NEED OF THE HOUR

IoT
MANAGED SERVICES FOR CONNECTED PRODUCTS

Addressing the services challenges of Service Providers, ISVs, OEMs through IoT Managed Services

happiest minds
The Mindful IT Company
Born **Digital** . Born **Agile**

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WHY DIGITAL TRANSFORMATION IS NEEDED?

Digital Transformation powered by disruptive technologies including Internet of Things, Analytics, Cloud, Robotics is reshaping our lives, work, and the global economy. Individuals as well as the businesses are embracing this digital revolution to improve efficiency, increase productivity and redefine the way we lead our life and business. Digital Transformation slowly blurs the line that existed between the physical and digital worlds, and Internet of Things (IoT) plays a key role in this. In this 21st century, out of all technologies that empowers digital transformation, IoT is the one with the most disruptive power to redefine all most all markets and industries. It brings in a brand new digital world of connected devices, with objects get embedded with sensors and acquire the ability to communicate each other without human intervention. With this intersection of physical and digital worlds, IoT holds the potential to create innovative business models, improve existing models and optimize business costs as well as reduce the inherent risks. The microchips embedded in the human body that track the sources of your illness, sensor enabled beacon devices tracking customer behavior and the home refrigerator getting auto replenished without any human intervention are not any more fanciful stories from Sci- Fi movies. The breakthrough applications of IoT in the form of wearables, health care implants, e-commerce tracking devices, fitness devices, self-monitoring transportation systems, etc. are getting widely accepted globally. In short, IoT is redefining the way we gather, store, transmit and analyze information and derive valuable insights from it. Connected devices to bring in a connected experience is what every stream of business desires to deliver to their customers.

USE CASES & BENEFITS

$1.6-1.7 T
Potential Economic Impact in

60% Healthcare applications will

HEALTHCARE

Operations Optimization	5-12.5% Cost Reduction
Predictive Maintenance	10-40% Cost Savings
Inventory Optimization	20-50% Cost Reduction
Health & Safety	10-25% Savings

$210-740 B
Potential Economic Impact in 2025

40% Global Automotive Manufacturers will use Connected Vehicles Platform by 2020*

VEHICLES

Automated Checkout	75% Cashier Cost Reduction
Real-Time In-Store Promotion	3-5% Productivity Improvement
Condition-based Maintenance	10-40% Cost Reduction
Energy Management	20% Improvement

$0.4-1.2 T
Potential Economic Impact in 2025

1.5X Increase in Productivity by 2019 using IoT & Robotics*

RETAIL

Maintenance/ Replacement	25% Improvement
Human Productivity	10-18% Improvement
Safety & Security	25% Improvement

$1.2-3.7 T
Potential Economic Impact in 2025

75% Large manufacturers will upgrade their operations with Iot by 2017*

FACTORY

Monitoring & Treating illness	20% Reduction in disease burden
Improving Wellness	$80-600 per year in benefits per user

Like the correlation between human evolution through communication, IoT is also evolving through the input of data and wisdom that we get as output. An IDC Worldwide Semiannual IoT Spending Guide forecasts that the worldwide spending on the Internet of Things (IoT) to grow 16.7% year over year in 2017, reaching just over $800 billion. Gartner, Inc. forecasts that 8.4 billion connected things will be in use worldwide in 2017, up 31 percent from 2016, and will reach 20.4 billion by 2020. These numbers and growth predictions regarding IoT bring in a lot of excitement in the global business world.

IoT brings in huge potential for device manufacturers, product owners and service providers who can embrace the technology, manage a large amount of data and understand the immense business value it can deliver to their customers. Realizing this potential, many global organizations have started adopting IoT and its underlying technologies to their core business strategies. Manufacturing, Healthcare, E-commerce, CPG, Travel, and Retail are some of the early adopters of IoT.

WHAT IS THE ROLE OF SERVICE PROVIDERS, OEMS, ISVS IN DIGITAL TRANSFORMATION

Digital transformation is creating a major paradigm shift in the product development space. Various industry reports states that it is estimated that by 2018, 30% of manufacturers with field service operations will use embedded intelligence to drive customer satisfaction and product design that yields higher profitability than their peers. By 2020, 60% of discrete manufacturers will use digital twins of connected products with analytics to track performance and usage for better product and service quality. By 2020, manufacturers that use data from IoT sensors as components in smart contracts will increase their service margins by five points.

