TM Forum

ANLAV Report

Rakuten Mobile

Scenario: GB1059H – RAN Energy Efficiency Optimization

Sub-scenario: Intra-RAT intra-frequency & Inter-RAT multi-Site energy saving

Maturity Level: Alpha

Validator: Nikos Kontis

Date: 11/02/2026

Region: Japan

Score: **4.0**

ANLAV Report: Rakuten Mobile
Executive Summary - 11 February 2026

Rakuten Mobile's Energy Efficiency use case demonstrates a mature, end-to-end autonomous closed-loop architecture across intent, awareness, analysis, decisioning, and execution capabilities. The provided evidence shows continuous automated PM/CM data collection at 15-minute granularity, AI/ML-based traffic and performance forecasting, intelligent per-cell energy-saving decision generation, and fully automated implementation via CMaaS APIs without human supervision. The system autonomously detects performance degradation linked to energy-saving actions, applies corrective measures (including rollback and backoff logic), and generates auto-tickets where repeated failures occur. Root cause analysis is supported by forecast-versus-actual comparisons, contextual classification (e.g., special events, model deviations, multi-agent coordination), and automated remediation. Execution logs and dashboards confirm production-grade implementation with observability and status tracking.

Overall, the evidence reflects a strongly integrated, production-operational closed loop with autonomous behavior consistent with advanced ANL maturity in the Energy Efficiency domain.

ANLAV Report: Rakuten Mobile
Second Review Cycle - 11 February 2026

Process Flow	Cognitive Activity	Service Capability	Weight	Question	Method: Average															
					Criteria				Sub-scenario 1		Percentage	80%	Sub-scenario 2		Percentage	0%	Sub-scenario 3		Percentage	20%
					Option A	Option B	Option C	Option D	Answer	Original score	Compensated score	Overall Score	Answer	Original score	Compensated score	Overall Score	Answer	Original score	Compensated score	Overall Score
RAN Energy Efficiency Optimization	Intent	Intent Translation	15%	How does the System translate the RAN Energy saving intent to the RAN energy saving related control information?	4	0	0	0	A	4	4	4.00	0	FALSE	FALSE	#DIV/0!	A	4	4	4.00
		Intent Fulfillment & Evaluation	10%	How does the System evaluate RAN energy saving intent fulfilment?	4	0	0	0	A	4	4		0	FALSE	FALSE		A	4	4	
	Awareness	RAN Energy Saving Information Collection	10%	How does the System collect RAN energy saving related information?	4	0	0	0	A	4	4		0	FALSE	#DIV/0!		A	4	4	
	Analysis	RAN Energy Saving Issues Identification	10%	How does the System identify energy saving issues?	4	0	0	0	A	4	4		0	FALSE	FALSE		A	4	4	
		RAN Traffic & Performance Prediction	10%	How does the System predict traffic load and network performance that can be used for energy saving solutions?	4	0	0	0	A	4	4		0	FALSE	FALSE		A	4	4	
		RAN Energy Saving Issues Demarcation & Root Cause Analysis	10%	How does the System demarcate energy saving & performance issues and analyze their root cause?	4	0	0	0	A	4	4		0	FALSE	FALSE		A	4	4	
		Solution Generation	15%	How does the System generate the recommended RAN energy saving solutions to solve the identified energy saving issues?	4	0	0	0	A	4	4		0	FALSE	FALSE		A	4	4	
	Decision	Solution Evaluation & Decision Making	10%	How does the System evaluate energy saving solutions and decide on the best solution to be implemented?	4	0	0	0	A	4	4		0	FALSE	FALSE		A	4	4	
	Execution	Solution Implementation	10%	How does the System implement solution that can resolve identified energy saving issues?	4	0	0	0	A	4	4		0	FALSE	#DIV/0!		A	4	4	
											Individual Sub-scenario scoring	4.00				#DIV/0!				4.00
											High Value Scenario Scoring	4								

Note 1: Scores are automatically calculated by formulas, which cannot be changed.

ANLAV Report: Rakuten Mobile
Second Review Cycle - 11 February 2026

Capability Area	Capability	Score Claimed	Score Validated	Provided Evidence	TMF (GB1059H) requirements	Questions
Intent	Intent Translation	A	**A**	Human-defined energy saving intents for 4G and 5G domains, with distinct intent definitions. Intent translated into structured JSON configuration including: KPI thresholds, enable/disable conditions, guardrails (e.g., high-load protection) Integration of AI/ML forecasted traffic as decision input. Separate autonomous flows demonstrated for 4G and 5G. Logs showing decision processing and configuration payload creation. Execution linkage to SET API calls. Live dashboard indicating intent fulfilment observability. **Evidence demonstrates machine-readable translation and automated operationalization of intent.**	**Option A**: Based on RAN energy saving Intent defined by Human, the System automatically selects candidate energy-saving objects (e.g. NE/CELL) and generates the RAN energy saving related control information based on the RAN energy saving intent, without Human Intervention. The system can automatically explore the energy saving gains and performance impacts to support human continuous adjustment of intent targets to achieve optimal energy saving effect and performance.	**OK**

Rakuten Mobile Response:

ANLAV Report: Rakuten Mobile
Second Review Cycle - 11 February 2026

Capability Area	Capability	Score Claimed	Score Validated	Provided Evidence	TMF (GB1059H) requirements	Questions
Intent	Intent Fulfillment & Evaluation	A	**A**	Near-real-time dashboard showing: Target state, Execution status (success/failure), Execution timestamps, Per-network-element actions. System-generated daily performance summary reports including: Total actions recommended, Correctly enabled/disabled, Missed enable/disable, Failed actions. Weekly automated reports distributed via email. No evidence of manual validation step. Reporting derived directly from executed actions in the RIC/CMaaS chain. **Evidence demonstrates automated fulfilment tracking and performance reporting.**	**Option A**:The system automatically evaluates and generates an intent fulfillment report including targets fulfilment status, based on intent.	**OK**

Rakuten Mobile Response:

ANLAV Report: Rakuten Mobile
Second Review Cycle - 11 February 2026

Capability Area	Capability	Score Claimed	Score Validated	Provided Evidence	TMF (GB1059H) requirements	Questions
Awareness	RAN Energy Saving Information Collection	A	**A**	Automated PM data ingestion pipeline running at 15-minute intervals. Historical KPI storage in centralized OSS database. Database tables showing 15-minute timestamp granularity. Automated CM data retrieval via GET API. Logs confirming production endpoint interaction. No manual export process observed. Scheduler logs confirming recurring execution. **Evidence demonstrates continuous, production-grade automated PM/CM data collection.**	**Option A**: The System continuously collects RAN energy saving related information, without human intervention. **Option B:** As above but requires human intervention (e.g.: for data quality checks).	**OK**

