Case Study

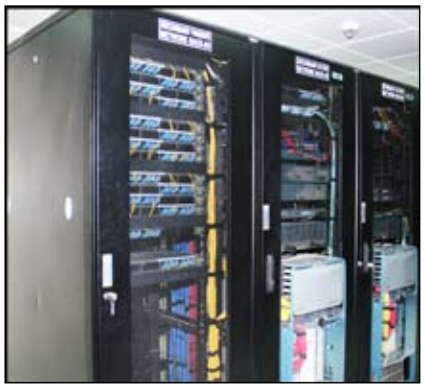
PROJECT OVERVIEW

- Mahindra is a US$ 12.5 billion multinational group incepted in 1945
- 125 Kms of OFC & 165 Kms of UTP / FTP
- Over 4500 information outlets used so far
- 700 acres of area of which 280 acres is Phase 1

IT Enabled Future Ready Plant

Mahindra in Chakan, Pune

Founded in 1945 as a steel trading company, Mahindra entered the automotive manufacturing in 1947 to bring the iconic Willy's Jeep onto Indian roads. Over the years, they have diversified into many new businesses in order to better the needs of customers.
The Mahindra Group is a US $12.5 billion multinational group with more than 119,900 employees in over 100 countries across the globe. Today, their operations span over 17 key industries that form the foundation of every modern economy: aerospace, aftermarket, agribusiness, automotive, components, consulting services, defense, energy, farm equipment, finance and insurance, industrial equipment, information technology, leisure and hospitality, logistics, real estate, retail, and two wheelers.
Mahindra Vehicle Manufacturers Ltd. (MVML) is located in Chakan - Pune, India. This constitutes the complete manufacturing facility for Heavy & Light Commercial vehicles, SUV's, Pick-up vehicles, four wheeler vehicles for domestic and export business.
MVML was designed and built as a green-field facility to integrate the best in technology, environmental sustainability, social responsibility, and operational excellence. Spread across 700 acres of area, Chakan offers a flexible and eco-friendly manufacturing layout, with approximately 2700 employees located on site. Mahindra anticipates further growth as the plant gradually expands its operations with the commissioning of new shops. To date, there are 14 major shops catering to both heavy, light and SUV type vehicles. The plant is also supported by a separate supplier park, stock yard of approx 200 acres and other entity companies of Mahindra & Mahindra Ltd within the entire campus. The entire campus development is planned in phases. Of the 700 acres, presently 280 acres of land has been developed in Phase – 1, which includes the 14 shops.



The Network Challenge

The Campus LAN for Mahindra's Chakan project was designed and implemented to support major applications such as; VOIP, Plant Data, IT Data, IBMS, Security and Alarms within the facility. After careful study of the layout for the Chakan facility, the following key points were identified as areas to be addressed:

- The Campus Network to take care of IT (data, voice and video traffic within the campus) and Manufacturing (MES) setup.
- Users to be given access to Intranet and Internet at workstations / desktop.
- Product Lifecycle Management and Plant Network to Integrate with the IT Network and communicate with the MES Servers in the Data Centre.
- A secured connectivity with a combination of Wired and Wireless end points
- Provide a secure backbone to support the environmental systems of the several industrial equipments employed on the assembly line, which are interconnected through the installed industrial network switches.

Molex was tasked to cater for the Passive solution of the complex Network infrastructure. The Primary requisites for this installation included a Hub room in each of the shops connected with SingleMode 10Gbps optical fibre cable and inter-shop with Multimode 1Gbps optical fiber, so as to obtain maximum redundancy with dual path (subterranean and aerial). The average size of each shop measures around 25000 Sq. metres approx. and each user desk within the plant must be terminated with two Category 6 UTP cables – one for Data and one for Voice. Additionally, within the body shops, Category 6 FTP cabling was employed especially to withstand the vibrations and EMI levels generated on the plant floor, alongside IP67 rated Industrial Ethernet Bayonet jacks on the plant floor to provide protection from contamination such as dust, water, and oil spills.

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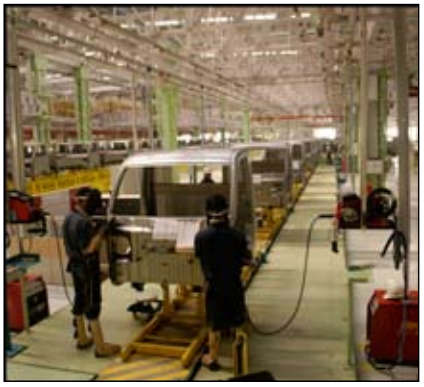
PROJECT OVERVIEW

- Virtualized environment used to support "Green Initiatives"
- Fault tolerance and self-healing techniques built in the setup
- Astute Project Management helped to complete the project.
- Maximum redundancy with dual path

IT Enabled Future Ready Plant
Mahindra in Chakan, Pune



As part of their expansion plans, any future shops built in the plant area must have wireless connectivity and the shops to have dust proof Industrial racks.

