

# OT Automation System Use Cases

## Overview

This document outlines five key use cases for a fully implemented OT automation system, including the workflow and components involved in each scenario.

## Use Cases

### 1. Automated Network Failover

**Description:** When a critical network component fails, the system automatically detects the issue and reroutes traffic through backup paths without human intervention, ensuring continuous service availability.

flowchart LR

```
A[Failed Router] -->|Alarm| B[OSS Fault Management]
B -->|Analyze| C[Topology Database]
C -->|Calculate Route| D[Orchestration Engine]
D -->|Configure| E[Backup Routers]
D -->|Configure| F[Core Switches]
E -->|Acknowledge| G[Performance Monitor]
F -->|Acknowledge| G
G -->|Verify| H[Service Restored]
H -->|Notify| I[NOC Dashboard]
```

### 2. Rapid Service Provisioning

**Description:** Customer orders a new service online, and the system automatically configures all necessary network elements end-to-end, activating the service within minutes instead of days.

flowchart LR

```
A[Customer Portal] -->|Order| B[BSS/OSS Interface]
B -->|Validate| C[Inventory System]
C -->|Design| D[Service Orchestrator]
D -->|Configure| E[CPE Device]
D -->|Configure| F[Access Switch]
D -->|Configure| G[Core Router]
D -->|Configure| H[Firewall]
E & F & G & H -->|Status| I[Provisioning Monitor]
I -->|Activate| J[Service Live]
J -->|Notify| A
```

### 3. Predictive Maintenance

**Description:** System continuously analyzes performance metrics from network devices to predict failures before they occur, automatically scheduling maintenance.

nance or adjusting parameters to prevent service impact.

flowchart LR

```
A[Network Devices] -->|Telemetry| B[Performance Database]
B -->|Stream| C[AI/ML Engine]
C -->|Predict| D[Maintenance Scheduler]
D -->|Generate| E[Work Order System]
C -->|Alert| F[Orchestration Platform]
F -->|Adjust| G[Device Parameters]
E -->|Schedule| H[Field Technician]
G -->|Update| A
B -->|Dashboard| I[Operations Center]
```

#### 4. Security Compliance Automation

**Description:** Continuous security audit of all network devices with automatic remediation of configuration deviations and coordinated patch deployment across the infrastructure.

flowchart LR

```
A[Security Policy DB] -->|Baseline| B[Compliance Engine]
B -->|Audit| C[Network Devices]
C -->|Config Data| B
B -->|Deviations| D[Remediation System]
D -->|Fix Commands| E[Configuration Manager]
E -->|Apply| C
F[Patch Repository] -->|Updates| G[Patch Orchestrator]
G -->|Deploy| C
C -->|Status| H[Security Dashboard]
B -->|Report| I[Audit Logs]
```

#### 5. Dynamic Capacity Management

**Description:** Real-time monitoring of network utilization with automatic capacity adjustments to handle traffic spikes, optimize resource usage, and maintain quality of service.

flowchart LR

```
A[Traffic Monitors] -->|Metrics| B[Analytics Engine]
B -->|Thresholds| C[Capacity Manager]
C -->|Demand Forecast| D[Resource Optimizer]
D -->|Commands| E[SDN Controller]
E -->|Adjust| F[Routers/Switches]
E -->|Modify| G[Optical Transport]
E -->|Scale| H[Virtual Functions]
F & G & H -->|Feedback| B
C -->|Alert| I[NOC Display]
D -->|Report| J[Capacity Planning]
```

## Implementation Notes

Each use case leverages multiple OSS/BSS components working in concert:

- **Orchestration Platforms** coordinate actions across domains
- **Inventory Systems** maintain real-time network state
- **Analytics Engines** process telemetry for intelligent decisions
- **Configuration Managers** ensure consistent device settings
- **Monitoring Systems** provide continuous visibility
- **API Gateways** enable integration between components

The success of these automated workflows depends on: 1. Standardized device APIs (NETCONF/RESTCONF) 2. Real-time telemetry collection 3. Accurate network inventory 4. Robust orchestration logic 5. Comprehensive testing and validation

## Technical Architecture

### Core Components

Component	Function	Key Technologies
Service Orchestrator	End-to-end workflow automation	BPMN, TOSCA, YANG models
Configuration Manager	Device configuration management	Ansible, NSO, NETCONF
Performance Database	Time-series telemetry storage	InfluxDB, Prometheus
Analytics Engine	ML-based predictive analysis	TensorFlow, Apache Spark
Inventory System	Real-time network topology	Graph DB, Neo4j
Policy Engine	Business rule enforcement	Drools, OPA

### Integration Patterns

The automation system employs several integration patterns:

- **Event-Driven Architecture:** Components communicate through event streams (Kafka)
- **API-First Design:** RESTful APIs for all inter-component communication
- **Microservices:** Each functional domain deployed as independent services
- **GitOps:** Configuration as code with version control and CI/CD pipelines

## Benefits Summary

### Operational Benefits

- **Reduced MTTR:** From hours to minutes for common failures
- **Elimination of Human Error:** Standardized, tested automation workflows
- **24/7 Autonomous Operation:** No dependency on human availability
- **Proactive vs Reactive:** Issues resolved before customer impact

### Business Benefits

- **Faster Time to Revenue:** Services activated in minutes not weeks
- **Reduced OpEx:** Fewer manual interventions and truck rolls
- **Improved SLAs:** Higher availability and consistent performance
- **Competitive Advantage:** Ability to offer on-demand, API-driven services

### Strategic Benefits

- **Scalability:** Handle network growth without proportional staff increase
- **Innovation Platform:** Foundation for new services (network slicing, edge computing)
- **Data-Driven Insights:** Rich telemetry enables business intelligence
- **Future-Ready:** Prepared for 5G, IoT, and cloud-native architectures

## Conclusion

A fully implemented OT automation system transforms network operations from reactive manual processes to proactive autonomous management. By orchestrating complex workflows across heterogeneous infrastructure, telecommunications providers can achieve unprecedented levels of efficiency, reliability, and agility. The five use cases presented here represent just the beginning of what's possible when network intelligence is combined with comprehensive automation capabilities.