:

- The network is currently anchored in the 4G LTE TDD layer, with 5G deployed selectively in high-demand areas to enhance throughput. Approximately 5% of cells are currently 5G-enabled.

Evolution capability and roadmap alignment:

- The solution supports both 4G and 5G and is designed to enable a seamless migration from NSA to Standalone (SA), in line with NBN Co.'s planned transition by 2028.

Measurement scope and evidence basis:

- As users are anchored on the 4G network and 5G coverage remains limited, all performance and user experience measurements—and the supporting evidence presented—are based on the 4G network.

Solution Highlights

- **Zero-touch operations (closed-loop):** Continuous AI-driven monitoring and analytics
- **AI-driven root cause analysis (RCA):** Identifies impacted resources and underlying faults
- **Autonomous policy-driven execution:** Recommends and executes corrective actions without manual intervention
- **Closed-loop assurance and observability:** Provides multi-layer visibility of intent fulfilment through network health, cell-level mitigation (tabular), and geospatial visualisation dashboards

Key Benefits

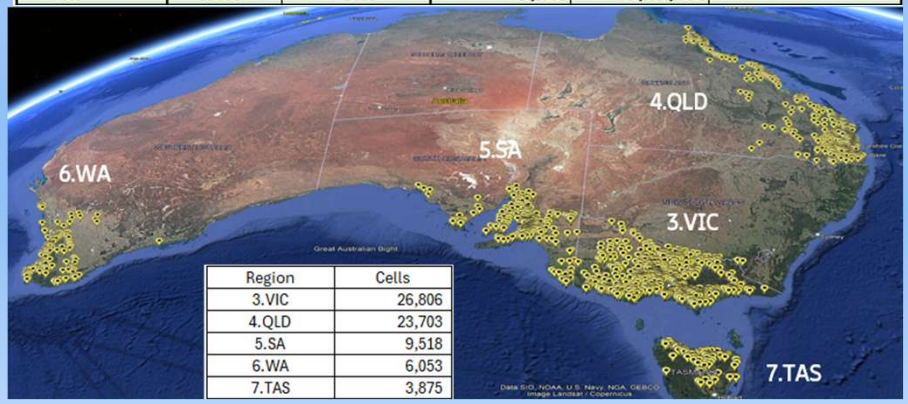
Key Benefits

- **Improved customer experience:** Sustained uplift in service performance through proactive issue mitigation
- **Reduced operational effort:** Enables zero-touch operations, minimising manual intervention
- **Faster issue resolution:** Accelerates detection, analysis, and correction of network faults
- **Enhanced operational transparency:** Provides end-to-end visibility of network health and mitigation outcomes

Measured Impact

- **~200M traffic minutes annually (increasing, based on EoCY run-rate)**
- Deployment across VIC, QLD, SA, WA and TAS

year_month	Total number of impacted cells	Total number of mitigation applied cells	Total number of benifitted AVCs	Total rescued AVC_minutes	Total Rescued AVC_Minutes per year
2024				Subtotal	198,851,836
Jan	36294	7838	117,081	53,112,205	
Feb	49724	10959	169,974	72,425,893	
Mar	46588	6375	96,405	41,608,401	
Apr	18560	1906	25,619	9,221,505	
May	24918	1953	22,598	6,155,432	
Jun	5291	435	5,876	1,730,231	
Jul	11214	699	2,956	1,122,097	
Oct	14395	1228	4,164	4,894,993	
Nov	12541	1160	3,371	4,280,953	
Dec	46380	4923	11,123	4,300,127	
2025				Subtotal	172,291,383
Jan	67778	6290	13,814	14,590,750	
Feb	43862	3488	8,584	9,063,065	
Mar	84967	8087	19,980	19,183,698	
Apr	38461	2232	5,784	4,738,783	
May	45979	3643	9,078	5,845,879	
Jun	21844	861	4,022	4,080,475	
Jul	28867	1427	14,076	10,491,104	
Aug	44293	2494	24,456	20,150,476	
Sep	46578	3377	32,578	25,249,172	
Oct	78597	7636	75,420	58,897,981	



Region	Cells
3.VIC	26,806
4.QLD	23,703
5.SA	9,518
6.WA	6,053
7.TAS	3,875

Sub-scenarios: Ticket generation evidence and traceability (summary)

Summarized historical Ticket data – **4G network**

Date from 01-Jan-2026 to 31-Mar-2026

Sub Scenarios	Ticket Type	# Of Cells	Sub Scenario Total	% of Total	% Fixed by TPMS
Service Anomaly & Stability	Service Anomaly	6,152	6,749	17.6%	89%
	HW Issue	597			
Performance	Performance - Degradation	13,474	17,032	44.4%	
	Performance -Step Change	3,558			
Experience	Experience -Low Throughput	14,619	14,619	38.1%	
		Total	38,400		

Percentage of faults detected and fixed by the system

Summarized historical Ticket data – **5G network**

Date from 01-Jan-2026 to 31-Mar-2026

Sub Scenarios	Ticket Type	# Of Cells
Service Anomaly & Stability	Service Degradation	15
		30
		7
	HW Issue	2
		19
	Total	73

Majority of impacted cells are from 4G network, 5G network contribution is insignificant:
73 vs 38,400

Source data from the system used to generate the summary tables (left).

Data extracted from the output database and used to automatically create Trouble Tickets (TTs) in the external Ticketing system.

The last column shows fault sub-scenarios. See Slide 7 for 4G TT examples.

eutrancelltdd character varying (50)	started_time timestamp without time zone	ticket_status character varying (20)	notification_id integer	notified_time timestamp without time zone	TT_Type character varying
[redacted]	2026-02-18 17:00:00	open	[redacted]	2026-02-19 00:50:12.41257	HW Issue
	2026-02-18 17:00:00	open		2026-02-19 00:50:12.41257	HW Issue
	2026-02-18 19:00:00	open		2026-02-19 00:50:12.41257	Experience -Low Throughput
	2026-02-18 19:45:00	open		2026-02-19 00:50:12.41257	Experience -Low Throughput
	2026-02-18 19:45:00	open		2026-02-19 00:50:12.41257	Experience -Low Throughput
	2026-02-18 19:00:00	open		2026-02-19 00:50:12.41257	Performance - Degradation
	2026-02-18 19:00:00	open		2026-02-19 00:50:12.41257	Experience -Low Throughput
	2026-02-18 19:00:00	open		2026-02-19 00:50:12.41257	Experience -Low Throughput
	2026-02-18 20:00:00	open		2026-02-19 00:50:12.41257	Performance - Degradation
	2026-02-18 19:15:00	open		2026-02-19 00:50:12.41257	Performance - Degradation
	2026-02-18 19:00:00	open		2026-02-19 00:50:12.41257	Performance - Degradation
	2026-02-18 19:15:00	open		2026-02-19 00:50:12.41257	Performance - Degradation
	2026-02-18 19:45:00	open		2026-02-19 00:50:12.41257	Performance - Degradation
	2026-02-18 19:15:00	open		2026-02-19 00:50:12.41257	Performance - Degradation
	2026-02-18 19:15:00	open		2026-02-19 00:50:12.41257	Performance - Degradation
	2026-02-18 19:15:00	open		2026-02-19 00:50:12.41257	Performance - Degradation
	2026-02-18 19:45:00	open		2026-02-19 00:50:12.41257	Performance - Degradation
	2026-02-18 19:45:00	open		2026-02-19 00:50:12.41257	Performance - Degradation
	2026-02-18 19:00:00	open		2026-02-19 00:50:12.41257	Perfprmance -Step Change
	2026-02-18 19:15:00	open		2026-02-19 00:50:12.41257	Experience -Low Throughput
	2026-02-18 19:15:00	open		2026-02-19 00:50:12.41257	Perfprmance -Step Change
	2026-02-18 19:15:00	open		2026-02-19 00:50:12.41257	Perfprmance -Step Change
	2026-02-18 19:45:00	open		2026-02-19 00:50:12.41257	Experience -Low Throughput
	2026-02-18 19:45:00	open		2026-02-19 00:50:12.41257	Experience -Low Throughput
	2026-02-18 19:00:00	open		2026-02-19 00:50:12.41257	Experience -Low Throughput
	2026-02-18 19:15:00	open		2026-02-19 00:50:12.41257	Experience -Low Throughput
	2026-02-18 19:15:00	open		2026-02-19 00:50:12.41257	Perfprmance -Step Change
	2026-02-18 19:00:00	open		2026-02-19 00:50:12.41257	Service Anomaly
	2026-02-18 11:45:00	open		2026-02-19 00:50:12.41257	Experience -Low Throughput
	2026-02-18 20:00:00	open		2026-02-19 00:50:12.41257	Performance - Degradation

Sub-scenarios: Ticket generation evidence and traceability

System Notifications (Alarms)
Network elements (eNB/gNB) generate alarms when faults or performance issues occur

→

Automatic Ticket Creation
Alarms are processed and trigger ticket creation in the external system

→

Ticket Traceability
Tickets are linked to the impacted cell for end-to-end traceability

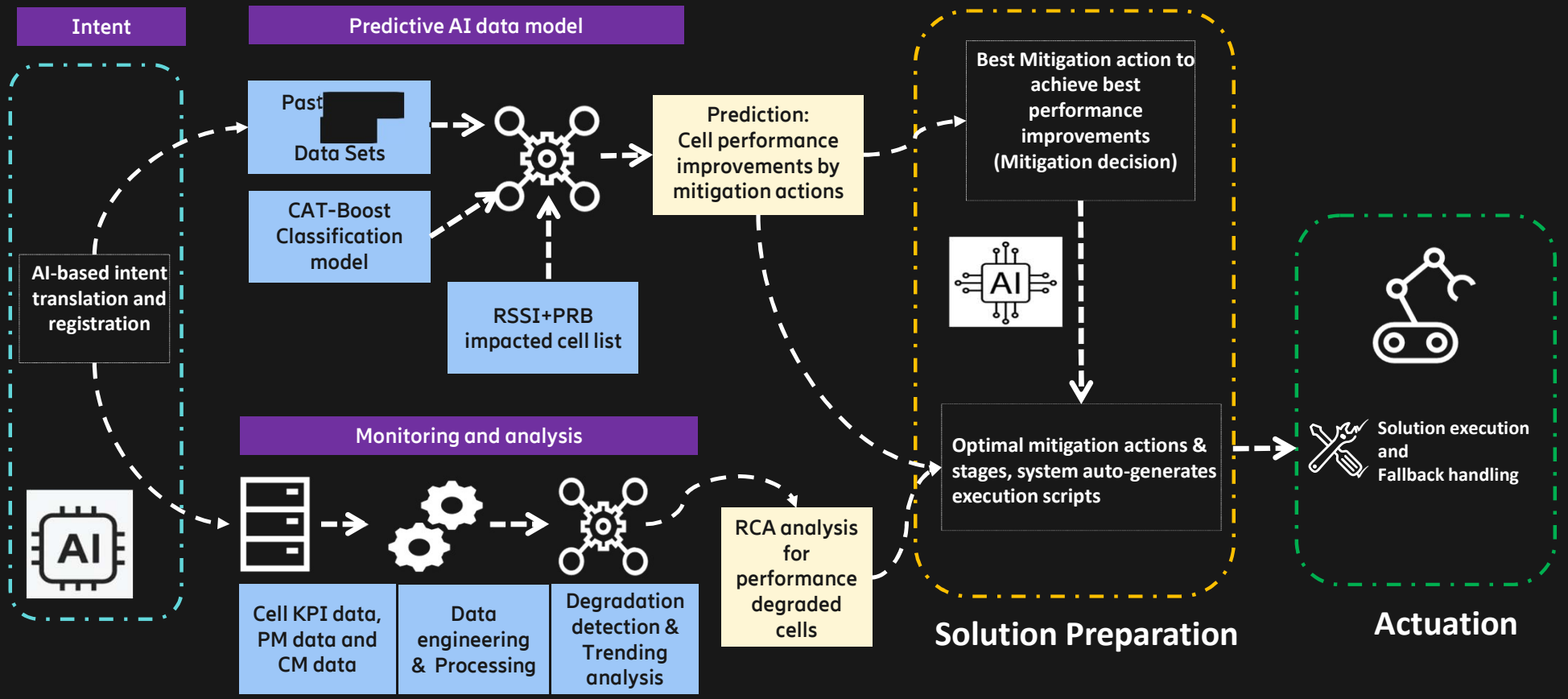
customer_n character va	incident_number [PK] character varying (1	status character va	network_element_type character varying	node_ci character varying	closed_date timestamp without time zone	description text	resolution_category_ character varying (1(	resolution_category character varying	notification_id text
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-18 11:51:27	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	[redacted]
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-18 13:21:14	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-18 15:21:22	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	WReNB5[redacted]	2026-02-18 15:54:09	NWAS || Loss of link to [redacted]	Resolved	Power Issue Fixed	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	WReNB4[redacted]	2026-02-18 16:00:14	NWAS || Loss of link to [redacted]	Resolved	Power Issue Fixed	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	WReNB2[redacted]	2026-02-18 17:16:45	NWAS || Loss of service to 9 Cells for [redacted]	Resolved	Hardware Replaced	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-18 17:21:32	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-18 17:22:36	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-19 01:21:50	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-19 01:22:49	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-19 01:51:51	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-19 02:21:34	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-19 04:51:47	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	WReNB20[redacted]	2026-02-19 06:04:01	NWAS || Loss of service to Cell[redacted]	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	WReNB40[redacted]	2026-02-19 06:23:16	NWAS || Loss of service to 3 Cells for[redacted]	Resolved	Reconfiguration/data fix	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-19 07:22:02	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-19 07:51:53	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-19 09:52:09	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	WReNB80[redacted]	2026-02-19 11:56:46	NWAS || Loss of service to [redacted]	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-19 12:21:41	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-19 12:22:50	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-19 12:23:32	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-19 13:51:22	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-19 13:52:21	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-19 14:21:46	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	Multiple	2026-02-19 14:55:36	NAR || NWAS || Thermal Ducting Mitigation || Notif ID: 7...	Resolved	Remote Mitigation	
NBN-AU	INC00009[redacted]	Closed	eNode B - Ericsson	WReNB30[redacted]	2026-02-19 15:24:14	NWAS || Loss of service to 12 Cells for[redacted]	Resolved	Hardware Replaced	

