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MNOs and Private Networks

Bharti Airtel supports Mahindra 5G manufacturing

Who:

Bharti Airtel, Mahindra & Mahindra and Tech Mahindra

What:

A 5G for enterprise solution at Mahindra's car manufacturing facility provided through Airtel and Tech Mahindra partnership to create India's first 5G-enabled car manufacturing plant.

Spectrum:

Airtel provided 5G coverage using n78 3.5 GHz spectrum which was acquired through the auction process in August 2022. Mahindra's Chakan plant has a large campus which was already covered by 4G sites, subsequently upgraded with 5G base stations.
A dedicated 5G core network was deployed to offer standalone 5G services to connect the factory use cases. Public 5G connectivity through the same 5G sites is planned for employees and visitors as well. Sites are dedicated to the captive use cases and therefore slicing is not implemented. Future use cases may use slicing depending upon the solution model.

Client requirement:

The network enhances connectivity at a car manufacturing plant to allow multiple car firmware updates to occur simultaneously, lowering production times and raising productivity. Automated, computerised inspection of production quality is also carried out.

Reliable and dependable data network services along with strong performance SLAs and enhanced network were considered important to meet client needs, a common requirement for enterprise/manufacturing solutions. These are provided through Mahindra's partnership with Airtel for a private 5G connectivity solution. The deployment has enhanced network connectivity at Mahindra's Chakan facility, resulting in improved speeds for software flashing and automated detection of paint defects, leading to an overall increase in efficiency and scalability of operations.

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Solution:

Massive MIMO remote radio heads were installed at the customer premise operating on 3.5 GHz 5G mid-band spectrum. A dedicated 5G core network was specially deployed. The network delivers peak speeds over 1Gbps and latencies as low as around 20ms. The factory campus coverage is over a significant geographical footprint, spanning over 700 acres.

Through the networks, Mahindra and Airtel have been able to achieve parallel software flashing sessions (updating the vehicle's firmware) for around 1000 vehicles almost simultaneously which resulted in reduced turn-around time for the operation. Previously, every semi-finished vehicle had to be brought into the factory floor from the parking yard to flash the ECU software over the LAN or Wi-Fi. This was a time-consuming process, bringing vehicles in and out of the parking yard once the dealer issued the orders.

The private 5G campus network gives connectivity to flash the ECU at the parking yard itself, resulting in enhanced productivity and reduced manual efforts, ultimately lowering production time. Simultaneously, the actual ECU flashing time per vehicle reduced from 210 seconds to 150 seconds because of increased speeds. Almost 1000 cars can be flashed at the same time leading to improved efficiency.

The system also allows the detection of paint defects almost automatically through computerised vision-based inspection without any kind of manual intervention on vehicles. This is done by capturing 360-degree high-definition images through cameras installed in a tunnel.

This replaced a previous cumbersome manual process using human eyes to identify the paint defect on a vehicle body. The private 5G network allows Mahindra to push and process large video/image HD files captured from various camera angles to the edge server. With this solution time to identify the paint defects reduced from around 45 to 2-3 minutes per car.

https://www.airtel.in/press-release/12-2022/airtel-partners-tech-mahindra-to-deploy-captive-private-network-at-mahindras-chakan-facility

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