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Managing essential medical assets to improve care delivery

Managing thousands of medical devices that provide patient care every day is a daunting task. Automating the tracking and maintenance of essential medical equipment through IoT technologies can deliver massive benefits.

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Executive summary

What medical equipment do we have? Where are those devices? How are they being used and how are they performing? Do any medical devices need to be repaired, replaced or retired? Are all our medical devices properly accounted for and compliant from a security perspective? These questions are simple, but gaining visibility into your medical devices to answer them has been anything but, and not knowing the answers can negatively impact patient care.

A recent Accenture survey found 63 percent of executives were accelerating their digital transformation initiatives.[1] One area in healthcare where the move from paper-based, manual workflows to automated, digital processes offers the most benefit is asset track and trace. Implementing IoT-driven track and trace not only improves asset management performance, it also introduces new capabilities to reduce costs and risk, improve patient care and drive innovation.

Overcoming the challenges of traditional asset track and trace starts with applying IoT to transform asset operations and management. This allows organizations to go further in several key areas, including inventory management, asset tracking, asset utilization and performance, condition-based and predictive maintenance, end-to-end asset visibility and supply chain management. The potential efficiency boosts are enormous.

Achieving success requires careful planning and execution. OpenText's IoT-enabled asset management solutions allow for creating a digital twin of all assets and incrementally layering capabilities to reach 360-degree asset visibility at the pace and cost that suits your business.

1 Accenture, Leaders Wanted: Experts at Change at a Moment of Truth. (2021)

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Introduction

What medical equipment do we have? Where are those devices? How are they being used and how are they performing? Do any medical devices need to be repaired, replaced or retired? Are all our medical devices properly accounted for and compliant from a security perspective? These questions are simple but gaining visibility into your medical devices to answer them has been anything but, and not knowing the answers can negatively impact patient care.

A recent Accenture survey found 63 percent of executives were accelerating their digital transformation initiatives.[2] Implementing digital, IoT-driven track and trace not only improves asset management performance, it also introduces new capabilities to reduce costs and risk, improve patient care and drive innovation.

Historically, asset management has revolved around spreadsheets, handwritten lists and visual inspections to track location, status and performance. Even where more sophisticated asset management systems are deployed, organizations often lack the necessary realtime data to realize the benefits. As a result, assets are under-utilized, fall through maintenance cracks or fail completely. Staff may spend hours searching or purchase unnecessary replacements and assets are vulnerable to damage and theft.

It is difficult to know when an asset needs to be replaced or, even when it has been replaced. Many organizations find themselves with "ghost assets" that they are still paying for and insuring long after they have been retired. With thousands of devices under management, large healthcare providers can significantly improve clinical care and significantly reduce costs by better managing medical devices with an asset track and trace solution.

What is IoT-driven asset track and trace?

Internet of Things (IoT) has brought the physical asset into the digital world. Estimates suggest there will be more than 260 billion IoT tracking devices deployed worldwide by 2027.[3] Previously, digital asset track and trace solutions used RFID tags to deliver basic information. However, IoT devices have matured to capture and process information at the edge.

IoT devices, such as sensors and accentuators, can deliver realtime data on every aspect of an asset— including inventory levels, location, condition and performance, as well as where and how they are being used. This information is fed back to a central platform either in real time or at scheduled intervals.

2 Accenture, Leaders Wanted: Experts at Change at a Moment of Truth. (2021)

3 ON World Inc., Industrial IoT Asset Tracking. (2019)

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Delivering end-to-end asset visibility

This opens the potential to deliver asset information not only to the central team but also to everyone who needs it, including nursing staff, physicians and maintenance. A central IoT platform collecting data from all assets delivers a holistic, realtime picture of cross-site and inter-site assets to quickly locate and deploy critical medical devices in support of patient care.

With highly granular asset data, an organization's track and trace strategy will:

- Provide complete visibility of inventory.
- Deliver realtime tracking of asset status, condition and location.
- Increase inventory speed and efficiency.
- Eliminate human error through automation.
- Manage device security patch and update processes.
- Improve the flow of assets along supply chains.
- Optimize asset utilization and performance.
- Eliminate costly and non-compliant ghost assets.
- Minimize risk from theft or damage.
- Categorize and analyze asset failure to identify the root cause faster.
- Move from scheduled and preventive to condition-based and predictive maintenance.
- Combine IoT data with other asset data and documentation within a digital twin to
- create a 360-degree asset view.
- Use digital twins as a foundation for management of assets throughout their lifecycle

Being able to quickly locate and deploy equipment has an immediate impact on the quality of care. It also improves clinical staff productivity while ensuring devices are secure, well-maintained and available when required.