TPMS (automated remediation)

Field intervention (truck roll)

Our solution

Performance degradation is mitigated by Predictive AI-based Solution TPMS



Assessment Methodology

- Assessed using the **TM Forum GB1503A Service Assurance Questionnaire (Individual Services)**
- Evaluation performed across defined sub-scenarios (introduced in slide 6): **Service Anomaly & Stability, Performance and Experience**
- Each sub-scenario is evaluated against **closed-loop automation criteria**

Cognitive Activity	Service Capability	Weight	Questions	Option A	Option B	Option C	Option D	Industry Standard Reference	Sub-scenarios		
									Anomaly & Stability	Performance	Experience
									20%	40%	40%
Intent	Intent Translation & Fulfilment	10%	How does the System translate Service intents (e.g., throughput, latency, availability) into network actions and evaluate their fulfillment?	The System automatically generates Service Assurance objectives (e.g., throughput targets, latency bounds) and policy actions based on Service intents, entered/updated by Person. The System evaluates and presents intent fulfillment based on implementation effect, and informs if intent is not fulfilled.	The System processes Intent using predefined rules and policies. Intent fulfillment evaluation is manually validated.	The System processes Intent using templates and guided workflows. Intent fulfillment evaluation is manually validated.	Intent configuration and evaluation are entirely manual and based on human expertise.	3GPP TS 28.100 7.1.1 Intent handling: -Task A: control information generation and determination. -Task B: intent fulfilment evaluation.	A	A	A
Awareness	Service Performance Monitoring & degradation/outage detection	10%	How does the System monitor Service KPIs (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and detect performance degradation, outage or anomalies?	The System continuously monitors Service KPIs (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and detect performance degradation, outage or anomalies without human intervention.	The System continuously monitors Service KPIs (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and detect performance degradation, outage or anomalies based on predefined rules	Performance monitoring, Service degradation and anomaly / outage detection are determined based on human expertise		3GPP TS 28.100 7.1.1 Awareness: -Task C: information collection.	A	A	A
Awareness	Service Performance degradation Prediction	10%	How does the System predict Service degradation (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and SLA violation ?	The System uses self-learning AI Models to analyze Service KPIs (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and predicts SLA violations, without human intervention	The System uses dynamic rules (context-aware) or ML outputs to analyze Service KPIs (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and predicts SLA violations and may require human intervention (e.g. for	The System predicts SLA violations based on pre-defined rules.	SLA violation is manually detected and addressed based on performance reports.	3GPP TS 28.100 7.1.1 Analysis: -Task D: issues identification. -Task E: deterioration prediction.	A	A	A
Analysis	Service Degradation Impact Analysis	10%	How does the System identify and analyze the impact of Service degradation (e.g., throughput, latency, stability issues, experience deterioration,VoLTE/VoNR call drop rate) on user experience or SLA compliance?	The System identifies and analyzes the impact of Service degradation (e.g., throughput, latency, stability issues, experience deterioration, VoLTE/VoNR call drop rate) using self-learning AI Models without human intervention.	The System identifies and analyzes the impact of Service degradation (e.g., throughput, latency, stability issues, experience deterioration, VoLTE/VoNR call drop rate) using dynamic rules (context-aware) or ML Outputs and may require human confirmation to proceed	The System identifies & analyzes impact of Service degradation, based on predefined rules	Impact of degradation is determined based on human expertise.	3GPP TS 28.100 7.1.1 Analysis: -Task F: Network issue demarcation. The tasks of analyze the network issue and determine the network issue categories (e.g. weak coverage, high load, low throughput)	A	A	A
Analysis	Service Degradation Demarcation & Root Cause Analysis	15%	How does the System isolate the root causes of Service degradation by analyzing contributing factors within or across network domains (e.g., RAN, transport, core), covering performance, stability, and experience-related issues?	The System isolates and analyzes the root causes of Service degradation by evaluating contributing factors within or across network domains using self learning AI Models, without human intervention.	The System isolates and analyzes the root cause of Service degradation using Dynamic Rules (context-aware) or ML Outputs and may require human intervention	The System isolates & analyzes performance degradation Root Cause, based on predefined rules	Performance data and alarms are manually analyzed to determine the root cause.	3GPP TS 28.100 7.1.1 Analysis: -Task F: Network issue demarcation. The tasks of analyze the network issue and determine the network issue categories (e.g. weak coverage, high load, low	A	A	A
Analysis	Solution Generation	15%	How does the System generate solutions to address Service degradation (performance, stability, or experience) based on root cause analysis?	actions (towards specific user group, service type and Apps) to address Service degradation and continuously learns from past resolutions using AI Models, without human intervention.	The System generates corrective actions using dynamic rules (context-aware) or ML Outputs and may require human confirmation	The System suggests corrective actions based on pre-defined rules.	Solutions are manually created based on human expertise	3GPP TS 28.100 7.1.1 Analysis: -Task H: solutions analysis.	A	A	A
Decision	Solution Evaluation & Decision making	20%	How does the System evaluate solutions and decide on the optimal solution to implement ?	The System evaluates multiple remediation options, analyzes risk and trade-offs, and selects the optimal solution using self learning AI Models, without requiring human decision-making.	The System evaluates remediation options, recommends the optimal solution to be executed using Dynamic rules (context-aware) or ML Outputs and may require human approval	The System evaluates remediation options, recommends the optimal solution to be executed based on pre-defined rules. Option selection is made by Human	Remediation options, risk assessment and selection of appropriate solutions are manually done	3GPP TS 28.100 7.1.1 Decision: -Task I: solutions evaluation and determination.	A	A	A
Execution	Solution Implementation	10%	How does the System implement solution and apply fallback mechanisms in case of solution failure?	The System implements the selected corrective action and triggers fallback mechanisms in case of failure, without human intervention	The System applies corrective action and fallback mechanisms using pre-defined rules, based on human approval.	Implementation and fallback handling of the corrective action are manually executed		3GPP TS 28.100 7.1.1 Execution: -Task J: solutions execution.	A	A	A

Scoring

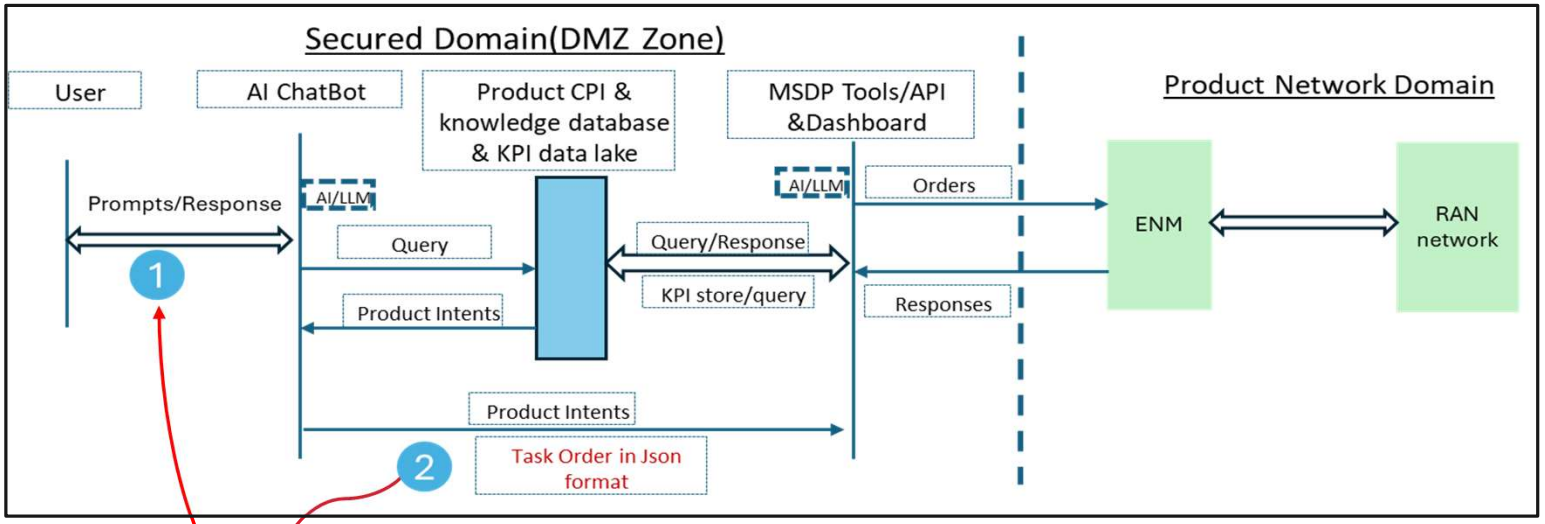
- The TPMS solution achieves **Level 4 (High Automation)** maturity under the TM Forum Autonomous Networks model
- Consistent capability is demonstrated across all sub-scenarios: **Service Anomaly & Stability, Performance, and Experience**
- The solution delivers **end-to-end closed-loop automation**, with AI-driven analysis, decision-making, and execution

Process Flow	Cognitive Activity	Service Capability	Weight	Question	Method: Average																	
					Criteria				Answer			Anomaly & Stability 20%			Performance 40%			Experience 40%			Final Score
					Option A	Option B	Option C	Option D	Anomaly & Stability	Performance	Experience	Original score	Compensated score	Overall Score	Original score	Compensated score	Overall Score	Original score	Compensated score	Overall Score	
Service Assurance	Intent	Intent Translation & Fulfilment	10%	How does the System translate Service intents (e.g., throughput, latency, availability) into network actions and evaluate their fulfillment?	4	3	2	1	A	A	A	4	4	4.00	4	4	4.00	4	4	4.00	4.00
	Awareness	Service Performance Monitoring & degradation/outage detection	10%	How does the System monitor Service KPIs (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and detect performance degradation, outage or anomalies?	3	2	1	0	A	A	A	3	4		3	4		3	4		
		Service Performance degradation Prediction	10%	How does the System predict Service degradation (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and SLA violation ?	4	3	2	1	A	A	A	4	4		4	4		4	4		
	Analysis	Service Degradation Impact Analysis	10%	How does the System identify and analyze the impact of Service degradation (e.g., throughput, latency, stability issues, experience deterioration,VoLTE/VoNR call drop rate) on user experience or SLA compliance?	4	3	2	1	A	A	A	4	4		4	4		4	4		
		Service Degradation Demarcation & Root Cause Analysis	15%	How does the System isolate the root causes of Service degradation by analyzing contributing factors within or across network domains (e.g., RAN, transport, core), covering performance, stability, and experience-related issues?	4	3	2	1	A	A	A	4	4		4	4		4	4		
		Solution Generation	15%	How does the System generate solutions to address Service degradation (performance, stability, or experience) based on root cause analysis?	4	3	2	1	A	A	A	4	4		4	4		4	4		
	Decision	Solution Evaluation & Decision making	20%	How does the System evaluate solutions and decide on the optimal solution to implement ?	4	3	2	1	A	A	A	4	4		4	4		4	4		
	Execution	Solution Implementation	10%	How does the System implement solution and apply fallback mechanisms in case of solution failure?	2	1	0	0	A	A	A	2	4		2	4		2	4		

1. Intent Translation (Overview)

Cognitive Activity	Service Capability	Weight	Questions	Option A	Option B	Sub-scenarios		
						Anomaly & Stability	Performance	Experience
						20%	40%	40%
Intent	Intent Translation & Fulfilment	10%	How does the System translate Service intents (e.g., throughput, latency, availability) into network actions and evaluate their fulfillment?	The System automatically generates Service Assurance objectives (e.g., throughput targets, latency bounds) and policy actions based on Service intents, entered/updated by Person. The System evaluates and presents intent fulfillment based on implementation effect, and informs if intent is not fulfilled.	The System processes Intent using predefined rules and policies. Intent fulfillment evaluation is manually validated.	A	A	A

Intent input, translation and process sequence



Intent translation has actions:

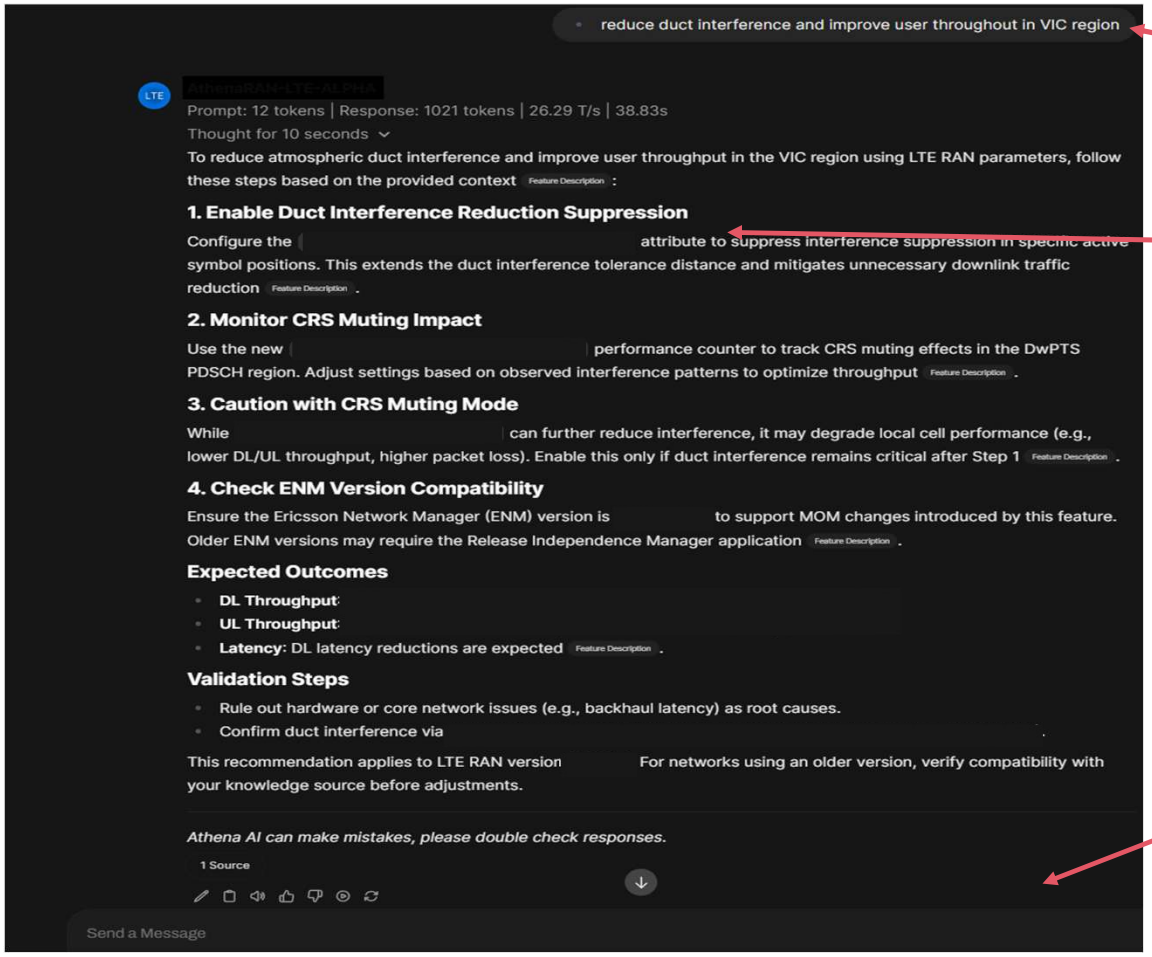
1) AI chatbot captures user intent and generates actionable steps. Evidence in slide 12
2) AI/LLM queries the knowledge base to generate executable task orders. Evidence in slide 13

MSDP: Ericsson Managed Services Delivery Platform

1.1 Intent Translation

Evidence of Intent Translation

User enters the Intent to the TPMS and it generates actionable steps via AI/LLM



Step 1: Intent Input through AI chatbot,

Step 2: AI generates actionable steps using the knowledge base

Further prompts can be added in the chatbot box (if required)

1.2 Intent Translation (Detailed Evidence)

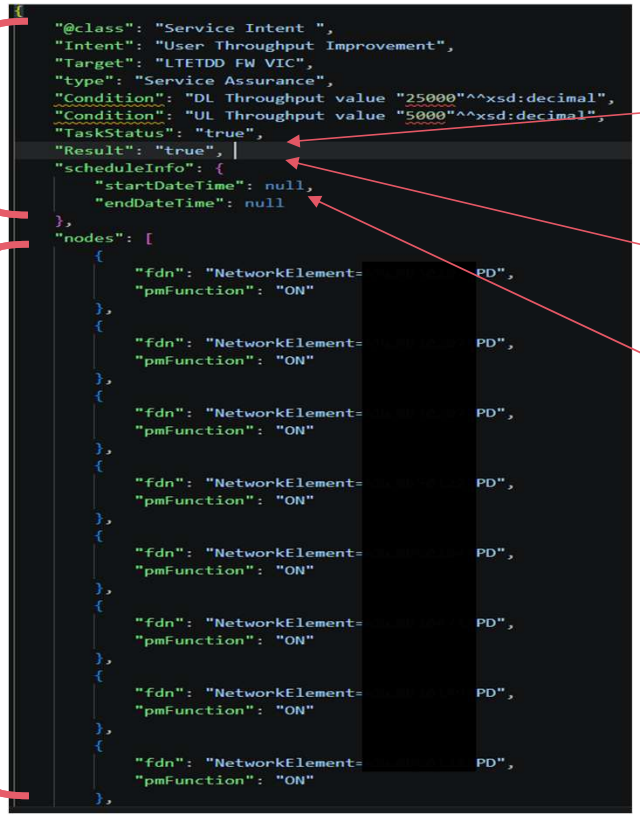
Intent Translation: AI/LLM converts intent into executable task orders using the knowledge base. The screenshot below shows an example of a task order used in the TPMS

Evidence of Intent Translation

ERICSSON

Order file header contains: Intent, Target, Conditions, policy settings, Schedule period etc.

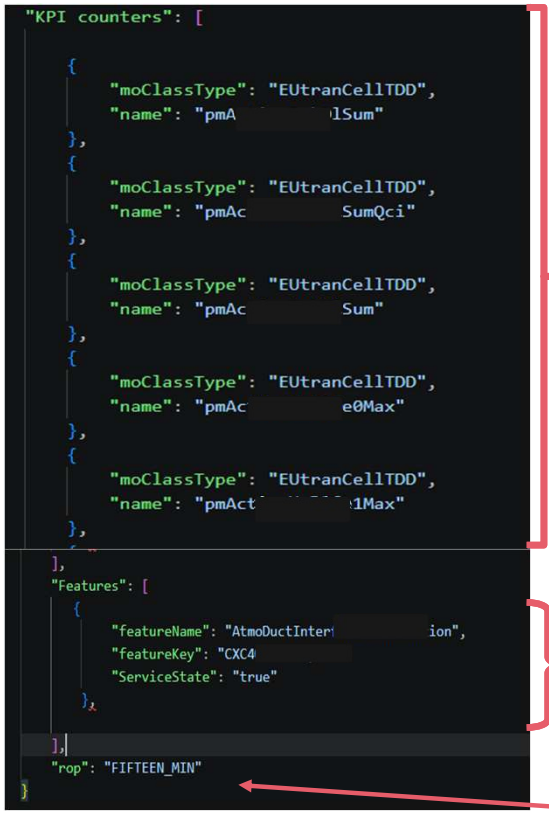
Node name in target area



True: request to provide task status feedback upon execution from next AI agent

True: provides feedback from task outcome

null: no defined time frame, task will run continuously.



Required KPI and Counters

Feature and parameter setting

Parameter for data collection frequency

1.3 Intent Fulfilment Evidence

Evidence of Intent Fulfilment

ERICSSON

A) Intent Registration & task status progress

intent_id integer	intent_type character varying (50)	intent_description character varying (100)	intent_scope character varying (50)	enobeb_number_i integer	cell_number_inscope integer	start_timestamp timestamp without time zone	job_status text	mitigation_applied_cell_number integer	mitigation_failure_cel integer	updated_time timestamp withou	intent_owner character vary
238	Service Assurance- UE throughput	reduce number of cell throughput break SLA	FW LTE TDD RAN Network-VIC	2330	26439	2026-03-23 15:08:11.860634	in_progress	135	0	2026-03-24 01:...	etcyagq

RED flag indicates the site has implemented a mitigation solution

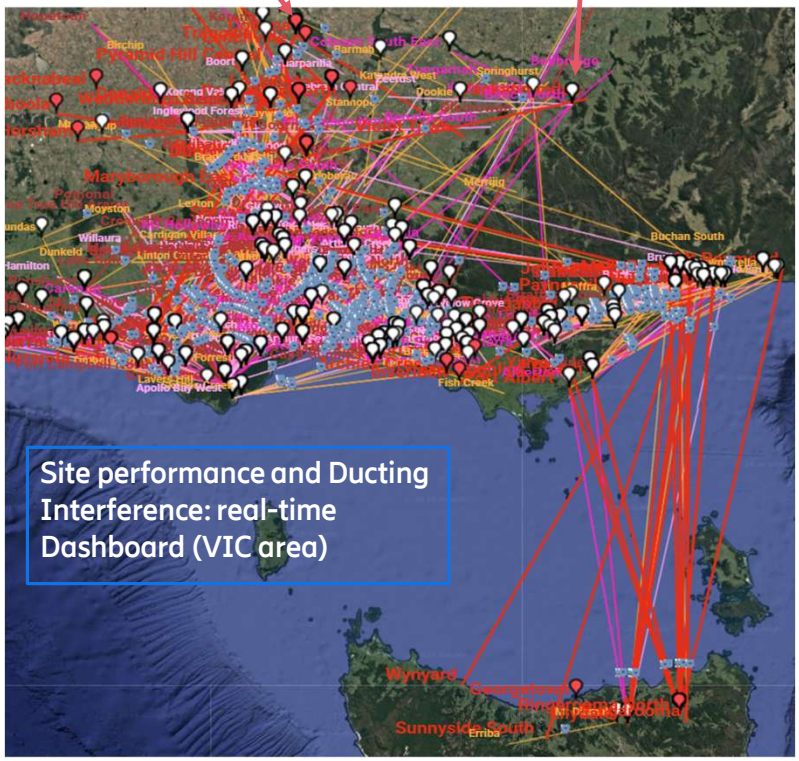
WHITE flag indicates the sites are under monitoring with no mitigation applied yet.

UE throughput improvements after the solution is implemented

B) Result Feedback

Percentage of UE throughput improvement for each target cell

eutrancelltdd character varying (50)	uethpdl_15min numeric (12,3)	uethpdl_2hrs numeric (12,3)	uethpdl_4hrs numeric (12,3)	mitigation_cell_status character varying (50)	mitigation_implementation_statu character varying (50)	improvement(%) numeric
[redacted]0-12	128231.430	79678.298	84503.324	monitoring_stage_0	completed	60.0
0-14	88442.920	69893.451	80335.958	monitoring_stage_0	completed	20.0
0-03	47175.870	42069.550	42269.428	monitoring_stage_1	completed	10.0
1-07	65000.000	50978.467	72138.475	monitoring_stage_0	completed	20.0
00-29	70666.670	49309.573	63984.521	monitoring_stage_0	completed	40.0
10-30	106059.700	101177.203	96276.475	monitoring_stage_0	completed	0.0
-00-01	121498.590	93931.879	59168.210	monitoring_stage_1	completed	40.0
-00-01	121498.590	93931.879	59168.210	monitoring_stage_1	completed	40.0
01-23	68960.920	49652.836	53515.529	monitoring_stage_0	completed	40.0
11-22	77597.740	49903.348	58005.118	monitoring_stage_0	completed	50.0
11-24	59376.710	47080.395	48117.193	monitoring_stage_0	completed	30.0
-00-14	73876.980	45927.621	45884.253	monitoring_stage_0	completed	60.0
-10-17	68206.750	62234.891	60342.531	monitoring_stage_0	completed	10.0
00-08	83098.190	69497.791	71146.009	monitoring_stage_0	completed	20.0
00-08	83098.190	69497.791	71146.009	monitoring_stage_0	completed	20.0
-00-28	95740.030	53798.631	61185.450	monitoring_stage_0	completed	70.0
-01-26	138491.910	77659.554	67889.853	monitoring_stage_0	completed	80.0
-10-29	67118.140	37552.606	41163.584	monitoring_stage_0	completed	80.0
-10-16	100495.030	26815.260	42719.990	monitoring_stage_0	completed	210.0
-10-11	113635.970	80761.537	87894.818	monitoring_stage_0	completed	40.0
11-08	69141.630	51918.433	50704.042	monitoring_stage_0	completed	30.0
R-00-24	125559.120	80277.678	90281.435	monitoring_stage_0	completed	50.0
R-10-25	98662.990	61403.286	71100.339	monitoring_stage_0	completed	60.0
R-10-26	123861.620	81467.421	81962.394	monitoring_stage_0	completed	50.0
-00-05	69828.050	33032.933	32976.669	monitoring_stage_0	completed	110.0
-10-06	62338.490	51799.904	45653.085	monitoring_stage_0	completed	20.0
-00-01	90071.790	78031.760	83652.270	monitoring_stage_0	completed	10.0
-00-01	90071.790	78031.760	83652.270	monitoring_stage_0	completed	10.0
-10-15	115319.670	93187.664	94618.424	monitoring_stage_0	completed	20.0



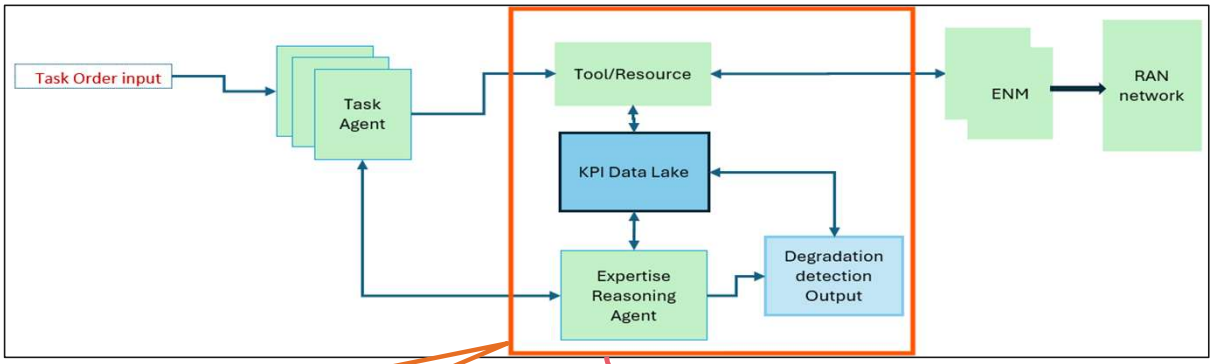
TPMS registration database contains intent details for each target cell

