Designing Large-Scale Automation Systems for Russian Steel Manufacturer

Customer: NLMK Group Lipetsk Branch

Industry: Manufacturing/Industrial
Location: Russia

Customer

NLMK is one of the most efficient and profitable steelmakers in the world. The company is a leading international manufacturer of high-quality steel products, with a vertically integrated business model.

Mining and steelmaking are concentrated in cost-efficient regions, while finished products are manufactured close to customers in Russia, North America and the EU.

Challenge

NLMK Group's Lipetsk branch underwent the implementation of large-scale automation systems consolidation.

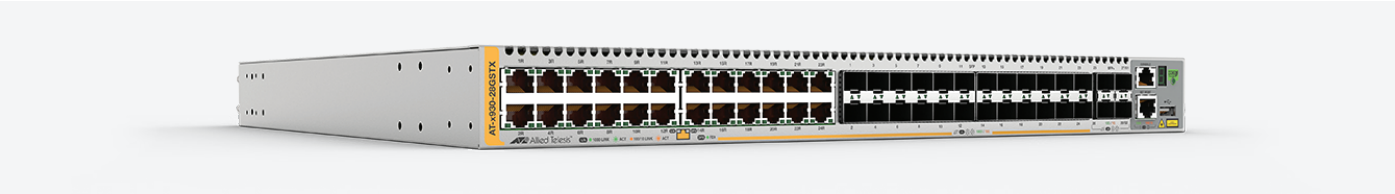
For this project, four data center automation systems or sites were deployed, covering eight main workshops and productions—two blast-furnace workshops, two converter shops and four rolling shops. Each site contains two data centers on two independent sites.

Consolidation implies the transfer of computer equipment (both client workstations and server) to a virtual environment. At the same time, technological networks are undergoing major modernization.

One of the tasks was equipment selection for the distribution level, for aggregating uplinks from the technological networks in the automation systems data centers.

Solution

After a review of several products and vendors, the Allied Telesis x930-28GSTX switch was chosen. This advanced switch met all the company's requirements for hardware and functionality: flexible use in any type of environment; a 24-combo port interface (copper/SFP); flexibility of speed utilization (100 Mbps, 1 Gbps, including SFP, 10 Gbps ports for connection to a high-speed core); stacking capability; gateway backup protocol (VRRP); VRF Lite support; and dynamic routing (OSPF).



The customer pointed out the number of VRF contexts on this device—up to 64, while many analogs have up to 24. Support of sufficient VRFs was very important, because not only the contexts of individual process units are logically divided, but also the different levels of automation of the same unit (programmable logic controllers level – PLC and human-machine interface level -HMI).

NLMK engineers also noted the factor "price-quality" of these devices. With sufficient functionality and flexibility, the price is slightly lower than that of other leading vendors.

> "In the course of implementation, we encountered a problem with the performance of the VRRP protocol for VRF contexts other than the "default" one. Thanks to the productive interaction with the technical support service, a case was opened on this issue, a fix was issued that solved the problem, and now everything works stably with the firmware version 5.4.6-2.6."

Valery Yeremeyev

Head of the Technological Networks Department of the NLMK Process Automation Directorate

Success

During the project implementation, a modular network and server architecture were created and safely integrated with the enterprise network.

The new network advantages are:

- Computer components of automation systems (CA) are taken out of the workshop to a virtual protected environment, which excludes equipment physical access.
- Extensive virtual environment management capabilities reduce troubleshooting and disaster recovery time.
- Two independent spatially separated data center sites form a catastrophically stable cluster.
- Several levels of redundancy within each site (servers, network devices, disks, storage systems, etc.) minimize event of a failure.
- Real-time networks located in the shops are physically isolated from each other and from other networks.
- Only the CA components of the relevant unit have access to the real-time networks of this unit.
- There is redundant communication of each CA with central sites on the passive fiber-optic network.
- Secure controlled connection to the corporate network minimizes the possibility of information attacks.
- The new network has the ability to independently monitor all traffic with aggregate networks at aggregation points.
- Thin clients on aggregate posts exclude attacks and abuses through removable media.

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