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Key use cases for IoT-enabled asset track and trace

End-to-end asset visibility can translate into significant improvements in clinician productivity, while enabling much closer management of required service and security patches. This combination of benefits can improve care while significantly reducing compliance risk.

Organizations can achieve improvements in several key areas including:

Inventory management

The first step in asset track and trace is to know what assets your organization has. You need to know what medical devices you own, where your devices are and the status of each device. This is key to reducing lost, misplaced or out of service assets. In addition, it removes the risk of ghost assets incurring cost and compliance issues long after they have been removed from service. According to Forrester, anywhere between 10 percent and 30 percent of lost, stolen or broken assets are still on balance sheets in the average organization.[4]

IoT-enabled device management systems automate manual processes; reduce errors in recording device location, movement and transactions; and provide realtime visibility into the entire asset portfolio.

Asset tracking

IoT asset tracking solutions continuously record the location and movement of assets and display that information periodically or in real time on pre-defined dashboards. In addition, many platforms can be configured to automatically send out warnings or notices with location information when an asset or device needs service or has been moved outside its assigned unit.

GPS and geo-fencing functionality allow continuous monitoring of mobile assets and notify immediately when they move outside the defined area or deviate from defined paths.

Asset utilization and performance

IoT-driven track and trace capabilities help you receive and interpret granular data on asset usage, location, inventory levels and asset turnover. Based on this information, the technology can provide automatic notifications based on asset status and condition. You can quickly and easily see when an asset is being under-utilized or operating outside optimum conditions.

With a complete view across all assets, it is possible to optimize asset performance in support of patient care and quickly redeploy devices to meet current needs. In addition, condition and performance insights inform decisions on asset maintenance, purchasing and retirement.

4 Michael N. Day and Stephen Talbot, Data Validation the Best Practice for Data Quality in Fixed Asset Management, Asset Management Resources

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Condition-based and predictive maintenance

With IoT-enabled monitoring, you can have realtime information on the condition of every asset and make that information securely available to maintenance engineers, as well as transient or contract teams. You can pre-define notifications and alerts for when the piece of equipment exceeds its operating parameters.

Predict, plan and take proactive steps for maintenance activities such as parts repair or equipment failure before they occur. Avoid relying on preventive or scheduled maintenance that can lead to equipment being serviced too often or not enough.

Supply chain management

IoT realtime asset tracking solutions help healthcare organizations extend just-in-time inventory processes to suppliers. Integrating IoT with other supply chain applications improves cross-channel visibility and decision-making. It helps build collaboration, as each party has in-depth information on the location and condition of assets—from individual products to containers to trucks and airplanes—as they pass through each segment in the supply chain.

The central role of the digital twin

A digital twin is a digital representation of a physical object, instantiated as a software object that mirrors a unique physical object's characteristics, performance and condition. Built upon a cloud-based IoT platform, the digital twin accepts data from IoT devices and other data sources to deliver a system of record for the asset. It provides a foundation for information sharing and collaboration necessary to manage and optimize the asset throughout its lifecycle.

A digital twin should include the following elements:

- **Initial asset configuration**
  Data that establishes the properties and characteristics that the asset originally has. This is usually developed as a model.

- **Operational data**
  Data from asset changes over time. This includes historical data for analysis and insight and realtime data for maintenance and asset optimization.

- **Data integration**
  Integration with business and operational systems provides access and connectivity to supporting data and documentation on the asset. This delivers a 360-degree view and ensures that all the information is kept correct—wherever it resides—over the asset's lifetime.

- **Bi-directional communication**
  Some IoT platforms provide ability to both receive and send data to the IoT device, allowing for remote maintenance and remedial work to take place quickly from the digital twin.

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The IoT platform is central to the digital twin. It receives data from the device, aggregates and cleans it, makes it available to the people who need it and prepare it for analysis to improve operational performance. In this way, customized and targeted IoT applications, such as asset track and trace or monitoring, can be layered upon the digital twin (See Figure 1).
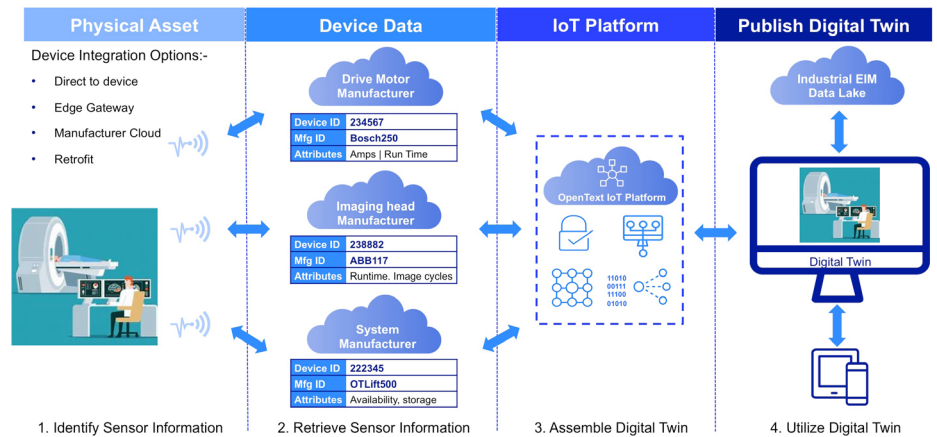
Use Case 1: Establishing a 'Digital Twin'