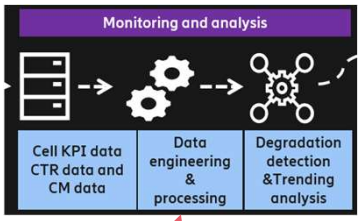
2.1 Awareness - Service Performance Monitoring & Degradation Detection

Cognitive Activity	Service Capability	Weight	Questions	Option A	Option B	Sub-scenarios		
						Anomaly & Stability	Performance	Experience
						20%	40%	40%
Awareness	Service Performance Monitoring & degradation/outage detection	10%	How does the System monitor Service KPIs (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and detect performance degradation, outage or anomalies?	The System continuously monitors Service KPIs (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and detect performance degradation, outage or anomalies without human	The System continuously monitors Service KPIs (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and detect performance degradation, outage or anomalies based on predefined rules	A	A	A

Service performance monitoring and degradation detection workflow covers all sub-scenarios:

- Task Agent receives the task order and requests KPI/counter collection from the production network, storing data in the data lake
- At the same time, the Task Agent instructs the Expertise/Reasoning Agent to monitor KPIs and detect degradation based on the task order
- Detected degradation results are stored in the data lake (evidence in Slide 16)





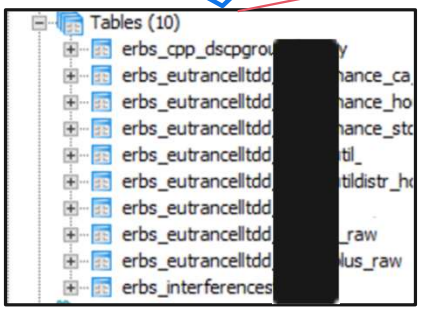
The red box highlights:
1. Data collection
2. Data engineering
3. Performance monitoring and degradation analysis

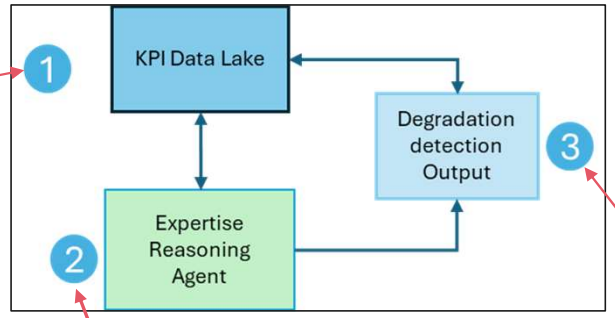
2.2 Awareness - Service Performance Degradation Detection (Cont.)

The agent uses a self-learning model and requires database credentials and location details.
The following evidence shows how the Expertise/Reasoning agent operates:

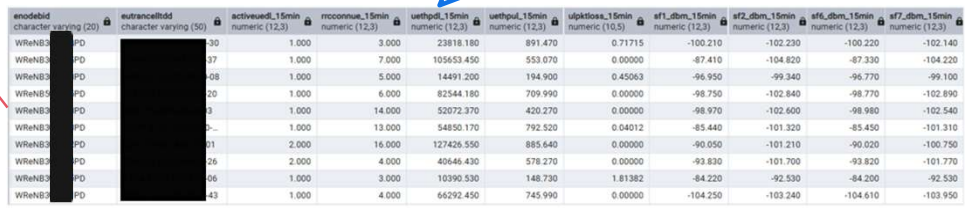
- Evidence 1: database tables used by the agent
- Evidence 2: Performance monitoring logs generated by the agent
- Evidence 3: Degradation detection results stored in the data lake, covering all three sub-scenarios in the same process

Evidence 1: Database tables used by Agent





Evidence 3: Degradation detection outcomes in data lake



enodebid character varying (20)	eutrancelltdd character varying (50)	activeuedl_15min numeric (12,3)	rrcconnue_15min numeric (12,3)	uethpdl_15min numeric (12,3)	uethpul_15min numeric (12,3)	ulpktloss_15min numeric (10,5)	sf1_dbm_15min numeric (12,3)	sf2_dbm_15min numeric (12,3)	sf6_dbm_15min numeric (12,3)	sf7_dbm_15min numeric (12,3)
WReNB3 PD	-30	1.000	3.000	23818.180	891.470	0.71715	-100.210	-102.230	-100.220	-102.140
WReNB3 PD	-37	1.000	7.000	105653.450	553.070	0.00000	-87.410	-104.820	-87.330	-104.220
WReNB3 PD	-08	1.000	5.000	14491.200	194.900	0.45063	-96.950	-99.340	-96.770	-99.100
WReNB5 PD	-20	1.000	6.000	82544.180	709.990	0.00000	-98.750	-102.840	-98.770	-102.890
WReNB3 PD	-3	1.000	14.000	52072.370	420.270	0.00000	-98.970	-102.600	-98.980	-102.540
WReNB3 PD	-P-	1.000	13.000	54850.170	792.520	0.04012	-85.440	-101.320	-85.450	-101.310
WReNB3 PD	-01	2.000	16.000	127426.550	885.640	0.00000	-90.050	-101.210	-90.020	-100.750
WReNB3 PD	-26	2.000	4.000	40646.430	578.270	0.00000	-93.830	-101.700	-93.820	-101.770
WReNB3 PD	-06	1.000	3.000	10390.530	148.730	1.81382	-84.220	-92.530	-84.200	-92.530
WReNB3 PD	-43	1.000	4.000	66292.450	745.990	0.00000	-104.250	-103.240	-104.610	-103.950

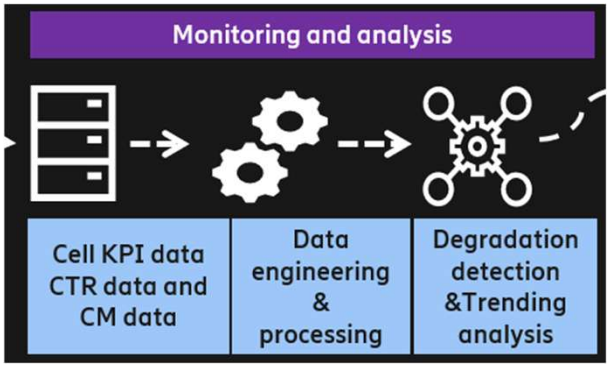
Evidence 2: Agent logs

Key Notes for Fixed Wireless

1. **Connectivity & Reliability:**
   - : Aim for ≥ 95%. Investigate if < 95% (e.g., check RACH configuration like).
   - Ensure E-RAB setup success is ≥ 98% to avoid service drops.
2. **Throughput & QoS:**
   - **Throughput Distribution:** Use to ensure most sessions are in high bins (e.g., ≥ 150 kbps for fixed broadband).
   - **QCI-Specific Metrics:**
     - **VoLTE (QCI1):** Check ≤ 50 ms and for consistent volume.
     - **Data (QCI9):** Verify meets subscriber SLAs.
3. **Signal Quality:**
   - **SINR:** Aim for ≥ -3 dB for 90% of UEs (low SINR clusters ir ndicate interference or coverage gaps).
   - **CQI:** Dominant values ≥ 10 (enables high MCS selection).
4. **Interference Management:**
   - **High** (> -100 dBm) or (> 3 dB) requires ICIC tuning (e.g.,).
5. **Subframe Configuration:**
   - Ensure matches traffic needs (e.g., **2:2 DL/UL ratio** for balanced services). Adjust if UL throughput is constrained.
6. **MIMO Performance:**
   - should show **rank 2/4 dominance** (if 4×4 MIMO is configured) to maximize spatial multiplexing gains.

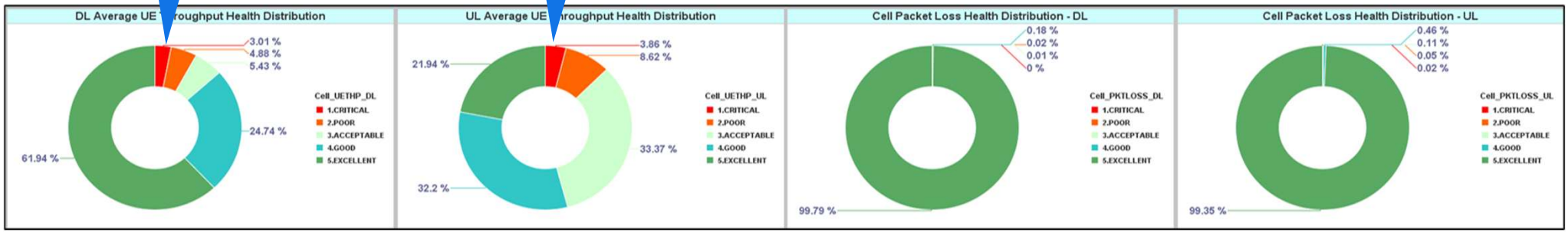
2.3 Awareness - Service Performance Monitoring & degradation Detection (Cont.)

The real-time health dashboard is generated from the Expertise/Reasoning agent's output data (stored in the data lake) and includes data from all three sub-scenarios in a single report



This low-performance area is a TPMS target for improvement

This low-performance area is a TPMS target for improvement



2.4 Awareness - Service Performance degradation Prediction

Cognitive Activity	Service Capability	Weight	Questions	Option A	Option B	Sub-scenarios		
						Anomaly & Stability	Performance	Experience
						20%	40%	40%
Awareness	Service Performance degradation Prediction	10%	How does the System predict Service degradation (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and SLA violation ?	The System uses self-learning AI Models to analyze Service KPIs (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and predicts SLA violations, without human intervention	The System uses dynamic rules (context-aware) or ML outputs to analyze Service KPIs (e.g., throughput, latency, availability, experience KPIs, VoLTE/VoNR call drop rate) and predicts SLA violations and may require human intervention (e.g. for	A	A	A

A self-learning model is integrated in TPMS for performance prediction

Inputs:

- Task order from the task agent
- KPI and historical data
- Product knowledge base

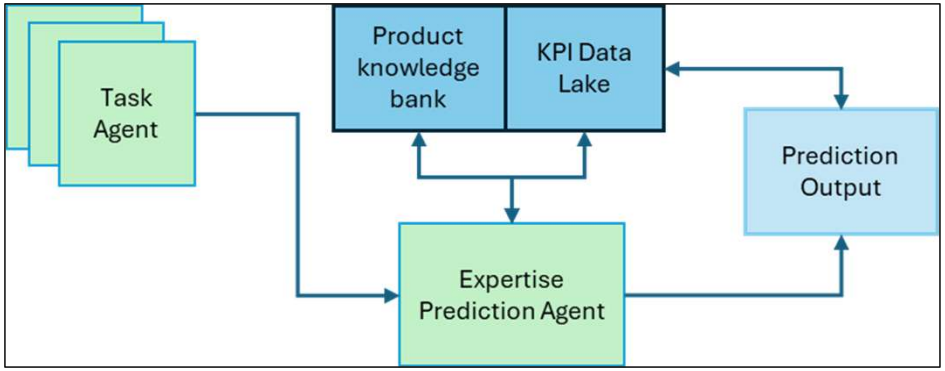
Output:

- Predictive model flags degradation risks one hour before throughput thresholds are breached

- Multiple prediction models are deployed within TPMS's self-learning framework. The best model is selected based on RMSE (Root Mean Square Error) and MAE (Mean Absolute Error). The selected model is then retrained on the full dataset and used for next-hour forecasting.
- The model uses Triple Exponential Smoothing with an additive trend and historical data to capture underlying trends, providing a fast and robust fallback that reduces noise and spikes.

Workflow (see flow diagram below; evidence of data inputs and outputs is provided in Slide 19):

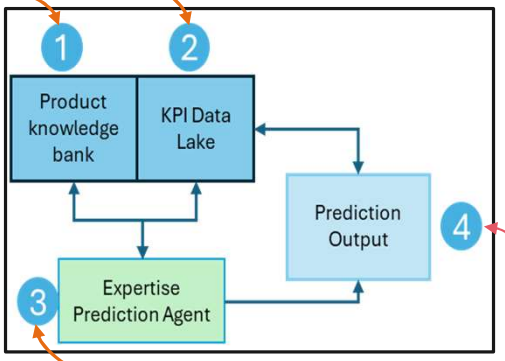
1. Task agent sends the task order to the prediction agent
2. The prediction agent retrieves KPI data and product knowledge base inputs
3. The self-learning model uses current and historical KPI data with product knowledge to predict degradation and stores the results in the data lake for use by other agents



2.5 Awareness - Service Performance degradation Prediction(Cont.)

Four evidence items are shown below:

- Evidence 1: Product knowledge base location
- Evidence 2: KPI and historical data tables used by the prediction agent
- Evidence 3: Prediction agent logs
- Evidence 4: Prediction results stored in the data lake, covering all three sub-scenarios in the same process



Screenshot of predictive model output

SYMPTOM	COUNTERS TO MONITOR	THRESHOLDS FOR ALERT
Signal Deterioration		> UEs in
Interference Escalation		> (rising trend over hours).
Throughput Decline		≥ of UEs in
Service Drops	(QCI1)	> for critical services.
MIMO Efficiency Loss		Dominant rank drops from

3.1 Analysis - Service Performance degradation Impact Analysis

Cognitive Activity	Service Capability	Weight	Questions	Option A	Option B	Sub-scenarios		
						Anomaly & Stability	Performance	Experience
						20%	40%	40%
Analysis	Service Degradation Impact Analysis	10%	How does the System identify and analyze the impact of Service degradation (e.g., throughput, latency, stability issues, experience deterioration,VoLTE/VoNR call drop rate) on user experience or SLA compliance?	The System identifies and analyzes the impact of Service degradation (e.g., throughput, latency, stability issues, experience deterioration, VoLTE/VoNR call drop rate) using self-learning AI Models without human intervention.	The System identifies and analyzes the impact of Service degradation (e.g., throughput, latency, stability issues, experience deterioration, VoLTE/VoNR call drop rate) using dynamic rules (context-aware) or ML Outputs and may require human confirmation to proceed	A	A	A