Rakuten Mobile Response:

ANLAV Report: Rakuten Mobile
Second Review Cycle - 11 February 2026

Capability Area	Capability	Score Claimed	Score Validated	Provided Evidence	TMF (GB1059H) requirements	Questions
Analysis	RAN Energy Saving Issues Identification	A	**A**	Real-time KPI monitoring for cells with energy saving mode enabled. Detection of performance degradation tied to energy-saving action. Automated revert of energy-saving configuration upon KPI deviation. Backoff logic to prevent ping-pong behavior. Auto-ticket generation triggered by repeated failures/timeouts. Logs showing issue detection and ticket workflow execution. **Evidence demonstrates autonomous issue detection, classification, and escalation.** .	**Option A:** The System intelligently identifies energy saving issues, without human intervention. **Option B:** As above but with human intervention.	**OK**

Rakuten Mobile Response:

ANLAV Report: Rakuten Mobile
Second Review Cycle - 11 February 2026

Capability Area	Capability	Score Claimed	Score Validated	Provided Evidence	TMF (GB1059H) requirements	Questions
Analysis	RAN Traffic & Performance Prediction	A	**A**	Raw PM KPIs used as training input to AI/ML model. PM data stored at 15-minute granularity. Forecast output produced at same 15-minute granularity. Per-cell traffic forecasting (e.g., forecasted_max_ue). Forecast integrated into decision-making process. Fully automated prediction pipeline. **Evidence demonstrates AI/ML-based traffic and performance forecasting aligned with source data granularity.**	**Option A**: The System intelligently predicts traffic load & network performance that can be used for energy saving solution at the minimum granularity that data is available from the source, without human intervention. **Option B:** As above but without the "the minimum granularity that data is available from the source"	**OK**

Rakuten Mobile Response:

ANLAV Report: Rakuten Mobile
Second Review Cycle - 11 February 2026

Capability Area	Capability	Score Claimed	Score Validated	Provided Evidence	TMF (GB1059H) requirements	Questions
Analysis	RAN Energy Saving Issues Demarcation & Root Cause Analysis	A	**A**	Forecast vs actual savings comparison tables. Achievement rate calculation. Categorization of issue types (e.g., SPECIAL-EVENT, HIGH-TRAFFIC-DEMAND, SYSTEM-OVERRIDE). Context-aware RCA including: External event correlation (calendar event example), ML model weighting explanation, Multi-agent coordination scenario Automated remediation actions (revert, suspend, override). Logs demonstrating causal trace from detection to action. **Evidence demonstrates automated root cause analysis and intelligent issue demarcation**.	**Option A:** The System intelligently demarcates energy saving & performance issues and analyze their root cause, without human intervention. **Option B:** As above but “requires human intervention to confirm the root causes”.	OK

Rakuten Mobile Response:

ANLAV Report: Rakuten Mobile
Second Review Cycle - 11 February 2026

Capability Area	Capability	Score Claimed	Score Validated	Provided Evidence	TMF (GB1059H) requirements	Questions
Analysis	Solution Generation	A	**A**	AI/ML forecast-driven per-cell decision logic. Dynamic enable/disable generation for powerSavingMode. Distinct 4G and 5G autonomous flows. Structured recommendation payloads generated by RIC application. API-based communication to execution platform. Execution status feedback incorporated. **Evidence demonstrates adaptive, forecast-driven energy-saving solution generation.**	**Option A:** The System intelligently generates energy saving solutions, adjusted to adapt to RAN Traffic & Performance changes, without human intervention	OK

Rakuten Mobile Response:

ANLAV Report: Rakuten Mobile
Second Review Cycle - 11 February 2026

Capability Area	Capability	Score Claimed	Score Validated	Provided Evidence	TMF (GB1059H) requirements	Questions
Decision	Solution Evaluation & Decision Making	A	**A**		**Option A:** The System intelligently evaluates energy saving solution when the recommended solutions are generated, and selects the best solution, without human intervention.	**OK**

Rakuten Mobile Response:

ANLAV Report: Rakuten Mobile
Second Review Cycle - 11 February 2026

Capability Area	Capability	Score Claimed	Score Validated	Provided Evidence	TMF (GB1059H) requirements	Questions
Execution	Solution Implementation	A	**A**	Stepwise execution logs: Intent loading, Cell processing, GET API state verification, SET API configuration change, Notification response from CMaaS. HTTP 200 responses confirming successful execution. Production service endpoints visible in logs. Dashboard showing request processing and execution status. No manual approval or intervention stage observed. **Evidence demonstrates fully automated production implementation of energy-saving actions**.	**Option A:** The System implements solution without human supervision.	**OK**

Rakuten Mobile Response:

Rakuten Mobile TMF ANL Evaluation (RAN Energy Optimization)

Powered By Rakuten Symphony

How RMI Delivers Autonomous RAN Energy Saving

- **Cloud-Native Open RAN Foundation:** Rakuten Mobile's fully cloud-native, disaggregated Open RAN on the Rakuten Symphony platform enables software-defined, automated, and intent-driven RAN operations.
- **RAN Intelligent Control (RIC) Platform:** RIC Platform enables the deployments of rApps for network optimization including energy saving, with integrated Conflict Detection and Mitigation Function (CDMF), with operational dashboards for monitoring and so on.
- **Data and AI Platform:** Enable the data collection, data engineering, data pipeline creation, AI/ML model deployment, scheduled retraining, inference pipelines creation and so on.
- **AI-Powered Cognitive Intelligence:** Integrated AI/ML-driven rApps (RIC Applications) analyze KPIs, detect patterns, and forecast future cell traffic patterns, KPIs and metrics utilized in energy saving decision making mechanisms.
- **RIC Application (rApp):** Enables the definition of energy saving intent, ingests input from the AI/ML models, makes decisions based on intent and output of AI/ML model, executes actions, self-monitors performance and checks for discrepancies with near-real time KPIs/metrics applying auto-correction when discrepancies are detected and so on.
- **End-to-End Energy Saving:** The system autonomously initiates energy saving based on the defined intent and derived technical criteria, whilst self-monitoring and taking corrective actions accordingly to preserve customer experience.