Digital Transformation in the Enterprises has a huge positive impact on the businesses of Service Providers, OEMs and ISVs. This provides them with an opportunity to reinvent themselves to meet the digital needs of their enterprise customers through the power of digital technologies. Ubiquitous connectivity, inexpensive sensors and ever-growing computing power helps to connect products to the internet and this coupled with powerful big-data analytics help to gather insights into the challenges, opportunities and operations of their customers.

In addition to connecting products to improve their performance, digital technologies open up new opportunities for OEMs and ISVs to bring operational efficiency, invent new business models, innovate their products, offer services and remain connected with their customers. –All these managed over a common platform will foster a culture of collaboration among the employees, external partners and customers. With this new collaborative platform based approach, product innovation and customer services can now be managed holistically rather than through a siloed approach.

The benefits of embracing Digital Transformation for OEMs, ISVs and their Service Providers are multifold. One way to reap these benefits is through IoT(Internet of Things) technologies whereby sensors and other electronic devices fitted into these products provide operational as well business data over internet to a server platform that will have applications running on it to provide valuable insights. These insights of the operational performance of these assets will be useful to the OEMs/ISVs whereas the business process insights will be useful for the enterprise customers. Such IoT products that are connected over internet are called as "Connected Assets". Let's look into the benefits that OEMs/ISVs and their Service Providers can reap using the "Connected Assets".

CONNECTED ASSETS BRING OPERATIONAL EFFICIENCY AND SERVICE REVENUE

The topmost drive for any OEM/ISV to have Connected Assets is to reduce the cost of support and maintenance operations of their products. Similarly, Service Providers to OEMs/ISVs can now serve their OEM customers and their end customers by deploying a smaller operational team and augmenting them with real-time remote performance data of the assets.

OEMs/ISVs and Service Providers now have access to the performance, security and other operational data of their products in real-time and can take evasive action even before product problems arise. Remote Diagnostics and Remediation helps to solve problems quickly and remotely without the need for the technicians to visit the site. As the fine line between product and services blur, enterprise customers would expect the OEMs/ISV and SPs to 'Build-Operate-Manage' the products and solutions and offer "Product-as-a-Service" model. This model enables OEMs/ISVs to get an additional source of revenue through building service capabilities. Product Innovation teams can use the data on

product usage and customer behavior to improve product design. This data can also be used to validate warranty claims, breaches and arrest false claims. Product usage data can also be used to validate warranty claims and identify warranty agreement violations.

Monitoring and responding to security threats in the products and solutions and its nearby ecosystem becomes critical for the OEMs/ISVs and Service Providers for the security and safety of not only of their products and solutions but of the enterprise itself.

As these products and solutions become critical to an enterprise's digital strategy and operation, enterprises would prefer partners who would help them in the products and solutions uptime through better maintenance and services. This low cost and secure operations helps the OEMs/ISVs/SPs to be competitive in the market and to differentiate themselves from the competition.

CONNECTED ASSETS BRING BUSINESS VALUE FOR ENTERPRISES

With their faith in Digital Transformation, enterprise CIOs are bringing in more digital partners and demanding them to join the digital bandwagon. They expect OEMs/ISVs to utilize every product or solution that they deploy and maximize the effectiveness and ROI of the deployed products and solutions. OEMs/ISVs can provide insights into the business process of their customers with the data that their connected assets that are part of the larger ecosystem throw out. This real-time view of performance of the business processes and assets helps the enterprises to improve processes, identify bottlenecks, take real-time decisions, empower their employees, enable strategic decision-making and foster a culture of innovation and collaboration in the enterprise.

CONNECTED ASSETS PROVIDE NEW SETS OF CAPABILITIES FOR ENTERPRISES

As per Harvard Business Review authors Michael E. Porter and James E. Heppelmann, connected products provide enterprises and partners with new set of capabilities:

MONITORING

Smart, connected products enable the comprehensive monitoring of a product's condition, operation, and external environment through sensors and external data sources. Using data, a product can alert users or others to changes in circumstances or performance.