TPMS uses the Expertise/Reasoning Impact Analysis agent to evaluate service impact

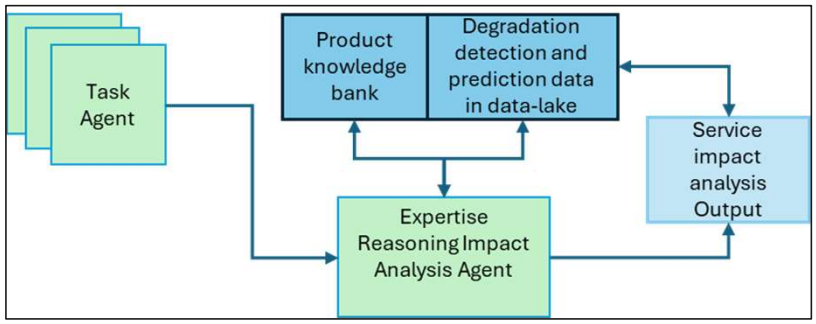
Inputs:

- Task order
- Detected and predicted degradation data
- Current and historical KPI data
- Product knowledge base

Output:

- Service impact of performance degradation

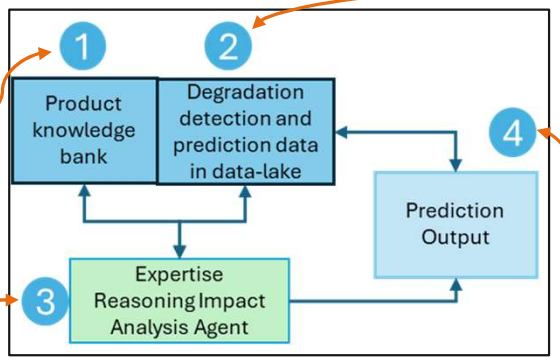
System flow diagram

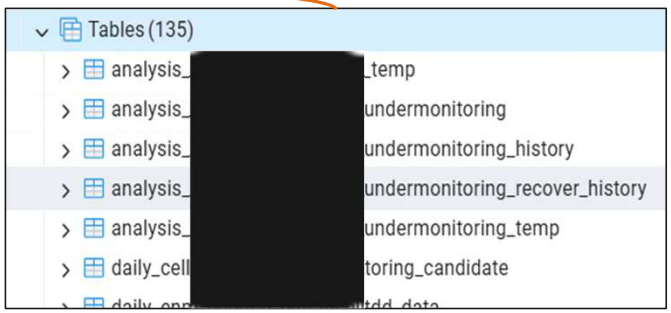


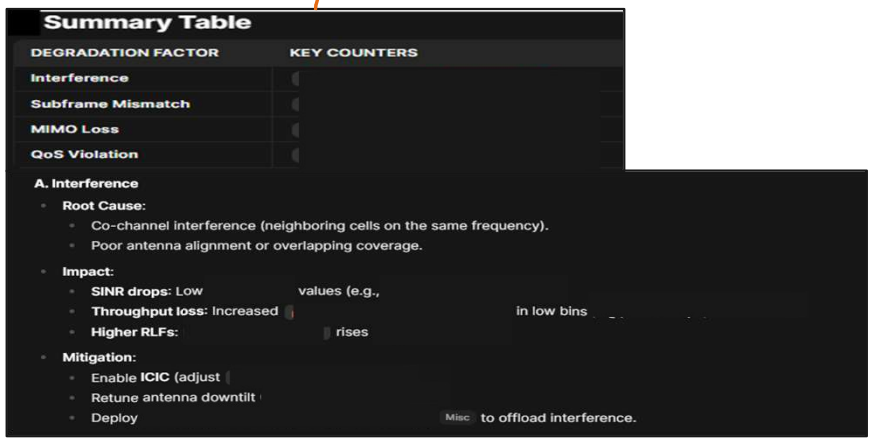
3.2 Analysis - Service Performance degradation Impact Analysis

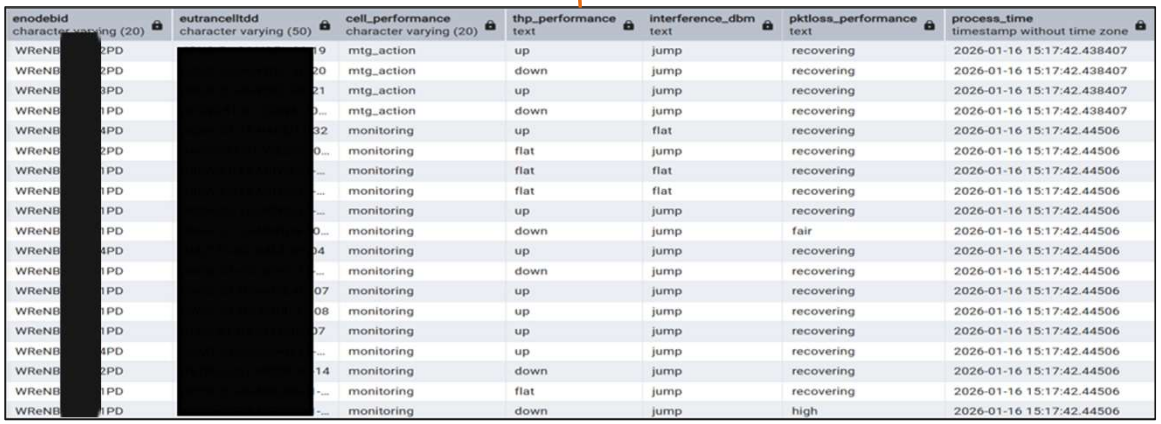
The following evidence demonstrates how TPMS performs impact analysis using the expertise/reasoning agent

- Evidence 1: Product knowledge base location
- Evidence 2: Degradation and prediction data used by the agent
- Evidence 3: Agent logs showing impact analysis processing
- Evidence 4: Impact analysis results stored in the data lake, covering all three sub-scenarios









3.3 Analysis - Service Performance Degradation, Demarcation & Root Cause Analyses

Cognitive Activity	Service Capability	Weight	Questions	Option A	Option B	Sub-scenarios		
						Anomaly & Stability	Performance	Experience
						20%	40%	40%
Analysis	Service Degradation Demarcation & Root Cause Analysis	15%	How does the System isolate the root causes of Service degradation by analyzing contributing factors within or across network domains (e.g., RAN, transport, core), covering performance, stability, and experience-related issues?	The System isolates and analyzes the root causes of Service degradation by evaluating contributing factors within or across network domains using self learning AI Models, without human intervention.	The System isolates and analyzes the root cause of Service degradation using Dynamic Rules (context-aware) or ML Outputs and may require human intervention	A	A	A

TPMS uses the Expertise/Reasoning Fault Analysis agent to perform root cause analysis (RCA)

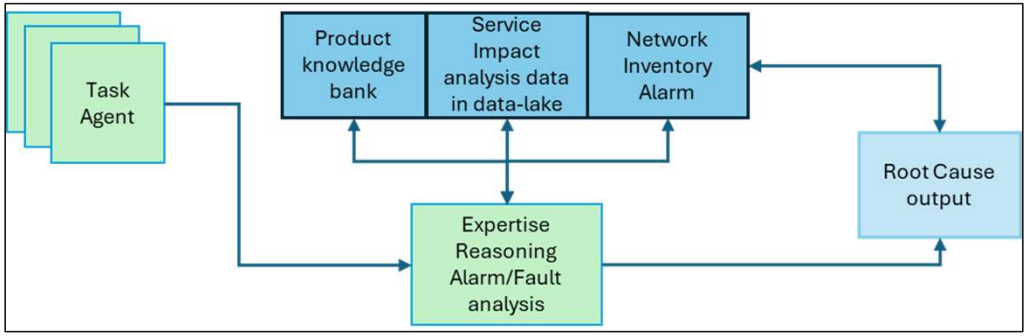
Inputs:

- Task order
- Degradation and impact analysis results
- Current and historical KPI data
- Configuration, inventory, and alarm data
- Product knowledge base

Output:

- Root cause of performance degradation or faults

System flow diagram as below

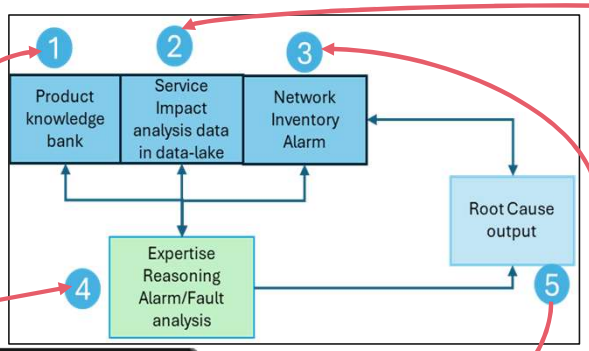


3.4 Analysis - Service Performance Degradation, Demarcation & Root Cause Analyses

The following evidence demonstrates how TPMS performs root cause analysis (RCA):

- Evidence 1: Product knowledge base location
- Evidence 2: KPI data and impact analysis results used by the agent
- Evidence 3: Configuration and alarm data inputs
- Evidence 4: Agent logs showing RCA processing
- Evidence 5: Root cause analysis results stored in the data lake

```
GCS_PATHS = [
    paths:
        "gs://[redacted]ml-agent/raw/[redacted]/uncompressed/Antenna_Sy
        "gs://[redacted]ml-agent/raw/[redacted]/uncompressed/Baseband_F                .4"
        "gs://[redacted]ml-agent/raw/[redacted]/uncompressed/Enclosure"
        "gs://[redacted]ml-agent/raw/[redacted]/uncompressed/Integrated                "
        "gs://[redacted]ml-agent/raw/[redacted]/uncompressed/LTE_RAN_2S
        "gs://[redacted]ml-agent/raw/[redacted]/uncompressed/Network_Sy
        "gs://[redacted]ml-agent/raw/[redacted]/uncompressed/Power"
        "gs://[redacted]ml-agent/raw/[redacted]/uncompressed/RAN_Comput
        "gs://[redacted]ml-agent/raw/[redacted]/uncompressed/Radio"
        "gs://[redacted]ml-agent/raw/[redacted]/uncompressed/Radio_Node                "
        "gs://[redacted]ml-agent/raw/[redacted]./uncompressed/Release_In               .4"
]
```



1. Service Degradation Demarcation

Differentiate root causes using **measurable RF metrics** and **cell behavior patterns**:

Demarcation Criteria

DEGRADATION TYPE	KEY METRICS	NETWORK BEHAVIOR
External Interference	Elevated RSSI, RSRQ/SINR degradation, PUSCH BLER	Sudden performance drops, frequent Random Access failures, Handover failures (e.g., Event A3 misalignment).
Atmospheric Ducting	SINR fluctuations, RSRP overshooting, UL interference spikes	Intermittent coverage holes, UE mobility false triggers, TDD UL/DL imbalance (source 1,3).
Mobility Failures	N310/N311 threshold breaches, T310 expiry, A3/A5 event delays	Ping-pong handovers, RLF (Radio Link Failure) during mobility, RSRP instability (source 6).
Hardware Faults	RSSI spikes, TRX failure alarms, CRC errors	Sudden performance collapse across all UEs in the cell, no geographical pattern (source 1's hardware degradation model).

2. Root Cause Analysis

A. External Interference

ROOT CAUSE	MECHANISM	KEY PARAMETERS
Co-channel Overlap	Neighboring cells' antennas overreach due to poor eTilt/azimuth alignment.	(misconfigured '), (aligned directly with neighbors).
Hardware Spurious Emissions	Non-linear RF components (e.g., power amplifiers) generate wideband noise.	(exceeds 25.5 dB, source 1's Equation 2).
Non-3GPP Interference	Wi-Fi/WiMAX signals leak into LTE bands (e.g., Band 40).	(disable if false alarms, source 2).

B. Atmospheric Ducting (TDD-Specific)

ROOT CAUSE	MECHANISM	KEY PARAMETERS
Signal Propagation Anomaly	DL signals "duct" over long distances, interfering with UL in distant cells.	(default LOCATION, set to REDUCTION to suppress interference, source 3).
SINR Instability	Rapid RSRP/SINR fluctuations due to temperature inversion.	(spikes > 10 dB during ducting events).

