TATA COMMUNICATIONS

CRAFTING AND LEADING A PEOPLE-FIRST, PLANET-FIRST INDUSTRIAL REVOLUTION

The need for an IoT fabric to navigate tomorrow's hyperconnected ecosystem

The Industrial Internet of Things (IIoT) is not just a technology revolution; it is a paradigm shift that is redefining how industries operate, innovate, and contribute to efficient business operations and a sustainable future. According to the Markets & Markets group, IIoT has a projected market size of **$286** Billion by 2029[1]. IIoT is enabling enterprises to create smarter ecosystems that integrate people, processes, and technology seamlessly. Various market reports have highlighted IIoT to be the cornerstone of Industry X.0, emphasizing its role in driving operational efficiency, sustainability, and innovation at scale. It is powered by the increasing integration of advanced IoT applications across sectors like energy, manufacturing, logistics, and beyond.

From energy management and environmental monitoring to smart automation and connected worker solutions, IIoT delivers unprecedented visibility and control over industrial processes. Embedded with AI and machine learning, these systems generate actionable insights, enabling proactive decision-making, enhancing safety, and improving productivity. To navigate a hyperconnected ecosystem, solutions such as Connected Worker, Video IoT, Remote Monitoring & Control, Energy & Environment Monitoring emerge as critical enablers, bridging the gap between legacy systems and next-generation operations and seamlessly integrating the two with network agnostic IIoT platforms.

[1] *Industrial IoT Market Size, Share & Industry Report 2032 by Markets and Markets*

IIoT: A FRAMEWORK FOR A HYPERCONNECTED ECOSYSTEM

IIoT's transformative power lies in its ability to weave diverse applications into a unified fabric that supports enterprises across multiple dimensions:

Connected Workforce

Enhancing safety and productivity through real-time location tracking, emergency alerts, and vital health monitoring.

Energy Management

Tracking power metrics to optimize energy usage and improve demand predictability to achieve cost and sustainability goals.

Environmental Monitoring

Ensuring optimum operating conditions for equipment and safeguarding worker safety through temperature and humidity tracking.

Video IoT

Leveraging advanced video based IoT solutions and video analytics for real-time process monitoring, and operational insights. Video based IoT deployed with edge processing improves efficiency provides increase data security.

Remote Monitoring

Delivering real-time equipment insights to improve uptime and reduce unplanned maintenance.

Smart Lighting

Enabling energy-efficient lighting solutions that adapt to usage patterns and enhance sustainability efforts. Together, these segments create an intelligent and adaptive industrial framework that prioritizes **people and the planet**, while driving business outcomes like operational efficiency, reduced costs, and innovation.

Smart Automation for Predictive/Preventive Maintenance

Transforming legacy OT systems by integrating IoT intelligence to measure critical parameters and ensure operational efficiency and cost optimization.

A large global steel company which is also one of the most geographically diversified steel producers has been able to prevent **45+** life threatening safety incidents using the connected worker solution and enabling help at the right time.

A large pharma retail store in India has witnessed ~2% increased store revenue just by footfall tracking using Video IoT solution implementation.

One of the largest cities in Saudi Arabia is saving ~10000 MTCO2e per year using smart streetlighting solutions with 20% energy savings and almost 50% reduction in O&M costs.

CONNECTED WORKFORCE: REDEFINING SAFETY AND PRODUCTIVITY

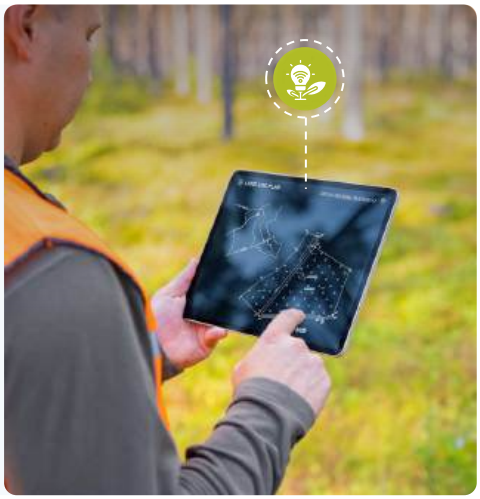
At the heart of the IIoT story is the connected worker—an essential piece in industries characterized by large, distributed workforces. With IoT-powered wearable/carry-on devices, worker safety is being reimagined. These devices monitor health metrics like heart rate and body temperature, detect falls or immobility, and provide real-time alerts to supervisors in cases of emergencies.