CONTROL

Smart, connected products can be controlled through remote commands or algorithms that are built into the device or reside in the product cloud. Algorithms are rules that direct the product to respond to specified changes in its condition or environment.

OPTIMIZATION

The rich flow of monitoring data from smart, connected products, coupled with the capacity to control product operation, allows companies to optimize product performance in numerous ways, many of which have not been previously possible. Smart, connected products can apply algorithms and analytics to in-use or historical data to dramatically improve output, utilization, and efficiency.

AUTONOMY

Monitoring, control, and optimization capabilities combine to allow smart, connected products to achieve a previously unattainable level of autonomy. Autonomous products can also act in coordination with other products and systems.

WHAT ARE THE CHALLENGES IN SERVICING CONNECTED PRODUCTS?

Any organization (Enterprises, OEMs, ISVs) requires seamless support from the IT Operations for leading a successful digital transformation journey. However, with the technology changes in the break neck speed and consumerization of IT, the business expectations are very high which makes it challenging for the IT operations team to keep up with the expectations. When the case moves from normal IT environment to IoT enabled business environment, the operational and management challenges are increasing manifold, provided the heterogeneous multiparty devices, the associated networks, the data from multi sources and finally managing an efficient security posture. The other major challenge in IoT enabled environments is the complexity associated with deploying IoT business models in existing legacy technologies and applications in organizations. Let's look into some of the challenges:

1 DEPLOYING AND MANAGING NEW INFRASTRUCTURE AND TECHNOLOGIES

The IoT world is still in its stage of evolution. An IoT environment in an enterprise involves heterogeneous devices, diverse connections, applications and business models which do not comply to any specific industry wide accepted standards. This lack of well- defined standards makes it challenging for enterprises and OEMs/ISVs and Service Providers to tread through an easy path of deploying new infrastructure and technologies in their IoT environment. It requires unprecedented collaboration, co-ordination, and communication between every device with in the whole integrated IoT environment. Bridging the physical world comprising of products, solutions, operational technologies (OT) with the digital world powered by information technology (IT) is a daunting challenge for IoT roll outs in organizations. The traditional IT operations centers are incapable of addressing the new complex set of challenges that the IoT environment presents in front of them. Setting up a separate in- house IoT operations center to deal with above said challenges is in fact not a feasible solution for many organizations.

2 INTEGRATION WITH THE LEGACY SYSTEMS

OEMs/ISVs and enterprises alike realize that Connected Assets cannot work in isolation. These have to be part of the larger ecosystem of systems, devices and process to be of value for both OEMs/ISVs and enterprises. In many enterprises, there will be a sizable amount of legacy system which is still supporting in mission critical workloads and data. When such organizations plan for an IoT roll out, they face a lot of issues with the interoperability and compatibility between the new gen IoT systems and the legacy systems. Ripping and replacing of these legacy systems which holds large chunks of business data is neither a practical solution nor financially viable.

3 MANAGING THE CONNECTIVITY CHALLENGES

As we have mentioned earlier, by 2020, there will be more than 20 billion connected devices around the globe. A wide variety of wired and wireless networks are needed to support the multitudes of IoT application requirements. Organizations need to create and maintain reliable connections, monitor it, trouble shoot it and manage it overall for the smooth functioning of the IoT environment. Currently, with a limited number of IoT devices, many organizations leverage the centralized or client/ server model of connections in their IoT environments. However, with the scale of devices rising to billions this kind of connections will be incapable to handle the requirements and will only end up in creating bottle necks. As in the IOT world, a small disruption in a connection can lead to disastrous effects, managing the connectivity of these devices efficiently is a herculean task when it is planning to be done internally.

4 GETTING REAL TIME OPERATIONAL PERFORMANCE ANALYTICS

In this age of big data, collecting the data in real time, applying analytics on it and generating valuable business insights from it has become a new norm for any business. With IoT and connected devices taking the center stage in many organizations, getting the operational performance analytics in real time is highly significant. It helps them in monitoring the scale and performance of their cloud usage, optimizing their systems, address the connectivity issues if any, find anomalies in real time and optimize the operational performance. However, for organizations that are new to the IoT world, find its challenging to get the real time operational performance analytics with traditional IT operations center capabilities.