C. Mobility Failures

ROOT CAUSE	MECHANISM	KEY PARAMETERS

enodebid character varying (20)	eutrancelltdd character varying (50)	ducting_status boolean	uethpdl_15min numeric (12,3)	uethpdl_30min numeric (12,3)	uethpdl_2hrs numeric (12,3)
WReNB3[redacted]1PD	[redacted]	true	148209.850	146796.325	135660.531
WReNB3[redacted]2PD		true	137773.570	113511.870	120342.389
WReNB3[redacted]2PD		true	79085.730	78331.685	80063.685
WReNB3[redacted]4PD		true	76351.770	61508.080	48813.273
WReNB3[redacted]1PD		true	36750.580	35419.400	32370.240
WReNB3[redacted]5PD		true	84486.350	107834.610	123622.250
WReNB4[redacted]1PD		true	27580.570	27029.845	25855.159
WReNB4[redacted]1PD		true	85564.400	82045.895	88964.409
WReNB4[redacted]3PD		true	58055.040	58055.040	77994.910
WReNB4[redacted]2PD		false	68139.860	65206.150	64809.455
WReNB5[redacted]1PD		true	82434.430	107399.380	96720.175
WReNB5[redacted]4PD		true	122742.460	113237.105	95729.721
WReNB5[redacted]4PD		true	62090.220	58965.110	54349.870

3.5 Analysis -Solution Generation

Cognitive Activity	Service Capability	Weight	Questions	Option A	Option B	Sub-scenarios		
						Anomaly & Stability	Performance	Experience
						20%	40%	40%
Analysis	Solution Generation	15%	How does the System generate solutions to address Service degradation (performance, stability, or experience) based on root cause analysis?	actions (towards specific user group, service type and Apps) to address Service degradation and continuously learns from past resolutions using AI Models, without human intervention.	The System generates corrective actions using dynamic rules (context-aware) or ML Outputs and may require human confirmation	A	A	A

TPMS uses the Synthesize agent to generate optimal mitigation solutions

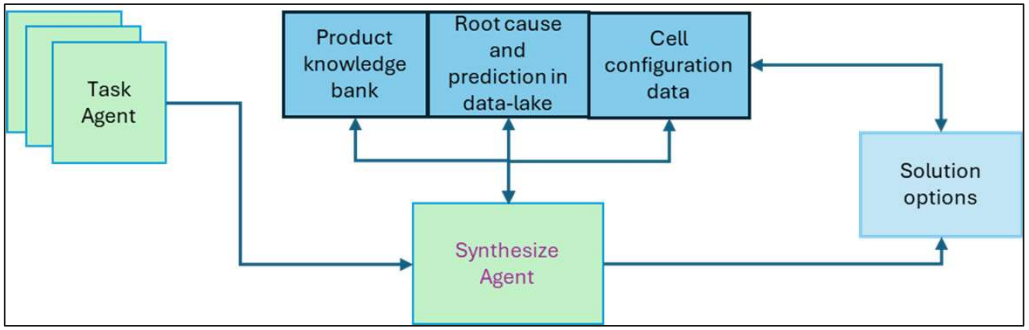
Inputs:

- Task order
- Root cause analysis results
- Performance prediction data
- Cell configuration data
- Product knowledge base

Output:

- Optimised mitigation solutions for performance issues

System flow diagram as below

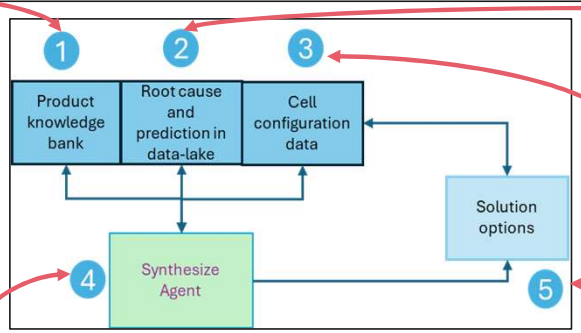


3.6 Analysis -Solution Generation(Cont.)

The following evidence demonstrates how TPMS generates mitigation solutions:

- Evidence 1: Product knowledge base location provided to the agent
- Evidence 2: Service impact analysis results and current/historical KPI data
- Evidence 3: cell configuration data
- Evidence 4: Synthesize agent logs
- Evidence 5: Solution options and results stored in the data lake, covering all three sub-scenarios

```
GCS_PATHS = [
    paths:
        "gs://  ml-agent/raw/          "/uncompressed/Antenna_S
        "gs://  ml-agent/raw/          /uncompressed/Baseband_F                .4"
        "gs://  ml-agent/raw/          /uncompressed/Enclosure"
        "gs://  ml-agent/raw/          /uncompressed/Integratec                "
        "gs://  ml-agent/raw/          /uncompressed/LTE_RAN_2
        "gs://  ml-agent/raw/          /uncompressed/Network_S
        "gs://  ml-agent/raw/          /uncompressed/Power"
        "gs://  ml-agent/raw/          /uncompressed/RAN_Comput
        "gs://  ml-agent/raw/          /uncompressed/Radio"
        "gs://  ml-agent/raw/          /uncompressed/Radio_Node                "
        "gs://  ml-agent/raw/          /uncompressed/Release_Ir                .4"
]
```



daily_cell_underducting_monitoring_candidate

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3. Mitigation Actions

A. External Interference

ACTION	IMPLEMENTATION	IMPACT
Adjust eTilt	Increase to reduce overreach.	Reduces co-channel , improves neighbor cell RSRQ/SINR.
Optimize Azimuth	Align to avoid direct pointing at neighboring cells (use for PCI mapping).	Improves isolation (D value in Equation 2) →
Enable IRC (Interference Rejection Combining)	Set to ON to suppress wideband noise.	Reduces , stabilizes SINR.

B. Atmospheric Ducting

ACTION	IMPLEMENTATION	IMPACT
Activate Duct Mitigation	Set to REDUCTION and enable (FAJ 121 5065).	Suppresses DL signal overreach ↑.
Increase eTilt Further	Adjust to to limit coverage overreach.	Reduces UL interference spikes by ducting events.

sitename character varying (200)	eutrancelltdd character varying (50)	mitigation_action_1 integer	mitigation_action_2 integer	mitigation_action_3 integer	mitigation_action_4 integer	mitigation_action_5 integer
		40	60	80	100	100
		40	60	80	100	100
		70	100	100	100	100
		70	100	100	100	100
		60	80	100	120	150
		60	80	100	120	150
		60	80	100	120	150
		60	80	100	120	150
		60	80	100	120	150
		60	80	100	120	150
		60	80	100	120	150
		40	60	80	100	100
		40	60	80	100	100
		40	60	80	100	100
		40	60	80	100	100
		60	80	100	120	150
		40	60	80	100	100
		40	60	80	100	100
		70	100	100	100	100

4.1 Solution Evaluation & Decision making

Cognitive Activity	Service Capability	Weight	Questions	Option A	Option B	Sub-scenarios		
						Anomaly & Stability	Performance	Experience
						20%	40%	40%
Decision	Solution Evaluation & Decision making	20%	How does the System evaluate solutions and decide on the optimal solution to implement ?	The System evaluates multiple remediation options, analyzes risk and trade-offs, and selects the optimal solution using self learning AI Models, without requiring human decision-making	The System evaluates remediation options, recommends the optimal solution to be executed using Dynamic rules (context-aware) or ML Outputs and may require human approval	A	A	A

TPMS uses the Evaluation agent to assess and select optimal mitigation solutions across different network types

Inputs:

- Solution options generated by the synthesis agent
- Network antenna parameters and topology
- Historical mitigation data

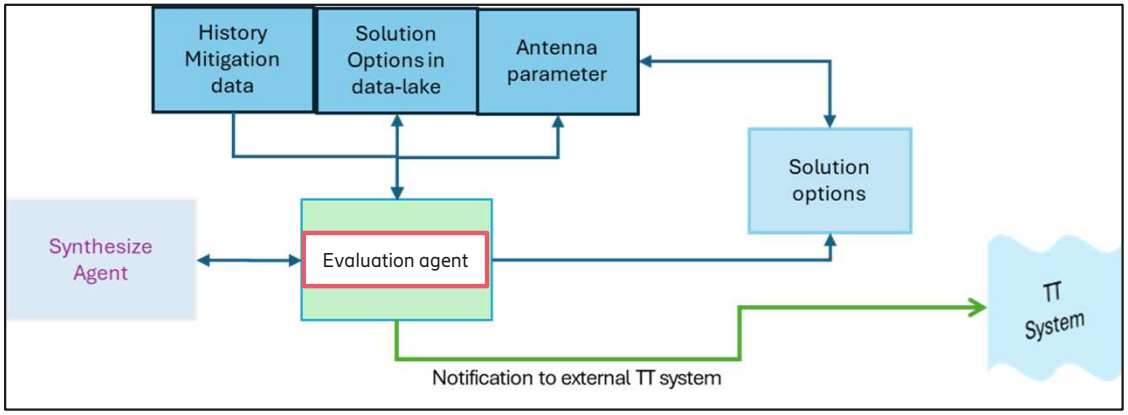
Processing:

- Evaluates solution options using risk analysis, policy rules (eg: ability to e-tilt antenna), and network constraints (eg: FW does not allow mobility)
- Selects network-appropriate mitigation actions (e.g. tilt adjustment, parameter changes, feature activation)

Output:

- Optimal mitigation solution after evaluation and filtering
- Sub-scenario classification (eg service degradation, hardware issue, performance degradation, step change, low throughput)
- Notification to the external trouble ticket system

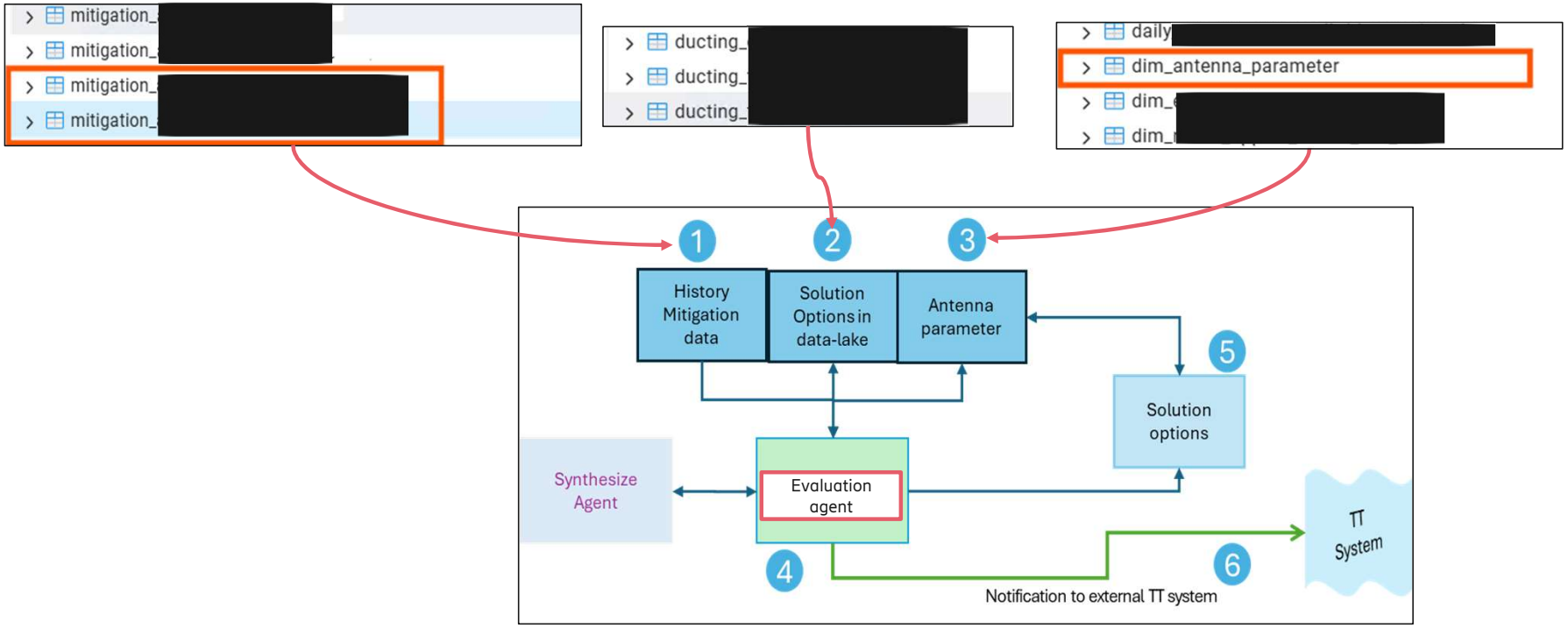
System flow diagram



4.2 Solution Evaluation & Decision making(Cont.)

The following evidence demonstrates how TPMS performs solution evaluation and selection:

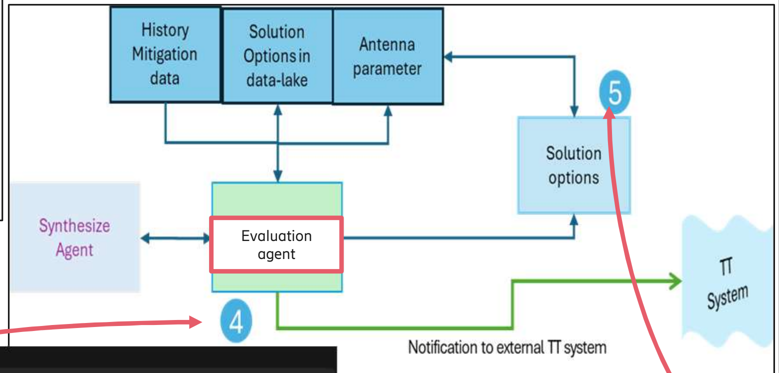
- Evidence 1: Historical mitigation data used for decision-making
- Evidence 2: Solution options stored in the data lake
- Evidence 3: Antenna operational parameters



4.3 Solution Evaluation & Decision making(Cont.)

The following evidence demonstrates how TPMS performs solution evaluation and selection:

- Evidence 4: Evaluation agent logs showing decision processing
- Evidence 5: Final mitigation solution selected after evaluation



Observed Symptoms

METRIC	IMPACT
Throughput	Severe [redacted] during atmospheric duct events (e.g., [redacted] collapse).
Interference	Sudden [redacted] in TDD cells ([redacted]
User Experience	Connection drops, [redacted]

Causal Chain

ROOT CAUSE	MECHANISM	KEY PARAMETERS/FEATURES
Atmospheric Ducting	Downlink signals "duct" over long distances, interfering with neighboring cells' uplink.	[redacted] (set to [redacted] to suppress interference), [redacted] (FAJ 121 5065).
Poor eTilt Configuration	Antennas overreach neighboring cells, worsening duct-induced interference.	[redacted] (default [redacted] recommended [redacted] or fixed wireless).