Beyond safety, connected worker solutions enhance operational visibility. Location tracking ensures that worker's movement is monitored for productivity optimization and operational improvements can be made based on real, on-ground challenges. Geofencing capabilities restrict unauthorized access to sensitive and hazardous areas. Analytics derived from these systems, powered by AI, provide actionable insights, helping enterprises proactively mitigate risks, streamline workflows and increase overall operational efficiency while reducing costs.

ENVIRONMENTAL MONITORING: SAFER FACILITIES, SMARTER OPERATIONS

Maintaining optimal environmental conditions in industrial facilities is essential for both equipment reliability and worker safety. IoT-powered sensors monitor variables like temperature, humidity, air quality noise, providing real-time alerts in case of deviations.

This capability helps in preventing equipment failures caused by adverse conditions and ensures compliance with regulatory standards. For example, pharmaceutical manufacturers use environmental monitoring to maintain sterile conditions, ensuring the efficacy of sensitive drugs.



ENERGY MANAGEMENT: POWERING SUSTAINABILITY

Industries account for a significant portion of global energy consumption, making energy efficiency a critical focus. IoT-enabled systems monitor and optimize energy parameters across facilities. For instance, smart meters and sensors embedded in mission-critical machines provide real-time insights, enabling companies to identify inefficiencies and implement energy-saving measures. Smart metering for domestic purposes help track consumption accurately, providing consumers with complete transparency and enabling service providers to better predict demand.

According to the International Energy Agency (IEA), energy efficiency measures can reduce energy demand by up to **40%** by 2040[2], underscoring the importance of IoT-driven energy management in achieving global sustainability goals.

[2] *How energy efficiency will power net zero climate goals - Analysis -2021 by IEA*

VIDEO IoT: BEYOND SECURITY TO OPERATIONAL INTELLIGENCE

Video IoT has moved beyond traditional security applications to become a critical enabler of operational insights. Advanced video analytics powered by AI can monitor production lines, detect anomalies, and ensure compliance with safety protocols.

For example, in a manufacturing plant, video IoT can analyse worker behaviour, detect improper use of machinery, and send instant alerts to prevent accidents. Retail and logistics industries also use video IoT to optimize inventory management, track shipments, and enhance customer experiences. The video analytics market is expected to be over **$22** Bn by 2028[3], reflecting its critical role in the broader IIoT ecosystem.

REMOTE MONITORING: REAL-TIME UPTIME ENHANCEMENT

For industries operating across geographies, remote monitoring solutions powered by IoT deliver real-time visibility into equipment performance. Condition monitoring ensures that machinery is maintained proactively, reducing downtime and optimizing productivity.

Remote monitoring also supports decentralized operations, enabling line managers and supervisors to make informed decisions without being physically present at facilities. This capability has become particularly vital in post-pandemic scenarios, where hybrid work environment, light-less plants and decentralized management are the new normal.

SMART LIGHTING: ILLUMINATING THE PATH TO SUSTAINABILITY

Smart lighting solutions, integrated with IoT, offer unparalleled energy efficiency and control. By adjusting brightness based on occupancy and natural light levels, these systems reduce energy waste while maintaining optimal illumination.

For instance, in smart campuses, lighting systems equipped with IoT sensors ensure that energy is consumed only when and where needed. Beyond energy savings, smart lighting contributes to creating more sustainable industrial and urban environments, aligning with the **"Planet-First"** philosophy of IIoT.