The Molex solution was chosen as part of Mahindra & Mahindra standards for selection of quality products as well as industry benchmarked solution for a manufacturing setup. Molex's Ecocare policy worked favorably with Mahindra's "Green Initiative" for the Project design of the MVML plant. Quality, delivery, service, wide ranging Industrial solutions and technical support were among the other reasons why Molex was the preferred supplier.

The Network Design:
The Mahindra network solution was to be of a scalable modular design and future proofed to accommodate the next stages of the plant development. A fault-tolerance mechanism was built in whereby the network traffic could re-route in case of network failure and be self-healing during the network recovery. This implies that in case of any breakdown in the physical cable connected to the primary port of the network switch, it automatically re-routes the traffic through redundant port using the port redundancy technique.

The network was of simple design to improve its adaptability yet included a high level of security requiring an intelligent, proactive, and multilayered approach to network security; not only from the external world, but also between different functional groups within the network. With that in mind, network performance and network failure prevention were at the forefront of expectations. Ensuring an optimised enterprise network operation was vital, and therefore must be compatible with unique industrial protocols and achieve real-time networking performance requirements of automation and control applications; usually defined as latency, jitter, and minimal packet loss. Lastly, the network was designed to be suitable for the physical and environmental constraints of the production floor.

The Challenges:
As with all large scale projects, each supplier had its share of challenges to overcome. System Integrator, Wipro Technologies overcame several hurdles to ensure the network challenges were met professionally. The very nature of the working automotive environment caused several implications, in particular providing a continued hosting service from multiple locations, including available IT resources from portable cabins and maintaining seamless connectivity to the 14 shops spread over the 280 acres. They experienced frequent cable cuts, both internally and externally, as well as working with extreme conditions of dust, moisture, oils, chemicals, gases, shock, vibrations, EMI and temperature fluctuations. At the same time, they had to maintain a safe working distance from the HT/LT electrical cables when planning and executing the installation of the fiber cable.

To manage a rollout on this scale not only from the Mahindra plant perspective, but also from Molex's side was phenomenal. There was no assigned storage space for the connectivity products. It was astute Project management on Molex's part to get in the right material in right quantities in line with the different levels of progress of the project.

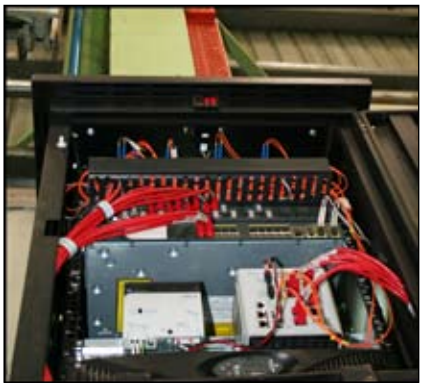
Case Study

PROJECT OVERVIEW

- Data Centre developed in just 100 days
- Long term vision behind the future ready plant
- Category-6 FTP cabling solution to withstand vibrations and EMI levels
- Mahindra Chakan built on the lines of Sustainability

IT Enabled Future Ready Plant

Mahindra in Chakan, Pune



Today, approximately 124 Km of OFC and close to 165 Km of UTP / FTP cables has been laid in the facility. The project has achieved its intermediate deadlines and is fully functional as per the Mahindra plan. This fully sustainable green initiative project is ready, future proofed for the next phase of development and is completely IT managed. Sustainability, heat control, recovery system, solar panels, water treatment along with several manufacturing processes are all riding on the IT backbone provided by Molex.

According to the Head of IT at MVML – Mr. B. Venkatakrishnan, "the key to any business success is its solid infrastructure. A versatile, scalable and future-ready plant was the vision behind the new Mahindra Automotive manufacturing facility. An Innovative engineering, a frugal mindset, manufacturing excellence and environmental sensitivity have always been the hallmark of this new plant. The Molex solution was chosen to provide more mileage to the new emerging challenges and technological advancement growth at the MVML facility."

He further remarked that "we have very carefully invested to take care of the business needs and the company's future global expansions at-least 10 years plus down the line by employing the right resources. The entire campus network has built-in resilience and redundancy with the High Level design, which was conceived by the industry technology experts at Molex".

The state-of-the-art data centre at MVML is best in class. This has been designed to accommodate the latest technology servers, database, sophisticated networking devices and high end application systems to support its modern manufacturing facility built on the Molex platform. Apart from the specialized equipment employed in the Data Center, the fibre backbone cables (primary and secondary) originating from all the 14 shops converges in the Data Center. The server farm and core network switches employ Molex specialized fibre / FTP cables.

Virtualized environment (VMware) is used on the server end, thereby reducing physical hardware and saving power, space, green gases and cost, copper cables replaced by fibre cable in the server consolidation stage.

Mr. Venkatakrishnan commends that "with the extensive guidance and onsite support from the Molex team, we were able to complete the Datacenter Development project within a stunning time of 100 days, which was else targeted at 240 days. Besides, we have been able to build a highly scalable, reliable, modular and robust backbone network for ensuring best performances to meet the requirements of the future ready plant – MVML Chakan."

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