Validation

METRIC/TOOL	PURPOSE	EXPECTED OUTCOME
[redacted] (RSSI)	Track sudden spikes during ducting events (e.g., ≥ 1 [redacted] rease).	RSSI stabilizes ≤ [redacted] after ductIntOpMode=R [redacted] and eTilt adjustment.
[redacted]	Verify detection of characteristic sequence power exceeding thresholds.	Threshold breach alerts reduce b [redacted] post-mitigation.
[redacted] (Uplink Interference Reporting)	Monitor RF port deltas ([redacted] during ducting.	Deltas decrease [redacted] after eTilt adjustment.

Fix & Mitigation Actions

ACTION	IMPLEMENTATION	EXPECTED OUTCOME
Enable Atmospheric Duct Mitigation	Set [redacted] R [redacted] per [redacted]). Enable [redacted] (FAJ 121 5065).	Downlink interference suppression activates, RSSI drops [redacted]
Adjust eTilt	Increase [redacted] (e.g., [redacted] limit cell overreach.	Reduces ICI [redacted] dB during ducting events (source 1).
Optimize Duct Detection Thresholds	Tune [redacted] (e.g., [redacted]) to detect weak characteristic sequences.	Faster interference detection and mitigation [redacted]

Summary Table

IMPACT AREA	ROOT CAUSE	MITIGATION ACTION	EXPECTED OUTCOME
Throughput	Ducting-induced uplink interference	Enable FAJ 121 5065 + set [redacted] + increase eTilt	DL/UL throughput [redacted] restored
Interference	Poor eTilt/duct detection thresholds	Adjust [redacted] + tun [redacted]	RSSI interference ↓
User Experience	Uplink signal suppression	Combine duct mitigation with [redacted] (Uplink CoMP).	Latency ↓ reduced [redacted]

Ducting Mitigation Monitoring (refresh every 15 minutes, local timestamp)

EUtrancellfdd	EARFCN	Azimuth	TDI Detected Time	Max_etilt	etilt_design	etilt_curr	TDM Stage	TDM Applied time	Reduction Status	Ducting Status	SF2_dBm	SF7_dBm	Last update
[redacted]	38968	315	2026-05-05 15:30:00	100	20	40	Stage-1 applied	2026-05-05 18:09	OFF	INTENSIVE	-62.9	-102.0	2026-05-06 11:09
[redacted]	38968	225	2026-05-05 15:00:00	100	20	20			OFF	STEP UP	-78.8	-86.2	2026-05-06 11:09
[redacted]	38352	210	2026-05-06 07:30:00	100	40	40			OFF	STEP UP	-103.4	-103.9	2026-05-06 11:09
[redacted]	38550	210	2026-05-06 08:00:00	100	40	40			OFF	STEP UP	-104.0	-103.7	2026-05-06 11:09
[redacted]	41690	300	2026-05-06 08:00:00	150	20	20			OFF	STEP UP	-103.0	-110.1	2026-05-06 11:09
[redacted]	38968	90	2026-05-05 23:00:00	150	40	40			OFF	STEP UP	-84.3	-86.0	2026-05-06 11:09
[redacted]	38968	90	2026-05-06 07:00:00	150	40	40			OFF	STEP UP	-101.7	-113.2	2026-05-06 11:09
[redacted]	38968	90	2026-05-05 18:00:00	150	50	50			OFF	STEP UP	-102.3	-112.9	2026-05-06 11:09
[redacted]	38770	30	2026-05-06 08:30:00	150	20	20			OFF	STEP UP	-104.8	-105.1	2026-05-06 11:09
[redacted]	38968	310	2026-05-05 04:30:00	150	20	20	eTilt restored	2026-05-05 05:08	OFF	MODERATE	-108.5	-107.1	2026-05-06 11:09
[redacted]	38968	310	2026-05-03 06:00:00	150	40	40			OFF	MODERATE	-108.7	-109.0	2026-05-06 11:09
[redacted]	39154	310	2026-05-05 07:30:00	150	40	40			OFF	MODERATE	-109.1	-110.4	2026-05-06 11:09
[redacted]	39154	310	2026-05-05 06:30:00	150	40	40			OFF	MODERATE	-109.8	-110.1	2026-05-06 11:09
[redacted]	38968	225	2026-05-06 07:00:00	150	40	40			OFF	MODERATE	-109.9	-108.8	2026-05-06 11:09
[redacted]	38968	310	2026-05-03 06:00:00	150	40	40			OFF	MODERATE	-109.9	-110.0	2026-05-06 11:09
[redacted]	42086	190	2026-05-06 08:30:00	150	10	10			OFF	MODERATE	-108.2	-108.8	2026-05-06 11:09
[redacted]	38770	40	2026-05-06 08:00:00	100	20	20			OFF	MODERATE	-109.2	-109.9	2026-05-06 11:09
[redacted]	38968	330	2026-05-06 07:00:00	150	40	40			OFF	MODERATE	-108.2	-115.5	2026-05-06 11:09
[redacted]	38968	90	2026-05-05 23:00:00	150	50	50			OFF	MODERATE	-108.0	-117.1	2026-05-06 11:09
[redacted]	39154	70	2026-05-06 07:00:00	150	40	40			OFF	MODERATE	-108.1	-108.1	2026-05-06 11:09
[redacted]	38352	70	2026-05-06 09:30:00	150	40	40			OFF	MODERATE	-108.1	-108.1	2026-05-06 11:09
[redacted]	39154	240	2026-04-23 21:30:00	150	20	20	eTilt restoring	2026-04-27 21:28	OFF	MODERATE	-105.7	-106.9	2026-05-06 11:09
[redacted]	38352	70	2026-05-06 03:30:00	150	20	40	Stage-1 applied	2026-05-06 05:38	OFF	RESTORING	-116.7	-116.6	2026-05-06 11:09
[redacted]	39154	310	2026-05-05 23:00:00	100	20	40	Stage-1 applied	2026-05-06 05:38	OFF	RESTORING	-119.4	-119.9	2026-05-06 11:09
[redacted]	38352	310	2026-05-05 23:00:00	100	20	40	Stage-1 applied	2026-05-06 05:38	OFF	RESTORING	-119.8	-119.1	2026-05-06 11:09
[redacted]	38352	30	2026-05-06 07:30:00	100	20	40	Stage-1 applied	2026-05-06 09:43	OFF	RESTORING	-120.0	-120.0	2026-05-06 11:09
[redacted]	38352	195	2026-05-06 06:00:00	150	30	50	Stage-1 applied	2026-05-06 07:40	OFF	RESTORING	-119.4	-119.2	2026-05-06 11:09
[redacted]	41690	220	2026-05-06 07:30:00	150	20	20			OFF	MARGINAL	-113.5	-113.2	2026-05-06 11:09
[redacted]	41888	50	2026-05-06 09:30:00	150	20	20			OFF	MARGINAL	-114.9	-115.7	2026-05-06 11:09
[redacted]	38968	310	2026-05-03 06:00:00	150	40	40			OFF	MARGINAL	-110.2	-109.4	2026-05-06 11:09
[redacted]	38352	285	2026-05-04 06:30:00	100	60	60			OFF	MARGINAL	-111.4	-111.9	2026-05-06 11:09
[redacted]	38770	310	2026-05-03 06:00:00	150	40	40			OFF	MARGINAL	-111.9	-111.8	2026-05-06 11:09
[redacted]	39154	310	2026-05-05 01:00:00	150	40	40			OFF	MARGINAL	-112.4	-113.3	2026-05-06 11:09
[redacted]	38770	310	2026-05-04 06:30:00	150	40	40			OFF	MARGINAL	-112.8	-112.3	2026-05-06 11:09
[redacted]	38968	225	2026-05-06 07:00:00	100	80	80			OFF	MARGINAL	-112.8	-112.4	2026-05-06 11:09
[redacted]	39154	310	2026-05-06 07:00:00	150	40	40			OFF	MARGINAL	-112.9	-113.8	2026-05-06 11:09
[redacted]	38352	95	2026-05-06 07:00:00	100	20	20			OFF	MARGINAL	-112.9	-113.3	2026-05-06 11:09

Legend:

INTENSIVE	>95 [redacted]
STRONG	>105 [redacted]
STEP UP	Inter [redacted] in latest RCP
MODERATE	>110 [redacted]
MARGINAL	>115 [redacted]
RESTORING	Retu [redacted] el
CLEARED	Retu [redacted] el
Applying	Comm [redacted] gh,waiting for "Completion" mess [redacted] b

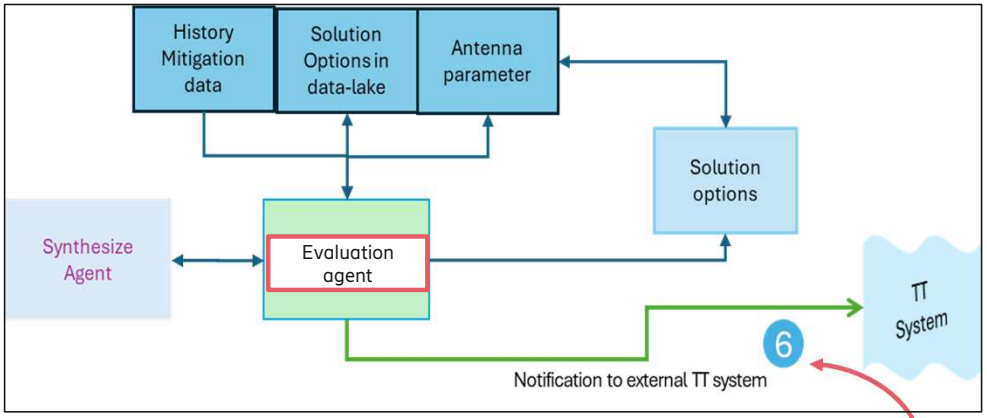
4.4 Solution Evaluation & Decision making(Cont.)

One evidence of solution decision making:

- Evidence 6: The Evaluation agent classifies sub-scenarios and selects the optimal solution, then notifies the external trouble ticket system for automatic ticket creation and issue tracking

TT types are derived from TPMS-classified sub-scenarios and include: Service degradation, Hardware issue, Performance degradation, Performance step change, Low throughput experience

These map to the three sub-scenarios defined in Slide 6



eutrancelltdd character varying (50)	started_time timestamp without time zone	ticket_status character varying (20)	notification_id integer	notified_time timestamp without time zone	TT_Type character varying
[redacted]	2026-02-18 17:00:00	open	[redacted]	2026-02-19 00:50:12.41257	HW Issue
[redacted]	2026-02-18 17:00:00	open	[redacted]	2026-02-19 00:50:12.41257	HW Issue
[redacted]	2026-02-18 19:00:00	open	[redacted]	2026-02-19 00:50:12.41257	Experience -Low Throughput
[redacted]	2026-02-18 19:45:00	open	[redacted]	2026-02-19 00:50:12.41257	Experience -Low Throughput
[redacted]	2026-02-18 19:45:00	open	[redacted]	2026-02-19 00:50:12.41257	Experience -Low Throughput
[redacted]	2026-02-18 19:00:00	open	[redacted]	2026-02-19 00:50:12.41257	Performance - Degradation
[redacted]	2026-02-18 19:00:00	open	[redacted]	2026-02-19 00:50:12.41257	Experience -Low Throughput
[redacted]	2026-02-18 19:00:00	open	[redacted]	2026-02-19 00:50:12.41257	Experience -Low Throughput
[redacted]	2026-02-18 20:00:00	open	[redacted]	2026-02-19 00:50:12.41257	Performance - Degradation
[redacted]	2026-02-18 19:15:00	open	[redacted]	2026-02-19 00:50:12.41257	Performance - Degradation
[redacted]	2026-02-18 19:00:00	open	[redacted]	2026-02-19 00:50:12.41257	Performance - Degradation
[redacted]	2026-02-18 19:15:00	open	[redacted]	2026-02-19 00:50:12.41257	Performance - Degradation
[redacted]	2026-02-18 19:45:00	open	[redacted]	2026-02-19 00:50:12.41257	Performance - Degradation
[redacted]	2026-02-18 19:15:00	open	[redacted]	2026-02-19 00:50:12.41257	Performance - Degradation
[redacted]	2026-02-18 19:15:00	open	[redacted]	2026-02-19 00:50:12.41257	Performance - Degradation
[redacted]	2026-02-18 19:15:00	open	[redacted]	2026-02-19 00:50:12.41257	Performance - Degradation
[redacted]	2026-02-18 19:45:00	open	[redacted]	2026-02-19 00:50:12.41257	Performance - Degradation
[redacted]	2026-02-18 19:45:00	open	[redacted]	2026-02-19 00:50:12.41257	Performance - Degradation
[redacted]	2026-02-18 19:00:00	open	[redacted]	2026-02-19 00:50:12.41257	Perfprmance -Step Change
[redacted]	2026-02-18 19:15:00	open	[redacted]	2026-02-19 00:50:12.41257	Experience -Low Throughput
[redacted]	2026-02-18 19:15:00	open	[redacted]	2026-02-19 00:50:12.41257	Perfprmance -Step Change
[redacted]	2026-02-18 19:15:00	open	[redacted]	2026-02-19 00:50:12.41257	Perfprmance -Step Change
[redacted]	2026-02-18 19:45:00	open	[redacted]	2026-02-19 00:50:12.41257	Experience -Low Throughput
[redacted]	2026-02-18 19:45:00	open	[redacted]	2026-02-19 00:50:12.41257	Experience -Low Throughput
[redacted]	2026-02-18 19:00:00	open	[redacted]	2026-02-19 00:50:12.41257	Experience -Low Throughput
[redacted]	2026-02-18 19:15:00	open	[redacted]	2026-02-19 00:50:12.41257	Experience -Low Throughput
[redacted]	2026-02-18 19:15:00	open	[redacted]	2026-02-19 00:50:12.41257	Perfprmance -Step Change
[redacted]	2026-02-18 19:00:00	open	[redacted]	2026-02-19 00:50:12.41257	Service Anomaly
[redacted]	2026-02-18 11:45:00	open	[redacted]	2026-02-19 00:50:12.41257	Experience -Low Throughput
[redacted]	2026-02-18 20:00:00	open	[redacted]	2026-02-19 00:50:12.41257	Performance - Degradation