Energy Efficiency KEI:

Energy Conservation（GWh）
~20%

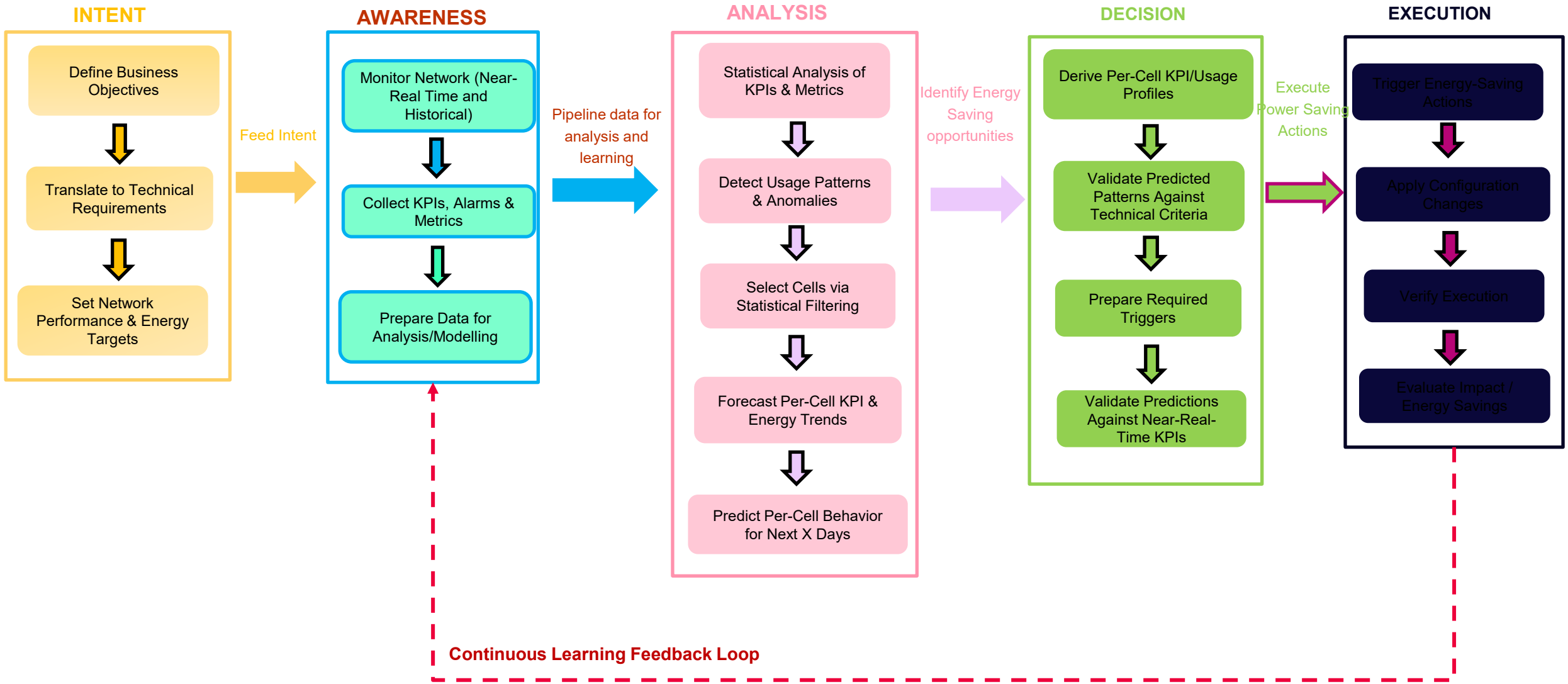
Autonomous network level evaluation - RAN Energy Optimization (1/2)

High- Value Scenario	Cognitive Activity (IAADE)	Service Capability	Weight	Question	Rakuten Mobile Option A	Option B	Option C	Option D
RAN - Energy Optimization	Intent	Intent Translation	15%	How does the System translate the RAN Energy saving intent to the RAN energy saving related control information? RAN energy saving intent includes RAN energy saving targets and performance targets (including but not limited to RAN UE Throughput Targets). Note1: Human defined policies can overwrite the automated selection of energy saving candidate objects	Based on RAN energy saving Intent defined by Human, the System automatically selects candidate energy-saving objects (e.g. NE/CELL) and generates the RAN energy saving related control information based on the RAN energy saving intent, without Human Intervention. The system can automatically explore the energy saving gains and performance impacts to support human continuous adjustment of intent targets to achieve optimal energy saving effect and performance.	The System can automatically generate RAN energy saving related control information through the execution of predefined Rules. Human manually select candidate energy-saving objects (e.g. NE/CELL) and confirm the RAN energy saving related control information based on the RAN energy saving intent.	RAN energy saving related control information are manually defined based on expertise	
		Intent Fulfilment evaluation	10%	How does the System evaluate RAN energy saving intent fulfilment?	The system automatically evaluates and generates an intent fulfilment report including targets fulfilment status, based on intent.	The system automatically evaluates and generates an intent fulfilment report (including targets fulfilment status) based on intent, but human confirms the evaluation result	Intent Fulfilment is manually evaluated	
	Awareness	RAN Energy Saving Information Collection	10%	How does the System collect RAN energy saving related information? RAN energy saving related information includes but not limited to energy efficiency measurements, e.g. Data Volume measurement and performance data, network configuration data e.g. energy saving state and environment data e.g. electronic map, site location.	The System continuously collects RAN energy saving related information, without human intervention	The System continuously collects RAN energy saving related information, but requires human intervention (e.g.: for data quality checks)	The System continuously collects RAN energy saving related information based on predefined rules.	RAN energy saving related information are collected based on expertise

Autonomous Network Level Evaluation - RAN Energy Optimization (2/2)