According to McKinsey[4], companies that successfully implement Industry 4.0 initiatives achieve notable sustainability benefits, such as reductions in greenhouse gas emissions and better resource management.

[3] *Video Analytics Market Size, Statistics, Global Trends, Growth Opportunities and Forecast |2024 by MarketsandMarkets™*

[4] *Advanced manufacturing and the promise of Industry 4.0 | 2022 by McKinsey*

SMART AUTOMATION: BRIDGING LEGACY AND FUTURE

Legacy OT systems are often seen as barriers to digital transformation, but IoT changes this narrative by enabling smart automation. By embedding sensors and connectivity into existing equipment, enterprises can measure critical process parameters like voltage and current, enabling real-time decision-making.

This transformation ensures operational continuity and future-proofs businesses, reducing the need for costly infrastructure replacements. Analysts estimate that automating legacy systems can lead to a **20-30% reduction in operational costs**, making it a cornerstone of Industry X.0 strategies. Deloitte's research[5] found that the right combination of digital transformation actions can generate up to **$1.25** Trillion in additional market value across Fortune 500 companies. Conversely, poor execution can result in a loss of over **$1.5** Trillion.

TATA COMMUNICATIONS' DIGITAL FABRIC

Tata Communications' digital fabric brings together different platforms, tools, solutions and technology expertise that can help IT and business leaders simplify complexity.

This digital fabric combines the capabilities of our network fabric, cloud fabric, interaction fabric and IoT fabric to facilitate the exchange of data, information and intelligence across diverse digital systems and applications. This digital fabric powers customers' hyperconnected ecosystem by enabling them to build applications for connected employee and customer experiences and connected solutions, on a foundation of connected infrastructure.

Specifically, our **IoT Fabric** includes global, multi-modal connectivity (cellular, private 5G, LoRaWAN, managed wi-fi etc.) that is purpose built for specific use cases. With embedded connectivity capabilities and access to over 200 countries and territories, it makes the design, implementation and monetization of connected devices and spaces, easier than ever before.

The platform that powers our IoT Fabric offers a single pane of glass for complete visibility and makes management simpler. And with our multi-layered approach to end-to-end security, and expertise in global regulatory compliance, including some of the most regulated markets, it is easy to identify and address vulnerabilities and stay compliant to enhance customer trust.

[5]*New Deloitte report finds digital transformation can open up US$1.25 Trillion in additional market capitalization 2023 by Deloitte*

An IoT fabric isn't just about connecting machines, it's about creating an ecosystem where people and the planet thrive alongside business success. By leveraging technologies such as Connected Worker, Remote Monitoring, Energy Monitoring, Video IoT, Smart Lighting, and AI-powered analytics, enterprises can achieve businesses goals of operational efficiency, sustainability, and innovation.

The future of IIoT lies in its ability to create a hyperconnected world where industries not only adapt to change but weave multiple efficiency enablers to craft an integrated IoT fabric. Enterprises that embrace this vision lead the way in building a smarter, safer, and more sustainable planet.

Additional Resources

Overview of Our Connected Worker Solution (SafePaaS)

Our Intelligent Street Light Solution in action

For more information about our IoT Fabric and to explore some of our customer success stories, schedule a no-obligation conversation by writing to us at internetofthings@tatacommunications.com

About Tata Communications

Tata Communications is a leading Commtech player that powers its customers' hyperconnected ecosystems through its digital fabric. We bring together tools, platforms, skills and expertise to help customers build agile infrastructure, enable compelling employee and customer experiences, deploy connected solutions and build cyber resilience. With our solutions-oriented approach, proven managed service capabilities and cutting-edge infrastructure, we enable a hyperconnected ecosystem powered by network, cloud, mobility, Internet of Things (IoT), collaboration and security services. Over one-third of the world's internet routes are connected to our network. We connect businesses to 80% of the world's top cloud providers and 4 out of 5 mobile subscribers. Our customers consistently rely on us for our expertise and our industry-leading NPS is a testimony to that.

For more information, visit us at www.tatacommunications.com

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