5. 1 Solution Implementation

Cognitive Activity	Service Capability	Weight	Questions	Option A	Option B	Sub-scenarios		
						Anomaly & Stability	Performance	Experience
						20%	40%	40%
Execution	Solution Implementation	10%	How does the System implement solution and apply fallback mechanisms in case of solution failure?	The System implements the selected corrective action and triggers fallback mechanisms in case of failure, without human intervention	The System applies corrective action and fallback mechanisms using pre-defined rules, based on human approval.	A	A	A

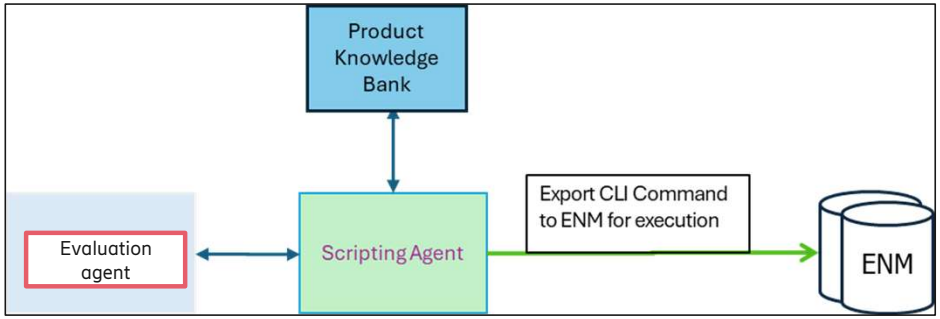
Solution Implementation: The Scripting agent generates CLI commands using production information, then transfers the command file to ENM for execution. It has two inputs:

- Final solution from Evaluation Agent
- Product Knowledge (CPI) information database

Output:

- CLI command for execution

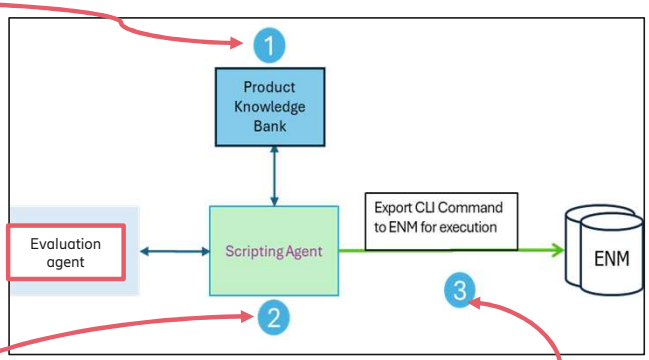
System flow diagram

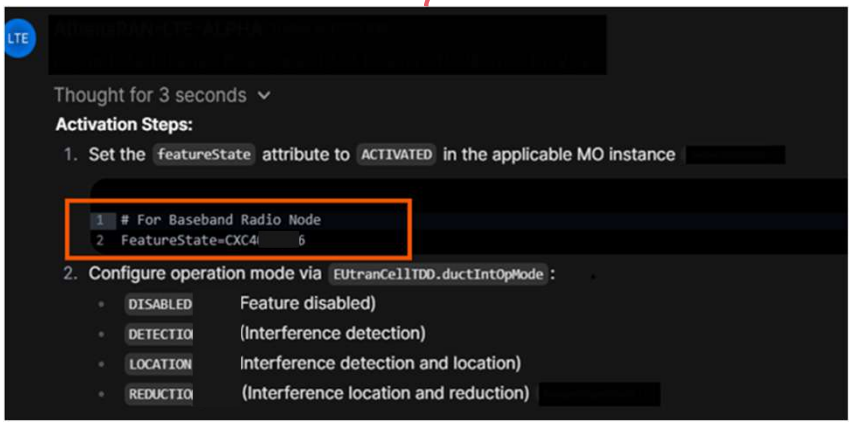


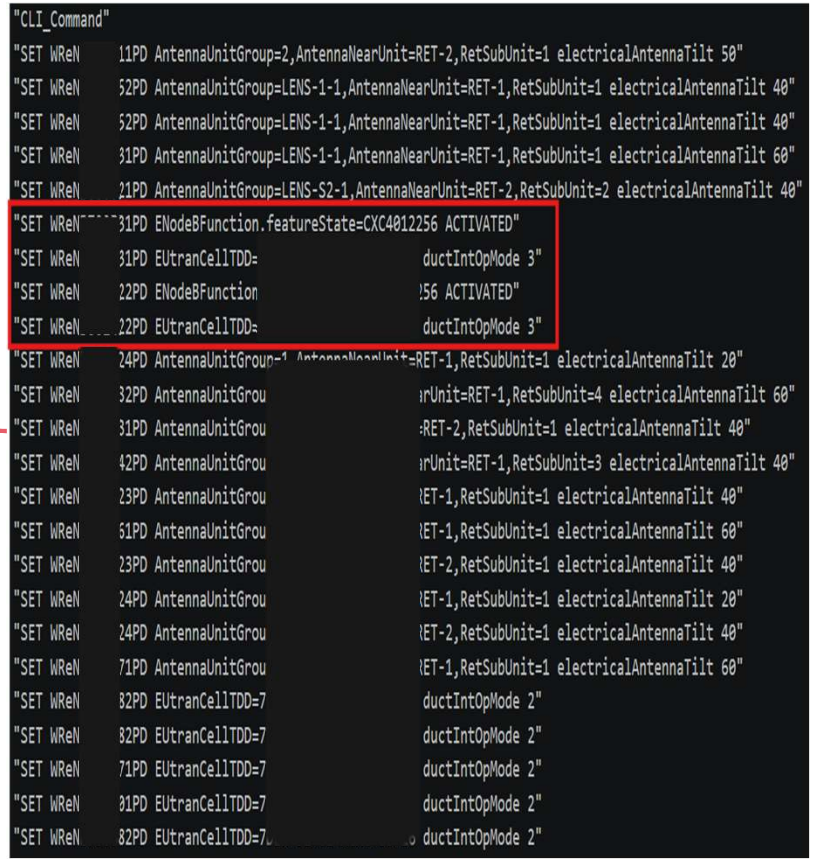
5. 2 Solution Implementation

Three evidences of solution implementation:

- Evidence 1: Production knowledge (CPI) file input to scripting agent
- Evidence 2: Evaluation Agent log
- Evidence 3: auto-generated CLI command file for ENM execution





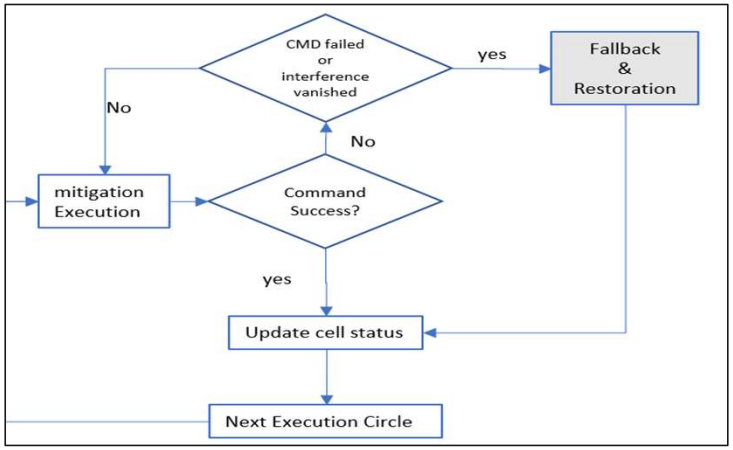


5.3 Solution Implementation(Cont.)

Implementation close loop Evidence

The solution has a closed-loop implementation mechanism as shown in flow diagram.
No human intervention required.

Two scenarios that trigger fallback:
- execution fails
- interference no longer detected

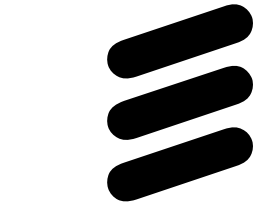


Fallback in case of failure or interference no longer detected

mitigation_stage integer	mitigation_cell_status character varying (50)	mitigation_implementation_status character varying (50)	cell_added_time_utc timestamp without time zone	first_mgt_applied_utc timestamp without time zone
0	rollback	pending	2026-02-10 15:26:27.382862	2026-02-10 15:37:41.444187
0	completed_stage-0	completed	2026-03-17 13:56:01.043011	2026-03-17 14:08:05.459731
0	monitoring_stage_0	completed	2026-03-16 09:54:28.181053	2026-03-16 10:09:09.031881
0	monitoring_stage_0	completed	2026-03-14 21:56:06.384913	2026-03-14 21:56:06.384913
0	monitoring_stage_0	completed	2026-03-17 14:55:17.523111	2026-03-17 15:03:55.896446
0	monitoring_stage_0	completed	2026-03-16 07:54:43.697994	2026-03-16 08:08:28.53743
0	monitoring_stage_0	completed	2026-03-17 14:55:17.523111	2026-03-17 15:08:08.773186
0	monitoring_stage_0	completed	2026-03-17 13:56:01.043011	2026-03-17 14:08:05.459731
0	monitoring_stage_0	completed	2026-03-17 14:55:17.523111	2026-03-17 15:08:08.773186
0	rollback	pending	2026-03-14 13:29:27.808627	2026-03-14 13:29:27.808627

Evidence of auto feedback of the implementation process

mitigation_stage integer	mitigation_cell_status character varying (50)	mitigation_imple character varyin	cell_added_time_utc timestamp without time zone	first_mgt_applied_utc timestamp without time zone
3	monitoring_stage_3	completed	2026-01-08 09:46:57.833164	2026-01-08 10:08:25.337524
2	monitoring_stage_2	completed	2026-01-08 14:50:31.063692	2026-01-08 15:09:08.123607
2	monitoring_stage_2	completed	2026-01-08 15:18:32.392917	2026-01-08 15:39:02.58383
2	monitoring_stage_2	completed	2026-01-08 08:47:21.141958	2026-01-08 09:08:07.115791
2	monitoring_stage_2	completed	2026-01-08 15:18:32.392917	2026-01-08 15:39:02.58383
2	monitoring_stage_2	completed	2026-01-08 09:46:57.833164	2026-01-08 10:08:25.337524
2	monitoring_stage_2	completed	2026-01-08 09:46:57.833164	2026-01-08 10:08:25.337524
2	monitoring_stage_2	completed	2026-01-08 11:49:36.898234	2026-01-08 12:08:52.539897
2	monitoring_stage_2	completed	2026-01-08 08:17:21.596576	2026-01-08 10:08:25.337524
2	monitoring_stage_2	completed	2026-01-08 14:50:31.063692	2026-01-08 15:09:08.123607
2	monitoring_stage_2	completed	2026-01-08 11:49:36.898234	2026-01-08 12:08:52.539897
2	monitoring_stage_2	completed	2026-01-08 15:48:58.283498	2026-01-08 16:39:16.688339
2	monitoring_stage_2	completed	2026-01-08 15:48:58.283498	2026-01-08 16:08:48.414408
1	monitoring_stage_1	completed	2026-01-08 13:52:00.067702	2026-01-08 14:08:57.584477
1	monitoring_stage_1	completed	2026-01-08 08:17:21.596576	2026-01-08 09:08:07.115791
1	monitoring_stage_1	completed	2026-01-08 05:16:43.714055	2026-01-08 05:37:45.303621
1	monitoring_stage_1	completed	2026-01-08 02:17:05.683057	2026-01-08 02:37:34.220323
1	monitoring_stage_1	completed	2026-01-08 13:20:28.19995	2026-01-08 13:38:07.150998
1	monitoring_stage_1	completed	2026-01-08 16:23:25.710902	2026-01-08 16:39:16.688339
1	monitoring_stage_1	completed	2026-01-08 15:48:58.283498	2026-01-08 16:08:48.414408
1	monitoring_stage_1	completed	2026-01-08 21:24:20.314243	2026-01-08 21:38:47.95626
1	monitoring_stage_1	completed	2026-01-08 21:52:18.832716	2026-01-08 22:08:39.309883
1	monitoring_stage_1	completed	2026-01-08 08:47:21.141958	2026-01-08 09:08:07.115791
1	monitoring_stage_1	completed	2026-01-08 11:18:38.429156	2026-01-08 11:38:14.452511
1	monitoring_stage_1	completed	2026-01-08 13:52:00.067702	2026-01-08 14:08:57.584477
1	monitoring_stage_1	completed	2026-01-08 21:52:18.832716	2026-01-08 22:08:39.309883
1	monitoring_stage_1	completed	2026-01-08 14:20:24.483012	2026-01-08 14:39:19.78866
1	monitoring_stage_1	completed	2026-01-08 19:53:51.362521	2026-01-08 20:08:41.062652
1	monitoring_stage_1	completed	2026-01-08 14:20:24.483012	2026-01-08 14:39:19.78866
1	monitoring_stage_1	completed	2026-01-08 11:49:36.898234	2026-01-08 16:08:48.414408
1	monitoring_stage_1	completed	2026-01-08 23:18:50.699249	2026-01-08 23:39:15.518579
1	monitoring_stage_1	completed	2026-01-08 11:49:36.898234	2026-01-08 12:08:52.539897



ERICSSON