High- Value Scenario	Cognitive Activity (IAADE)	Service Capability	Weight	Question	Rakuten Mobile Option A	Option B	Option C	Option D
RAN - Energy Optimization	Analysis	RAN Energy Saving Issues Identification	10%	How does the System identify RAN energy saving issues? e.g. insufficient energy saving issue, high energy consumption, low energy efficiency and performance issues caused by energy savings actions	The System intelligently identifies energy saving issues, without human intervention.	The System intelligently identifies energy saving issues, but requires human intervention for issue confirmation	The System identifies energy saving issues based on predefined rules.	Energy saving issues are manually identified.
		RAN Traffic & Performance Prediction	10%	How does the System predict traffic load and network performance that can be used for RAN energy saving solutions? Traffic load includes but not limited to PRB utilization rate. Network performance includes but not limited to RAN UE throughput	The System intelligently predicts traffic load & network performance that can be used for energy saving solution at the minimum granularity that data is available from the source, without human intervention.	The System intelligently predicts traffic load & network performance that can be used for energy saving solution, without human intervention.	The System predicts traffic load & network performance that can be used for energy saving solution, based on predefined rules.	Traffic load & network performance trend need to be manually established based on human expertise or through the execution of manual written procedures.
		RAN Energy Saving Issues Demarcation & Root Cause Analysis	10%	How does the System demarcate energy saving & performance issues and analyze their root cause (e.g., performance issues caused by which energy saving actions)?	The System intelligently demarcates energy saving & performance issues and analyze their root cause, without human intervention	The System intelligently demarcates energy saving & performance issues and analyze their root cause, but requires human intervention to confirm the root causes	The System identifies energy saving issues, based on predefined rules The root cause is analysed by expert	Energy saving & performance issues demarcation and root cause analysis are performed manually
		Solution Generation	15%	How does the System generate the recommended RAN energy saving solutions to solve the identified energy saving issues?	The System intelligently generates energy saving solutions, adjusted to adapt to RAN Traffic & Performance changes, without human intervention	The System intelligently generates energy saving solutions, without human confirmation	The System generates energy saving solutions based on predefined rules, and requires human intervention.	Energy saving solutions are manually proposed based on expertise.
	Decision	Solution Evaluation & Decision Making	10%	How does the System evaluate energy saving solutions and decide on the best solution to be implemented?	The System intelligently evaluates energy saving solution when the recommended solutions are generated, and selects the best solution, without human intervention	The System intelligently evaluates energy saving solution and selects the best solution, but requires human confirmation	The System evaluates energy saving solution and selects the best solution based on predefined rules	Energy saving solutions are evaluated and decided based on manual expertise.
	Execution	Solution implementation	10%	How does the System implement solution that can resolve identified energy saving issues?	The System implements solution without human supervision	The System implements solution under human supervision	Solution implementation is entirely manual.	

Rakuten Mobile E2E Autonomous Energy Savings Flow



Overall

In the ratings of eight autonomous capability for RAN energy optimization, all the service capabilities are currently assessed as “A”. The sub scenarios include Intra-RAT Intra-frequency multi-Site energy saving (80%), Intra-RAT inter-frequency multi-Site energy saving (N/A), Inter-RAT multi-Site energy saving (20%).

Service Capability	Weight	Answer	Score
Intent Translation	15%	A	4
Intent Fulfilment evaluation	10%	A	4
RAN Energy Saving Information Collection	10%	A	4
RAN Energy Saving Issues Identification	10%	A	4
RAN Traffic & Performance Prediction	10%	A	4
RAN Energy Saving Issues Demarcation & Root Cause Analysis	10%	A	4
Solution Generation	15%	A	4
Solution Evaluation & Decision Making	10%	A	4
Solution implementation	10%	A	4
			4

Intent Translation

Question	Rakuten Mobile Assessment
How does the System translate the RAN Energy saving intent to the RAN energy saving related control information? RAN energy saving intent includes RAN energy saving targets and performance targets (including but not limited to RAN UE Throughput Targets). Note1: Human defined policies can overwrite the automated selection of energy saving candidate objects	**Option A**

Intent Translation Process Flow

Capability

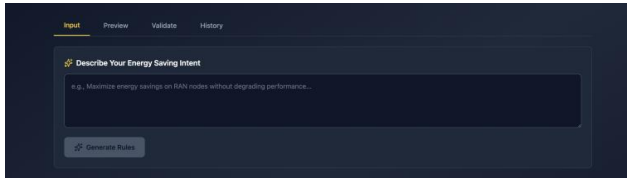
Once the RAN Energy Saving intent is defined, the system autonomously identifies suitable energy-saving candidate objects (such as network elements or cells). Based on the declared intent, it automatically generates the required RAN energy-saving control information.

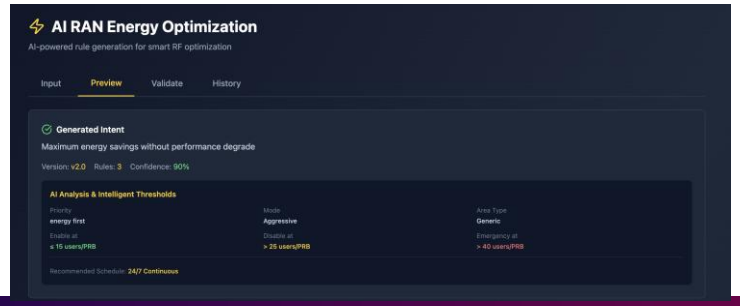
The system continuously evaluates potential energy savings alongside performance impacts. This assessment supports adjustments to intent targets, if needed, to achieve an optimal balance between energy efficiency and network performance.

Intent: Maximum RAN Energy Savings while maintaining customer experience, based on the traffic patterns.

Evidences

Intent → Define Technical Criteria and Thresholds





Based on the declared intent of maximizing energy savings without impacting customer experience, the system determines threshold levels for key performance indicators (KPIs) and metrics that safeguard customer experience. These KPI and metric threshold levels can be adjusted, if required, through configuration settings provided in JSON format.

- Metrics: A, B..
- Threshold levels: defined for enabling and disabling power-saving modes. Example condition: *Cell metric ≤ defined threshold level*

The system forecasts per-cell traffic using the selected metrics and applies the defined threshold levels to decide when to enable or disable energy-saving modes. These actions may include cell locking/unlocking or switching transmission configurations (for example, from 4x4 to 2x4).

Intent Fulfilment Evaluation

Question	Rakuten Mobile Assessment
How does the System evaluate RAN energy saving intent fulfilment?	**Option A**

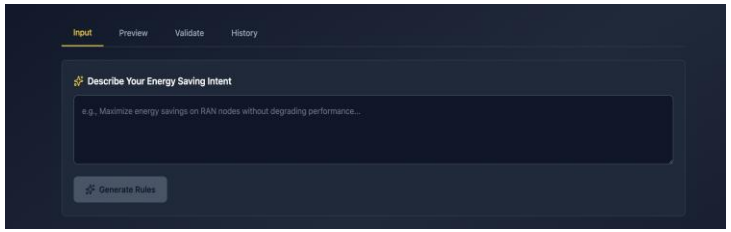
Intent Fulfilment Evaluation Process Flow

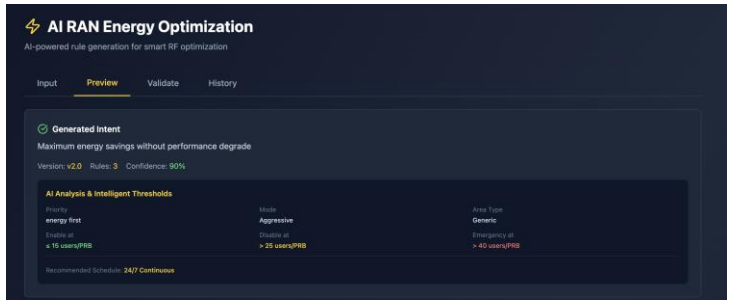
Capability

The system continuously determines and generates a set of actions in near real time based on the fulfillment of energy-saving intents. For example, when defined KPI thresholds are met, the system identifies the specific configuration changes required and the corresponding network resources on which they should be applied.

