

Project Completion Report

Project Title: Nagios XI Upgrade and HA Implementation

Project Duration: March 2025 – June 2025

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1. Executive Summary

This report outlines the successful completion of the Nagios XI Upgrade and High Availability (HA) Implementation project carried out for **spectra.co** by **Tetra Information Services LTD** between **March and June 2025**.

The goal was to revamp the monitoring system by upgrading the outdated CentOS-based setup, introducing redundancy through HA configurations, and improving reliability, database performance, and scalability. This project aligns the system for anticipated growth over the next 3–5 years and provides a resilient infrastructure to support 15,000+ hosts and over 150,000 monitored services.

All modules planned under this initiative have been executed and validated in collaboration with the client. Deliverables include new HA architecture, upgraded OS/Nagios versions, optimized databases, real-time configuration sync, and hardware recommendations for future scaling.

2. Project Objectives

2.1 Core Objectives

- To implement a robust and fault-tolerant **High Availability (HA)** configuration for both Main and Probe monitoring nodes.
- To **upgrade the Operating System** from CentOS 7 (EOL) to Ubuntu 20.04 LTS.
- To **upgrade Nagios XI** from version 5.8.9 to the latest stable release, 2024R1.4.4.
- To **address database performance issues**, backup failures, and table bloating.
- To **ensure real-time synchronization** between Main and Probe environments.
- To stabilize integration with API and Service Request (SR) automation tools.

2.2 Key Deliverables

- HA design documentation finalized with the client
 - Clean OS installations and configuration
 - Upgraded Nagios XI instances
 - Master-Master MySQL Replication and DRBD setup
 - Automated database cleanup configurations
 - Resolved main-probe sync lags
 - Reviewed and stabilized API/SR behavior
 - Capacity roadmap to scale up to 150K services
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3. Scope of Work

The project scope included infrastructure redesign, HA implementation, and full-stack upgrades with minimal downtime. The following major components were included:

- Planning and designing of Main/Probe HA infrastructure
 - Execution of OS and Nagios XI upgrades on both nodes
 - Re-establishing DRBD and MySQL replication clusters
 - Resolving historical database errors
 - Ensuring production-ready probe-main synchronization
 - Addressing post-upgrade API/SR issues
 - Providing a future hardware expansion strategy
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4. Implementation Timeline

Instead of a table, here's the timeline as a step-wise breakdown with date markers:

- **19–25 March 2025** – HA architecture finalized with Spectra
- **26 March – 07 May 2025** – SOC (Secondary) Node OS and Nagios installation completed
- **28 March – 13 May 2025** – Configuration and database migration to new node
- **16–19 May 2025** – Switchover to new SOC node completed
- **20–23 May 2025** – Primary Node OS/Nagios rebuilt and upgraded
- **24 May – 10 June 2025** – Main and Probe HA clusters established
- **10–25 June 2025** – Final testing, sync tuning, and hardware roadmap delivered

Each activity followed strict checklists, supported by configuration screenshots and validations reviewed by the client.

5. Detailed Activities and Outcomes

Module 1: HA Architecture Design

- Multiple HA models were proposed, tested, and validated.
 - Final decision involved using **MySQL master-master replication** and **DRBD** for file-level sync.
 - No major new hardware purchases were required at this stage.
 - Documentation of cluster failover scenarios was shared with Spectra.
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Module 2: OS and Application Upgrade

2.1 HA Break and Initial Preparation

- HA was temporarily disabled.
- Services temporarily shifted to the Main node.

2.2 Secondary Node Installation

- Ubuntu 22.04 LTS was first used, but changed to 20.04 LTS as per client feedback.
- Nagios XI 5.7 installed successfully, preparing for upgrade.

2.3 Configuration Migration

- Nagios configurations, DBs, custom scripts were moved from the old system.
- Data validation, backup recovery, and plugin compatibility tests were performed.

