CNC Machines Remote Monitoring

Computerized numerical control (CNC) machines are playing an increasingly important role in industrial automation. Featuring fast and reliable networking, python programming and industrial-grade design, the IR900 offers LTE connectivity to the CNC machine remote monitoring system, significantly saving both manual labor and costs.

Background

Modern-day machining has grown in leaps and bounds in terms of processing complexity, precision, machine scale, and automation level.
In the improvement of processing quality and efficiency, CNC (computerized numerical control) machine tools play a key role.

The CNC machines are usually costly, any part damage, decrease of production efficiency, or a halt in production may cause substantial losses.
To ensure proper running and realize preventive maintenance of the CNC machines sold to various manufacturing plants,

a machine tool manufacturer requested a remote monitoring and maintenance solution of distributed CNC machines.

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System Requirements:

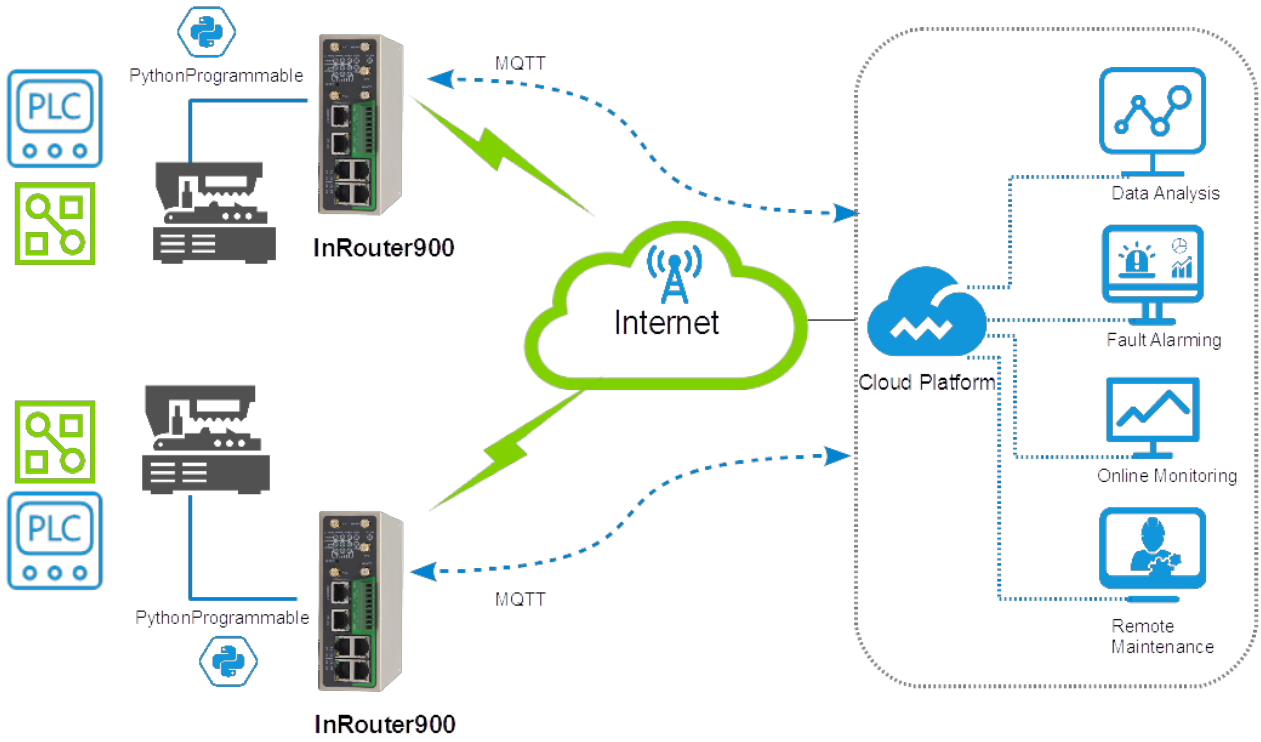
- The gateway shall support LTE to provide quick network access for the machine whether or not there is Ethernet connection on its position
- Firewall protections to safeguard network security
- High-reliability, autorecover from faults and disconnections, to provide reliable communications 24/7
- Support edge computing, preprocessing data on the front end to optimize cloud computing system
- Industrial-grade, can withstand strong EM interferences and other challenging conditions at industrial sites
- Operating temperature range: -25 ~ +70°C

Solution

Using InRouter900 industrial LTE router, the remote monitoring system connects CNC machines distributed at various industrial sites to the cloud platform, to collect and analyze the machines' operation status, degree of wear of vulnerable parts, and data of the electric controlling systems.

Through Python programming, the InRouter900 is developed to support edge computing, to perform data acquisition, data monitoring, data filtering, data cleansing, data security protection, data storage, data submission and logic processing on the front end, reducing the communications bandwidth needed between industrial sites and the central monitoring center, optimizing the cloud com-puting system.

The InRouter900 provides reliable low latency communications between CNC machines and the cloud center. Dual-SIMs allows transmission link redundancy, multi-layer link detection and recovery moreover safeguards uninterrupted communications. Engineers can monitor real-time operation of the machines, response to faults with shortened time, and plan for preventive maintenance, saving both manpower and costs significantly.



Why InRouter900?

- Dual-link backup: support link backup, VRRP for link redundancy; auto switch to backup link when the main link fails;
- Dual-SIMs: support backup between different operator networks to ensure continuous communications;
- Embedded with Python SDK for custom development, Microsoft Azure IoT certified;
- Can be developed to support edge computing through Python programming, to process and analyze data , customer may customize logic processing and local da-ta preprocessing as required;
- Real-time alarming, sending industrial site alarms to the cloud monitoring center and maintenance engi-neers through customer defined methods;
- Fully industrial grade, providing reliable, secure and stable data transmission links for unattended sites.