Evidences

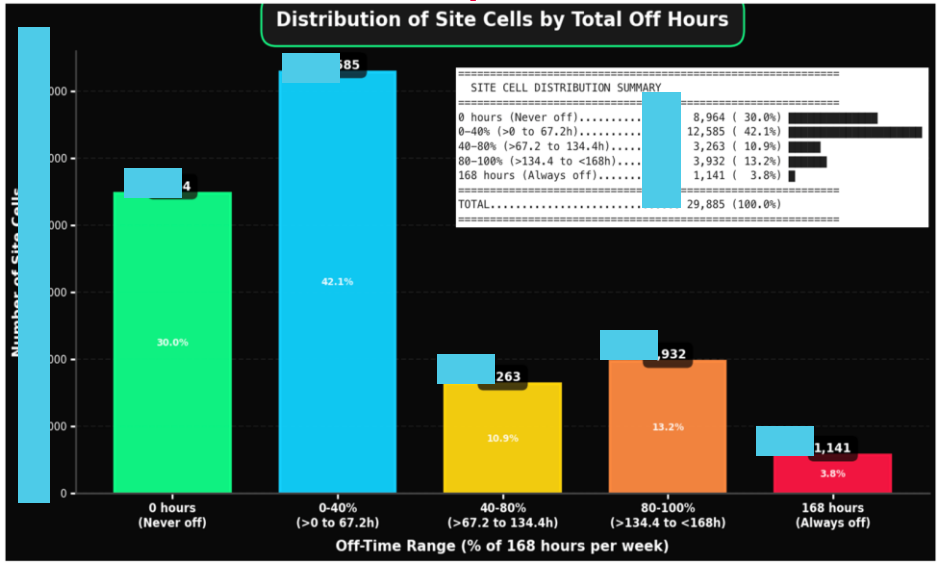
Intent → Derive Technical Criteria and Thresholds → Evaluate Intent Fulfillment





The user defines the business intent by specifying the desired energy-saving objective for the RAN. This intent serves as the primary input to the system.

Based on the user-defined business intent, the system automatically generates the intent rules and derives measurable technical criteria and thresholds.



This represents set of actions that are generated based on given intent fulfillment evaluation comprises of set of network resources and proposed changes to achieve required energy savings

RAN Energy Saving Information Collection

Question	Rakuten Mobile Assessment
How does the System collect RAN energy saving related information? RAN energy saving related information includes but not limited to energy efficiency measurements, e.g. Data Volume measurement and performance data, network configuration data e.g. energy saving state and environment data e.g. electronic map, site location.	**Option A**

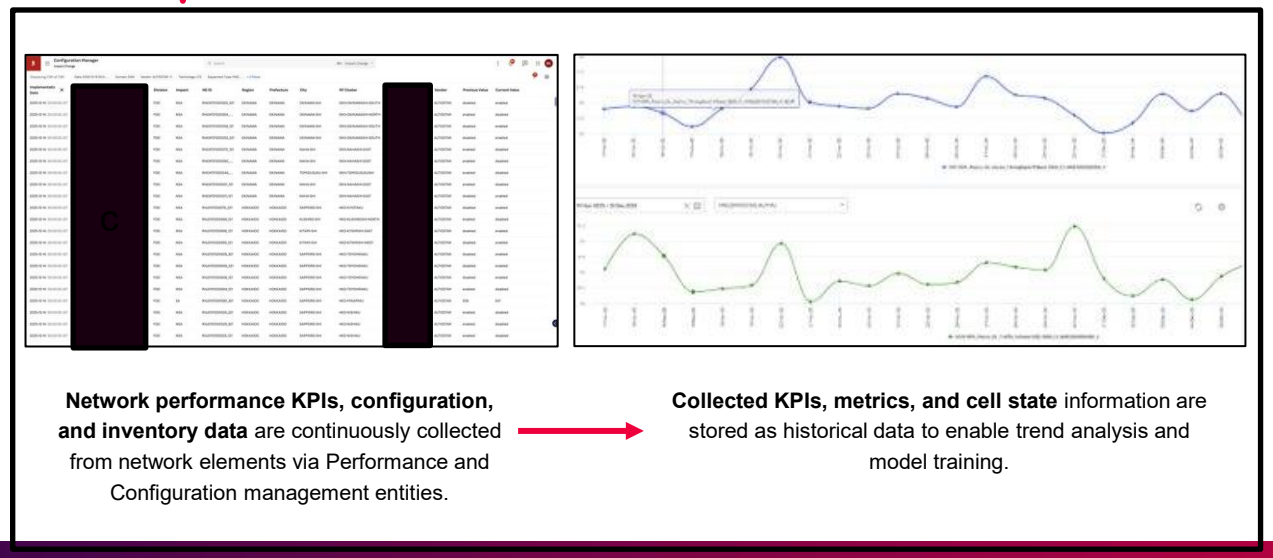
RAN Energy Saving Information Collection Process Flow

Capability

The system continuously collects network performance KPIs and metrics in near real time through integration with Performance Monitor. Network configuration data, including site location information, is gathered from Configuration Manager and the Inventory system. Historical network performance KPIs and metrics are used to train forecasting models. All cell state information is maintained in the Configuration manager database.

Evidence

Network Elements → KPI & Metric Collection → Historical Data Storage → Near-Real Time Data Collection



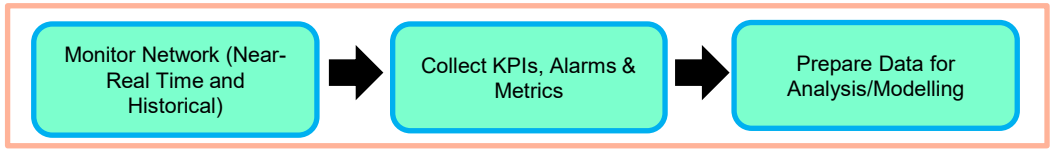
Network performance KPIs, configuration, and inventory data are continuously collected from network elements via Performance and Configuration management entities.