5 MAINTAINING AN EFFICIENT SECURITY POSTURE

Security marks one of the greatest obstacles to the growth of IoT. Billions of connected devices represent billions of new attack points for the attackers with malicious motives. The heterogeneous nature of devices, lack of proper monitoring, unsecured networks and lack of visibility into the whole IoT system brings in increased security risks. The implications of a security breach in the internet of things ecosystem are unimaginable. This can be hacking of a major oil refinery in a country or breaching the secure automated transportation system in a country or damaging the healthcare system in a country which the implications can be disastrous to the whole citizens in that country. The evolving IoT threat landscape and the inability of the organizations to deal with it internally demands a new managed services model for IoT services.

6 GETTING A HOLISTIC VIEW OF THE ENTERPRISE IOT ENVIRONMENT

The IoT environment is a happening area which involves deploying of multiple devices, networks, integration of new systems with the legacy systems, scaling up/ scaling down of the storage capacity, commissioning/ decommissioning of systems and so on. All these actions require a complete visibility of the IoT infrastructure environment for the organization to take informed and insightful business decisions. However, in many organizations which follow traditional approaches to IT, there is no option for getting a holistic view of the entire IoT infrastructure environment.

IoT MANAGED SERVICES

As per Gartner, "IoT Managed services are third-party management services delivered in support of parts, or the entirety, of a user's IoT solution…The key goal for IoT Managed Services is the optimization of service delivery through automated operational and administration activities (service automation)."

IoT Managed Services help manage IoT Devices, Network Infrastructure, IoT applications, Cloud and Security of the installed based through set of tools and 24/7 monitoring, managing and providing resolutions within a defined service level agreement (SLA).

HOW HAPPIEST MINDS'
IoT MANAGED SERVICES
POWERED BY
IOT OPERATIONS CENTER?

IoT Operations Center is Happiest Minds' flagship Managed Services Delivery Platform for managing IoT deployments and operations. This is enabled by IoT Device Management, Business Operations, IT Operations Management and Service Management tools and skilled domain and ITIL certified personnel observing structured processes in a dedicated operations center.
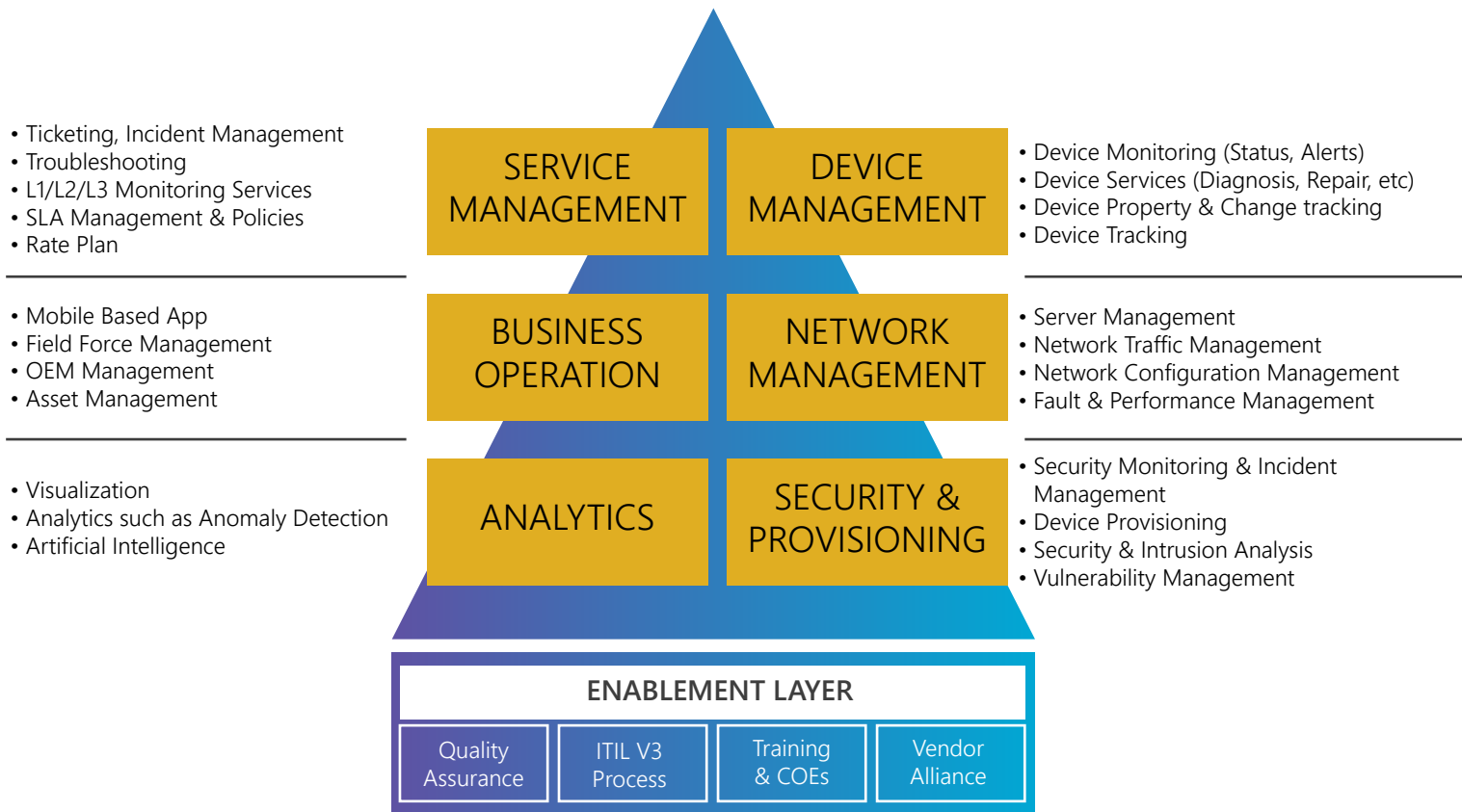
Efficient IoT Managed Services from a dedicated IoT Operations Center helps CIO's and CTO's in addressing the aforesaid complex set of challenges involving with IoT implementation, integration, technology and data management.