Figure 1

Creating the digital ecosystem

As well as managing the relationships of IoT sensors and devices, a digital twin needs to accommodate and securely enable the numerous roles and personas that must interact with the asset. This requires seamless and secure connectivity and communication of connected people, systems and things.

Connected People: The identity-centric personas and lifecycle of everyone that interacts with your digital assets and connected products—employees, suppliers, customers.

Connected Systems: The secure sharing of information between systems in the right format at the right time and to the right device.

Connected Things: Advanced IoT services for the many devices and things that need to connect and exchange information

This holistic and "identity-centric" approach brings together big data, IoT, analytics and AI to achieve end-to-end asset management and deliver transformational use cases like track and trace and remote monitoring.

In effect, the organization is creating a digital ecosystem of which IoT devices are only one component (See Figure 2). A single digital backbone connects and integrates with any person, device or enterprise system across a highly complex environment both within a single location or the entire health system.

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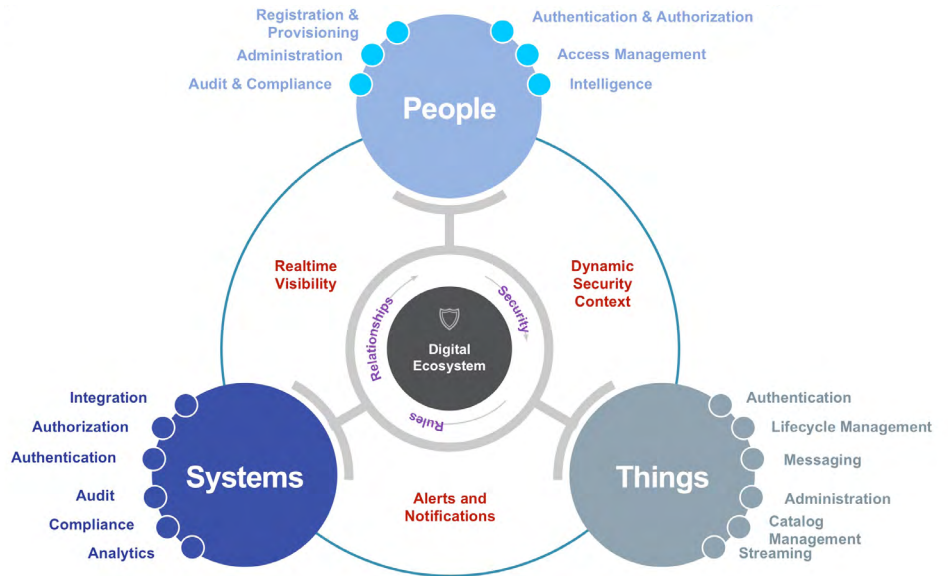## OpenText IoT manage & secure digital ecosystems

Figure 2

Deploying the IAM-driven IoT platform

This central platform enables organizations to quickly build and deploy new IoT applications, such as digital asset inventorying, track and trace and remote monitoring.

The key for all organizations looking to fully exploit a cloud-based IoT platform is to provide security for the entire digital ecosystem while ensuring everyone and everything has the access it needs. Taking an "identity-centric" approach to IoT allows for the development of an IoT platform that enables the rapid development and delivery of a wide range of components to drive comprehensive asset intelligence, tracking, monitoring and eventually transformational insights. (See Figure 3).

Key capabilities of the IoT platform include:

- **Secure device management**
  Protects all operating assets by automatically and securely provisioning, managing, and retiring IoT devices across your asset base.

- **Ecosystem integration**
  Integrates and delivers seamless information flow across enterprise supply chain solutions. This enables the seamless exchange of sensor-based information with key business systems, such as ERP, WMS and TMS, and with people inside and outside of the organization.

- **Unified messaging**
  Aggregates information from disparate systems to obtain a single data feed to enable any-to-any communication. This provides complete transparency, governance and data tracking and visibility.

- **Actionable insights**
  Applies artificial intelligence and machine learning to monitor condition, boost performance and maximize availability of serviceable equipment and assets delivering end-to-end asset visibility.