Collected KPIs, metrics, and cell state information are stored as historical data to enable trend analysis and model training.

RAN Energy Saving Issues Identification

Question	Rakuten Mobile Assessment
How does the System identify RAN energy saving issues? e.g. insufficient energy saving issue, high energy consumption, low energy efficiency and performance issues caused by energy savings actions	**Option A**

RAN Energy Saving Issues Identification Process Flow



Capability

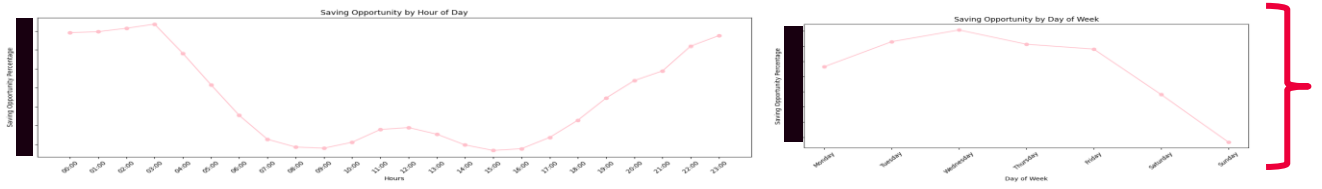
The system identifies energy-saving issues using both **non-real-time** and **near-real-time monitoring** of network behavior.

- System continuously evaluates the effectiveness of energy-saving actions by comparing **model predictions**, **executed configuration changes**, and **actual network KPIs** and metrics. This assessment determines how accurately energy-saving opportunities are being realized in live network conditions. Based on execution outcomes and observed changes in traffic patterns, the model is periodically retrained and fine-tuned to improve prediction accuracy and decision quality.
- In parallel, the system performs near-real-time KPI monitoring to detect any discrepancies between expected outcomes and actual network performance following energy-saving actions.

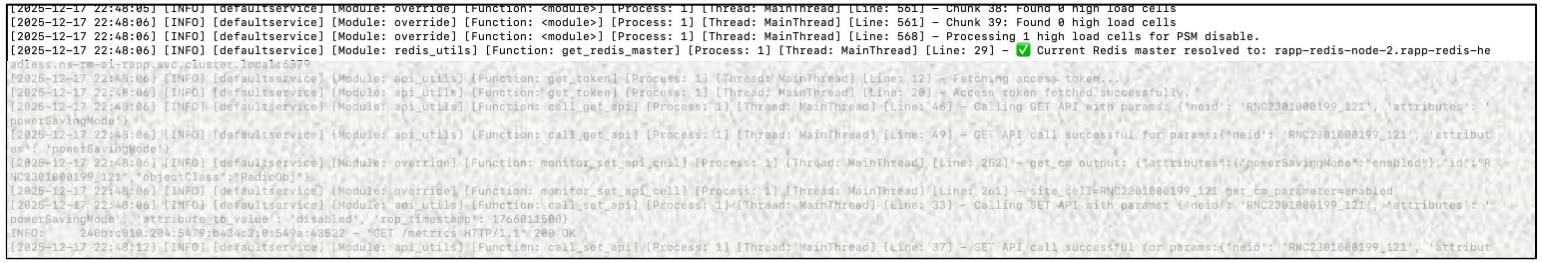
Evidence

Trigger Actions → Configuration Change Execution → Validate Energy Saving Opportunity Realization → Detect Near RT KPI Discrepancies

This view shows the system triggering energy-saving actions and executing the corresponding configuration changes on RAN elements based on identified opportunities.



System identifies the energy saving opportunities patterns through the hours of day and days of the week.



System logs capture real-time detection of high-load cells and the corresponding decision to disable power-saving mode. The logs provide execution-level traceability, including timestamps, affected cells, and API invocations, confirming that the system continuously validates intent outcomes and dynamically adjusts configurations to prevent performance degradation.

RAN Traffic & Performance Prediction

Question	Rakuten Mobile Assessment
How does the System predict traffic load and network performance that can be used for RAN energy saving solutions? Traffic load includes but not limited to PRB utilization rate. Network performance includes but not limited to RAN UE throughput	**Option A**

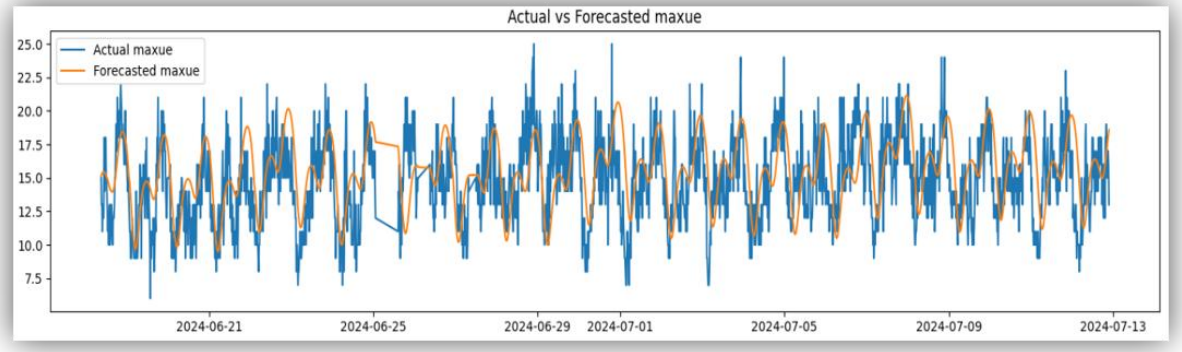
RAN Traffic & Performance Prediction Process Flow

Capability

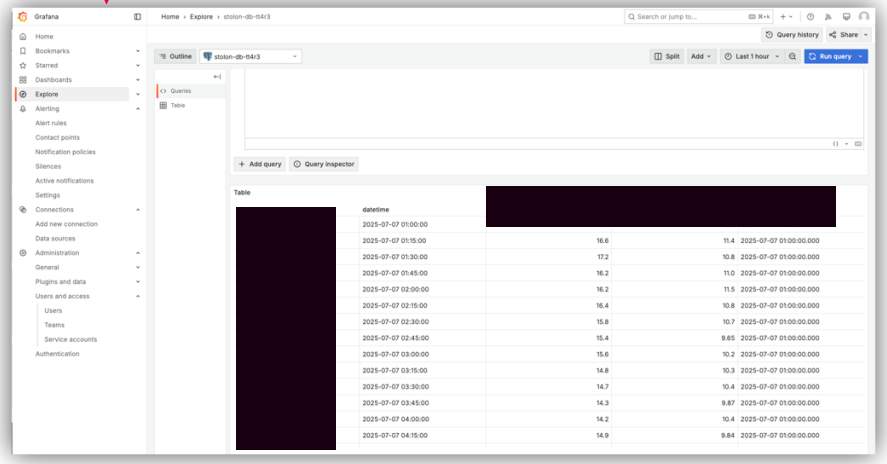
The system first performs statistical analysis on historical per-cell KPIs and metrics to identify outliers and classify cells into regular, irregular, and constant usage patterns. Based on this classification, network elements are categorized and an ensemble forecasting model is tuned to reflect the observed behavior. The system then uses historical data from all non-filtered cells to forecast key decision-making metrics for a defined number of future days.