Secure IoT Managed Services enable OEMs/ISVs and Enterprises to:

1 Get real-time visibility across all IoT installed base - devices, applications, infrastructure

2 Bring industry and compliance knowledge in managing operations

3 Remotely repair and upgrade devices

4 Track operational performance analytics

5 Receive predictive threat detection

6 Integrate with other enterprise systems

FEATURES OF HAPPIEST MINDS' IoT MANAGED SERVICES

MANAGED SERVICES POWERED BY
IoT OPERATIONS CENTER

- Ticketing, Incident Management
- Troubleshooting
- L1/L2/L3 Monitoring Services
- SLA Management & Policies
- Rate Plan

- Mobile Based App
- Field Force Management
- OEM Management
- Asset Management

- Visualization
- Analytics such as Anomaly Detection
- Artificial Intelligence

SERVICE MANAGEMENT	DEVICE MANAGEMENT
BUSINESS OPERATION	NETWORK MANAGEMENT
ANALYTICS	SECURITY & PROVISIONING

- Device Monitoring (Status, Alerts)
- Device Services (Diagnosis, Repair, etc)
- Device Property & Change tracking
- Device Tracking

- Server Management
- Network Traffic Management
- Network Configuration Management
- Fault & Performance Management

- Security Monitoring & Incident Management
- Device Provisioning
- Security & Intrusion Analysis
- Vulnerability Management

ENABLEMENT LAYER

Quality Assurance	ITIL V3 Process	Training & COEs	Vendor Alliance

BUSINESS OPERATIONS

In the IoT world, sensors embedded in physical objects links through wired and wireless networks and these physical information systems work even without human intervention. An IoT environment comprises of multiple technologies and operations management including mobile based application management, field force management, warranty management, OEM management, asset management for optimized efficiency and customer experience management. Our dedicated IoT operations center helps in effectively blending these technologies and multiple operations into an organizational environment. The dedicated IoT operations center would also play a key role in addressing the following aspects including monitoring for scale and performance of the cloud infrastructure, monitoring for uptime, and providing dynamic support of new protocols and devices.

SERVICE MANAGEMENT

In the IoT world, all the devices and connecting points require process and technology support which is different from the traditional IT service management. Dedicated IoT Managed services helps in efficiently automating and speeding up the service management which helps organizations to focus on their core business. Be it a simple L1 ticket monitoring or a complex incident management and troubleshooting or SLA management, warranty issues and policy compliance, our dedicated IoT Managed services team will take care.