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The IAM-driven IoT platform enables vast amounts of structured and unstructured data from a wide variety of sources to be rapidly ingested and aggregated in large data sets. A unified data model allows for all data to be normalized across the entire ecosystem. The platform can then apply a series of services to the data to meet the critical asset management needs of your healthcare organization.
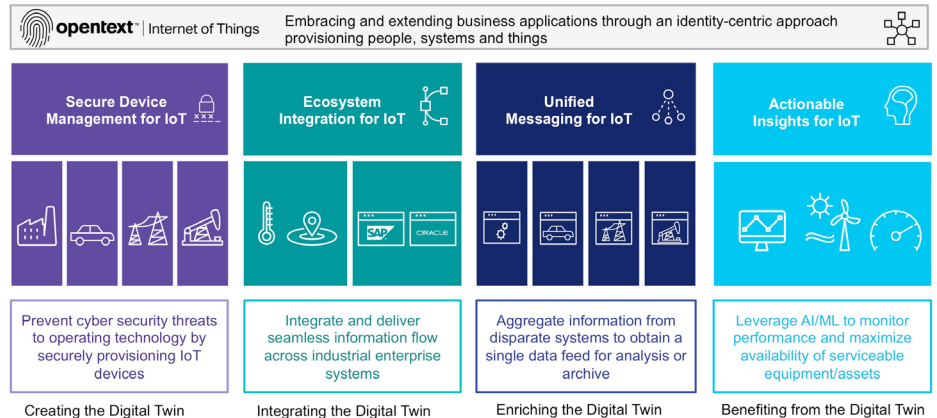
OpenText IoT offerings

Figure 3

An evolutionary approach to IoT-driven asset visibility

OpenText has created a comprehensive suite of IoT-driven asset management solutions to deliver visibility and control. Built on the OpenText IoT platform, it comprises four components (See Figure 3) that build incrementally to allow you to evolve track and trace capabilities as needed.

Asset Intelligence

OpenText Asset Intelligence allows transitioning from paper to digital asset inventorying by creating and managing an accurate, realtime inventory of all your assets. It enables you to collect a rich set of information, both IoT and related data and documentation, to build a digital twin of each asset, the starting point for creating additional use cases. It securely orchestrates and disseminates the digital twin data to key staff, customers or regulators based on their role in the asset's operation.

Asset Track

Building on Asset Intelligence, the Asset Track solution uses location-based services to pinpoint an asset's location in real time. You can track the location and movement of assets in real time to reduce production bottlenecks, optimize routes and reduce lost, stolen or misplaced assets. You can also maximize current asset operations and eliminate cost overruns due to additional time spent locating existing assets for processing or maintenance.

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The results of poor asset visibility can be extremely costly:

- 70% of organizations don't know when equipment is due for maintenance, upgrade or replacement[5]
- 30% of preventive maintenance activities occur too frequently[6]
- U.S. nurses spend up to 40 hours each month searching for equipment[7]
- Up to a third of the assets that organizations list don't actually exist[8]

Asset Monitor

The Asset Monitor solution enables monitoring an asset's condition across a wide range of variables, such as operating range, capacity utilization and duty cycle, to understand how it is being used across operations and facilities. Building on the digital twin, it gives an accurate, realtime system of record to ensure that engineering and maintenance staff are given the right information while in the office or the field. This provides the basis to move towards condition-based and eventually predictive maintenance operations.

Asset Insights

The Asset Insights solution empowers organizations to visualize all their assets as an ecosystem, using an exception dashboard to quickly identify underperforming assets or those that are missing in action. Combining IoT and non-IoT data within the digital twin allows for more effective planning and execution in areas such as inventory management, operational bottleneck reduction, asset utilization and performance, and it provides a basis to develop new IoT data-driven revenue streams.

Conclusion

The potential for IoT-enabled asset management in healthcare is enormous. Whether pinpointing inventory, detecting changes to asset condition, tracing lost or stolen goods or optimizing your supply chain, IoT-enabled asset management solutions provide the tools to improve efficiency in a wide range of use cases.

Achieving success when implementing the next generation of asset management must be carefully planned and executed. OpenText's IoT-enabled asset management solutions allow you to create a digital twin of all your assets and incrementally layer capabilities to reach 360-degree asset visibility at the pace and cost that suits your business and developing use cases.

About OpenText

OpenText, The Information Company, enables organizations to gain insight through market leading information management solutions, on-premises or in the cloud. For more information about OpenText (NASDAQ: OTEX, TSX: OTEX) visit: opentext.com.

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5 ServiceMax, After the Fall: Cost, Causes and Consequences of Unplanned Downtime. (2017)

6 UpKeep, Periodic Maintenance- What is it?

7 Nursing Times, Nurses waste 'an hour a shift' finding equipment. (2009)

8 Michael N. Day and Stephen Talbot, Data Validation the Best Practice for Data Quality in Fixed Asset Management, Asset Management Resources

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