Evidence

Data Pipeline → Statistical Analysis → Filtering & Categorization → Create & Tune Model → Forecast KPIs/Metrics per Cell



High-accuracy traffic and performance forecasts are continuously validated against near real-time network measurements. When deviations are detected between forecasted and actual KPI values, the monitoring mechanism automatically triggers corrective actions. As illustrated, for approximately 75% of cases, the decision logic for locking a cell operates within a low prediction error margin of around 1.4%, demonstrating the reliability of the forecasting model for operational decision-making.



Shows the structured per-cell forecast output and historical KPI inputs used by the prediction engine.

RAN Energy Saving Issues Demarcation & Root Cause Analysis

Question	Rakuten Mobile Assessment
How does the System demarcate energy saving & performance issues and analyse their root cause (e.g., performance issues caused by which energy saving actions)?	**Option A**

RAN Energy Saving Issues Demarcation & Root Cause Analysis Process Flow

Capability

The system systematically demarcates and analyzes energy-saving–related issues by correlating configuration actions, execution outcomes, and near-real-time performance KPIs. It distinguishes between different iss categories to accurately identify root causes and trigger appropriate corrective actions. The system classifies issues into the following categories:

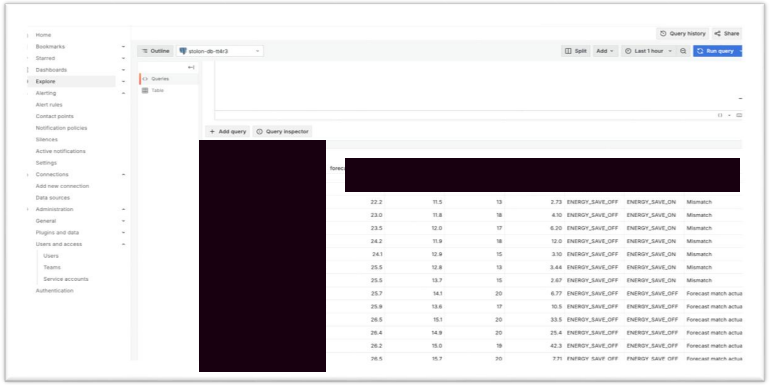
- **Action execution failures** – configuration changes that fail during execution
- **Action timeouts** – actions that exceed allowed execution time
- **Aborted actions** – actions intentionally rolled back or stopped by the system
- **Forecast vs. actual KPI discrepancies** – performance deviations caused by inaccurate traffic or load predictions

For each identified issue type, the system automatically determines the root cause and initiates the appropriate remediation.

Evidence

Execute Energy Saving Configuration Changes for → Validate Execution Status → Identify Root Cause

Displays failed, aborted, and execution delays that may impact system performance.



Shows Forecast vs. actual KPI discrepancies

Solution Generation

Question	Rakuten Mobile Assessment
How does the System generate the recommended RAN energy saving solutions to solve the identified energy saving issues?	**Option A**

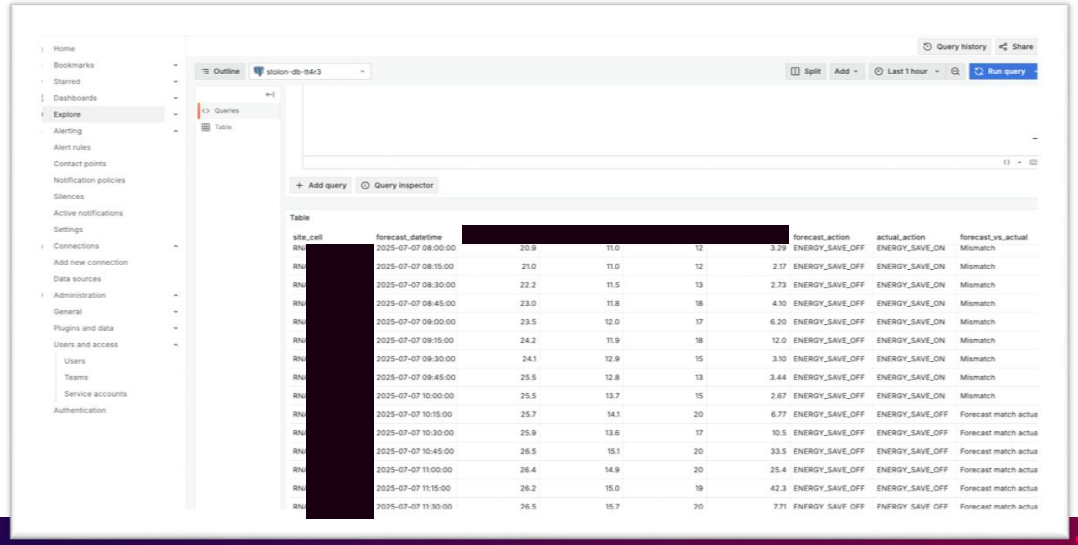
Solution Generation Process Flow

Capability

The model is regularly trained to detect changes in network traffic patterns and account for performance variations. Forecasted metrics for each cell are stored in a database. Using this data, along with technical criteria derived from the intent, the system generates recommended settings—such as enabling or disabling power-saving mode—and prepares the necessary triggers or actions for each cell. The system also continuously monitors its actions in near real-time and automatically corrects any discrepancies it detects.