DEVICE MANAGEMENT

An IoT world involves billions of connected devices to the internet which requires regular monitoring regarding the device health and performance. With IoT Managed services, organizations can avoid the challenges with internally monitoring and managing the devices. The dedicated IoT Operations Center from Happiest Minds helps our client organizations in efficiently doing the IoT device management with proper monitoring, on time service, device property and change tracking and updating it. IoT managed services also helps in keeping a vigilant eye on any possible breach of security and can ensure minimum downtime for the devices. Specific heuristics detect any anomaly in the device behavior and addresses the problems if any before it starts affecting the whole ecosystem. The other aspect major aspect in device management is calibration of sensors. Each sensor has its own life and with the right, organizations get the predictions regarding the life of a sensor with reasonable accuracy.

ANALYTICS

Analytics marks one of the key aspects of the IoT roll outs in organizations. The data that gets collected from the billions of connected devices is a gold mine which brings in tangible benefits for any organizations. However, data management is a major challenge that organizations face with IoT. Our dedicated IoT operations center enables better visualization of the large chunks of data, helps in better identification of anomalies, and application of Artificial intelligence in the collected data which enables organizations to find valuable business insights.

NETWORK MANAGEMENT

In the world of connected devices, a minor disruption in connectivity can be disastrous in nature and this signifies the importance of connectivity management. In the case of any instances or compromised connectivity, an IoT operations center would be able to use the right tools to ascertain the reasons for failure and take the appropriate steps to remedy the issue. Be it server management, network traffic management, network configuration management or Fault & performance management, our dedicated IoT operations center will take away all the headaches regarding day to day network management of your IoT devices.

SECURITY AND PROVISIONING

Cyber security is a major concern and obstacle for growth in the IoT world. As the number of connected devices proliferates, vulnerabilities can creep in rather easily and compromise the entire IoT system. Hence, security must be the foundation of any IoT roll out. However, currently there is no standard way of securing an IoT Device. With our IoT Managed services from the dedicated IoT operations center, client organizations can effectively address the concerns regarding IoT security. IoT operations center understand the limitations of the connected devices from a security standpoint and finds system anomalies in advance. We take care of security monitoring and incident management, device provisioning, intrusion analysis and vulnerability management.

HAPPIEST MINDS IoT MANAGED SERVICES
IMPACT DELIVERED

HOW A LEADING INDIAN ENERGY GENERATION COMPANY ENABLED REMOTE MONITORING AND MANAGEMENT SYSTEM

The customer builds, own and operate renewable energy power plants to generate clean energy through renewable sources namely wind, solar, bio mass and hydro.
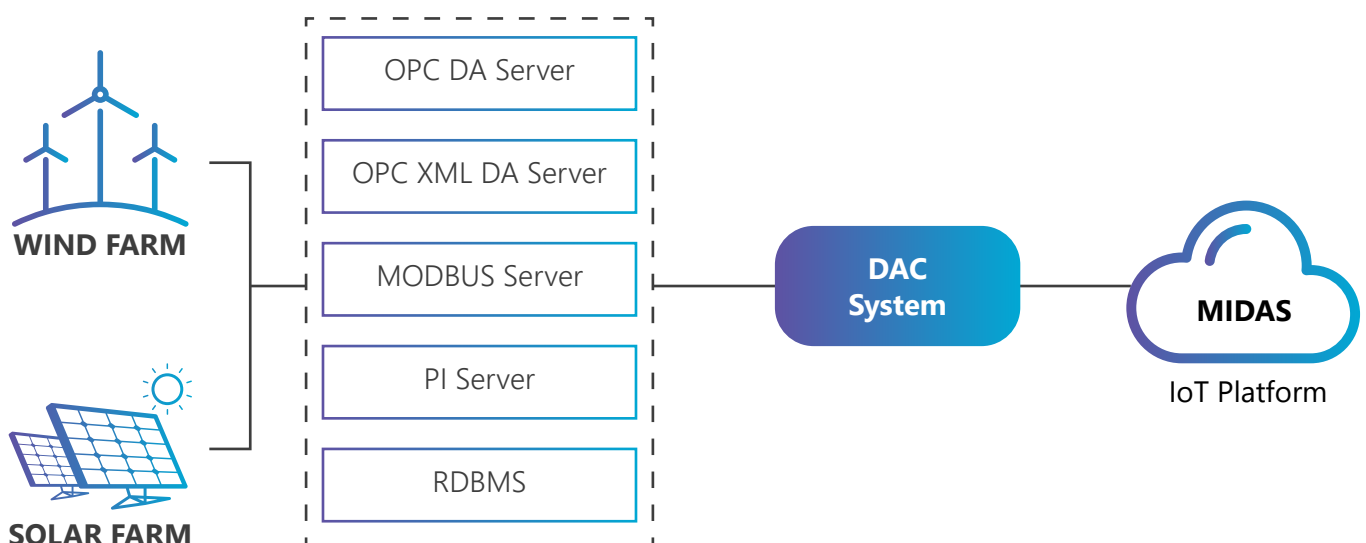
The customer was looking for a platform for managing the power plants remotely, which was connected by data loggers for collecting data from wind turbines, solar panels or Hydro plants. The solution was to leverage Happiest Minds' IoT Operations Center and IoT platform (MIDAS) to gather data from multiple farms with multiple assets / industrial protocols and expose the data using OPC.