2.4 SOC Go-Live

- Final production cutover took place on **19 May 2025**.
- Monitoring services resumed without loss of data or downtime.

2.5 Primary Node Upgrade

- Rebuilt Primary Node from scratch with Ubuntu 20.04 LTS.
 - Upgraded Nagios XI to 2024R1.4.4.
 - Configured DRBD and MySQL replication to secondary node.
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Module 3: HA Configuration – Main

- Cluster fencing, shared IP configuration, and failover scripting implemented.
 - **DRBD replication** verified for logs, configs, and backups.
 - **MySQL master-master** pair synchronized and validated.
 - All services continued without interruption during switchover simulations.
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Module 4: HA Configuration – Probe

- Probe node was duplicated and configured with identical packages.
 - MySQL cluster and DRBD replication implemented as in Main node.
 - Configured to handle real-time alerts and monitoring data from remote devices.
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Module 5: Database Issue Resolution

- Backups were previously failing due to large `.ibd` files and table locks.
 - Old tables (over 5GB each) were split and purged with automation.
 - Enabled **automated cleanup** scripts in Nagios XI.
 - Post-cleanup system is stable, with backup jobs running nightly.
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Module 6: Main–Probe Synchronization

- Prior to the upgrade, there were 15–20 minute lags in alarm sync.
 - Post-upgrade, the sync is **real-time**, with instant propagation of changes.
 - This led to faster deployment, reduced troubleshooting, and higher monitoring accuracy.
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Module 7: API & Integration

- SR automation previously created duplicate or missing records.
 - Integration scripts were revalidated and corrected with vendor support.
 - Delay in SR acknowledgment reduced from 5–10 mins to <2 mins on average.
 - Final integration success rate is now above 97%.
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Module 8: Hardware and Software Planning

- Final architecture allows for growth up to **150K services**.
 - Main HA servers:
/ = 600GB, /data = 5.2TB, RAM = 128GB, vCPU = 12
 - Probe nodes:
/ = 500GB, /data = 500GB, RAM = 32GB, vCPU = 4–6
 - Hardware scaling roadmap provided and accepted by Spectra.
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6. Key Challenges & Resolutions

- OS version conflict resolved by switching from 22.04 LTS to 20.04 LTS.
 - DRBD sync stalls fixed by tuning resource parameters.
 - Partition size mismatches addressed via disk resizing.
 - Backup failures resolved through database optimization.
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7. Recommendations

- Continue monitoring synchronization and replication status weekly.
 - Maintain **quarterly health checks** on MySQL size and HA logs.
 - Keep probe configuration updated for future monitoring growth.
 - Begin planning for cloud-based hybrid Nagios XI extension in 2026.
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8. Conclusion

The project has been executed successfully and fulfills all design, functionality, and availability expectations. The Nagios XI infrastructure is now fault-tolerant, stable, and scalable for years to come.

Final Handover Date: 25 June 2025

Project Closure Status: ✓ Fully Completed

9. Appendices

9.1 Reference Document List

The following documents were created, reviewed, and shared with **spectra.co** throughout the project lifecycle. Each document supports the execution and validation of key modules in the HA architecture, upgrade strategy, configuration, and optimization.

1. **Proposed Monitoring Architecture – Spectra**
Describes the final HA design including main and probe node layout, resource planning, and IP failover strategy.
2. **Solution Document – Nagios HA Comparison with Architecture Diagram**
Provides comparative analysis of different HA deployment methods and justifies selected approach for Spectra.
3. **PCS Cluster Failover – Process**
Step-by-step documentation outlining cluster fencing, VIP migration, and automatic failover process validation.
4. **Spectra_SOC Nagios Optimization – Project Status (Final Sheet)**
Status tracking sheet showing all completed activities, timelines, dependencies, and mitigation actions.
5. **Nagios XI Cluster Setup Checklist**
Comprehensive deployment checklist used by engineers to ensure no step was missed during HA and sync configuration.