Evidence

Get forecasted KPIs/metrics → Generate recommended settings→ Generate required actions → Self-monitor in near real-time



Forecasted data, recommended settings and self monitoring

Action Triggering Flow

Solution Evaluation & Decision Making

Question	Rakuten Mobile Assessment
How does the System evaluate energy saving solutions and decide on the best solution to be implemented?	**Option A**

Solution Evaluation & Decision Making Process Flow

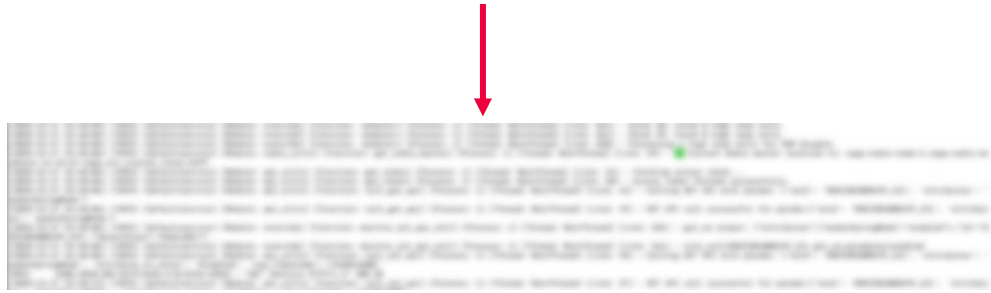
Capability

The system generates recommended settings, triggers the required actions, and continuously self-monitors with automatic corrections. As part of self-monitoring, it estimates energy savings using forecasted data. System performance is continuously assessed, including how effectively the AI/ML model identifies energy-saving opportunities and how accurately the system executes decisions. Based on this evaluation, cells are classified into high, medium, or low energy-saving opportunity categories, and the system acts accordingly for each category.

Evidence

Check Cell Energy Saving Opportunity → Trigger Action through RIC Platform → Self-Monitor & Evaluate → Auto-correct

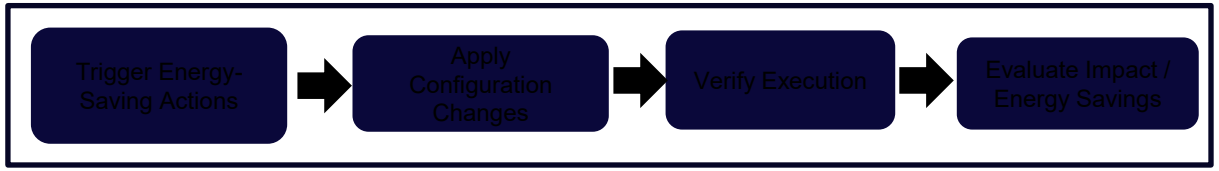
Illustration of system self-evaluation report generated on daily basis.



Solution Implementation

Question	Rakuten Mobile Assessment
• How does the System implement solution that can resolve identified energy saving issues?	**Option A**

Solution Implementation Process Flow



Capability

The application is implemented and deployed as a cloud-native solution composed of multiple microservices. It incorporates an AI/ML engine, comprehensive monitoring and logging capabilities, and automated fault-handling mechanisms. The application integrates with the RIC Platform, which in turn interacts with CMaaS to execute the recommended configuration changes on the network elements (cells).

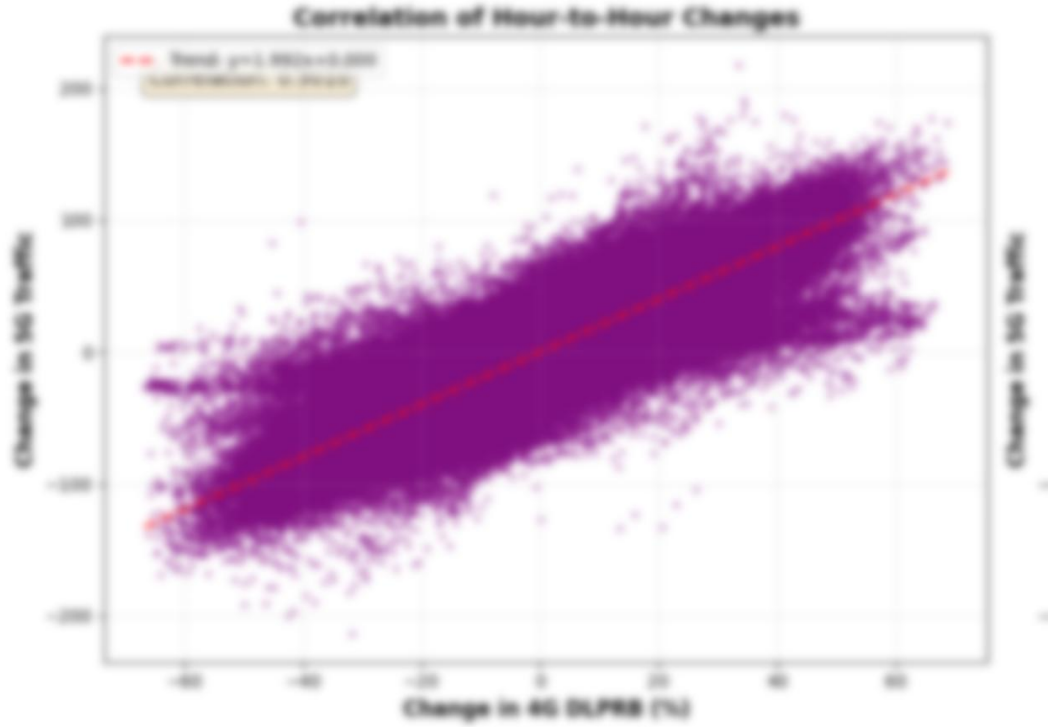
Evidence

Check Cell State → Trigger Action → Execute Configuration Change → Verify Execution

Sample workflow of the application/system.

Inter-RAT (4G and 5G) Energy Saving

- The system prioritizes 4G KPIs and metrics as a proxy in the decision-making process for 5G energy-saving mode when the 5G cell is in a locked administrative state.
- An increase in traffic on anchor 4G cells triggers actions to unlock or switch on the corresponding 5G cells.




```
Function: <module>] [Process: 1] [Thread: MainThread] [Line: 537] - Found 15 cells with changed state.

Function: <module>] [Process: 1] [Thread: MainThread] [Line: 561] - Chunk 1: Found 1 high load cells
Function: <module>] [Process: 1] [Thread: MainThread] [Line: 568] - Detected 1 highly loaded 4G cell(s) whose neighbor 5G cell(s) is turned off.
] [Function: get_redis_master] [Process: 1] [Thread: MainThread] [Line: 29] - ✅ Current Redis master resolved to: rapp-redis-node-2.rapp-redis-headless

[Function: get_token] [Process: 1] [Thread: MainThread] [Line: 12] - Fetching access token...
[Function: get_token] [Process: 1] [Thread: MainThread] [Line: 20] - Access token fetched successfully.
```

Thank you

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