The scope of work was to develop a monitoring system for renewable energy farms by aggregating data from wind turbines, solar panels or Hydro plants.

This encompassed customizing and deployment of Happiest Minds' IoT platform (MIDAS), application development/integration for Asset Monitoring and providing L2/L3 support for IT infrastructure, application, platform & gateways.

WIND FARM

SOLAR FARM

OPC DA Server

OPC XML DA Server

MODBUS Server

PI Server

RDBMS

DAC System

MIDAS

IoT Platform

HAPPIEST MINDS IoT MANAGED SERVICES
IMPACT DELIVERED

HOW A LEADING INTERNET SERVICE PROVIDER (ISP) ENABLED A CENTRALIZED MONITORING AND PROVISIONING SYSTEM

The business requirement was to enable efficient provisioning of new access network devices (from different vendors) by unskilled personnel and seamless migration of existing deployed unmanaged devices to the new system without interruption of live services.

Happiest Minds developed a centralized system for remote monitoring, L1/L2 support services and provisioning of new devices into the access network of the ISP which removes the need for manual provisioning completely.

AUTOMATION
Automated provisioning of the devices in the field based on the network topology and location. The system is device agnostic, and the network hierarchy is maintained.

DEVICE MANAGEMENT
Designed automated bulk firmware upgrade and bulk pre configuration of devices to make them deployment ready.

MOBILE APP
Developed an Android App to manage new customer provisioning, customer relocation from the field.

NETWORK MIGRATION
Provided mechanism for network migration from one location to another location without impacting the live services.

SCALABILITY
Developed a scalable solution that is agnostic to vendors and devices.

REPORTING
Implemented a module to capture multiple reports for different user profiles

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SETUP
Contains configuration information, inventory details, device profiles and information, network configuration and other settings.

FIELD
In this module, one can make changes to the configurations and network in the field including new device activation, firmware updates, device replacement, port blocks etc.

DASHBOARD
Dashboard gives an overall view of customer activations, field deployments and de-activations

STORE
The devices in the store are stamped and made field-ready by configuring them en-masse

CUSTOMER
Module to on-board new customers, provision and de-provision their home routers. Also, allow shifting of customers from one network to another

ABOUT HAPPIEST MINDS

Happiest Minds, the Mindful IT Company, applies agile methodologies to enable digital transformation for enterprises and technology providers by delivering seamless customer experience, business efficiency and actionable insights. We leverage a spectrum of disruptive technologies such as: Big Data Analytics, AI & Cognitive Computing, Internet of Things, Cloud, Security, SDN-NFV, RPA, Blockchain, etc. Positioned as "Born Digital . Born Agile", our capabilities spans across product engineering, digital business solutions, infrastructure management and security services. We deliver these services across industry sectors such as retail, consumer packaged goods, edutech, e-commerce, banking, insurance, hi-tech, engineering R&D, manufacturing, automotive and travel/transportation/hospitality.

Headquartered in Bangalore, India; Happiest Minds has operations in USA, UK, The Netherlands, Australia and Middle East.

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