Connected Product Maturity Model

Achieve Innovation with Connected Capabilities

Executive Summary

The world is moving to connected products. Companies will leverage the data and intelligence from these connected products to create smart business processes that will transform their businesses and drive improvements in efficiencies and effectiveness. They will also use connectivity to change the customer experience and to differentiate their offerings. But where do companies start, how do they maximize the value of the connected products, and how do they innovate?

PTC® has developed a connected product maturity model based on best practices gleaned from hundreds of engagements over more than 10 years with product manufacturers from nearly every industry. The level of maturity relates to the degree of integration of business processes and functions — from initial connection to differentiated services and solutions. As a product manufacturer, you can use this model to determine where your company fits on the curve and begin to understand how you can advance along that curve in achieving connected product innovation.

The convergence of connected products, wireless networks, cloud services, and enterprise business systems will drive enormous opportunities. To capitalize, C-level functions will need to think and act differently. Understanding the steps of a connected product maturity model is helpful to benchmark, gauge progress, and achieve your goals.

With Internet of Things (IoT) technology, many organizations begin their connected product initiatives with remote service programs. It's a proven business model with measurable ROI in the form of a recurring revenue stream, less fixed capital, and higher margins. Designed and executed properly, the same success of these programs can be achieved across the organization, creating an unbreakable bond with your customers. Companies who were early in bringing their products online are now realizing that the real "gold" in IoT is integrating that data with enterprise systems, such as CRM, ERP, PLM, or data ware houses—optimizing critical business processes and essentially "IoTizing" their organization. Realizing this business transformation is the key for market leaders to emerge in the new connected product economy.

Maturity Model

The Connected Product Maturity Model has six levels (see image below). Each level represents the progression of overall IoT maturity, bears discrete capabilities, and shows the return that your organization will realize by expanding its IoT capabilities. The purpose of this model is for you to understand your organization's current IoT capabilities along a continuum of value. It can also serve as a benchmarking tool against competitors who are providing differentiation. Below is a more detailed explanation of each level as well as the actionable steps your organization can take to move forward to the next level of the model.

Level 1 – Unconnected

Description: An unconnected organization is looking to make existing processes more efficient and drive higher levels of intelligence from the connected world. There are IoT opportunities in every industry because virtually all electronic and electro-mechanical products can be designed to automatically transmit information about status, performance, and usage, and can interact with people and other devices in real time.

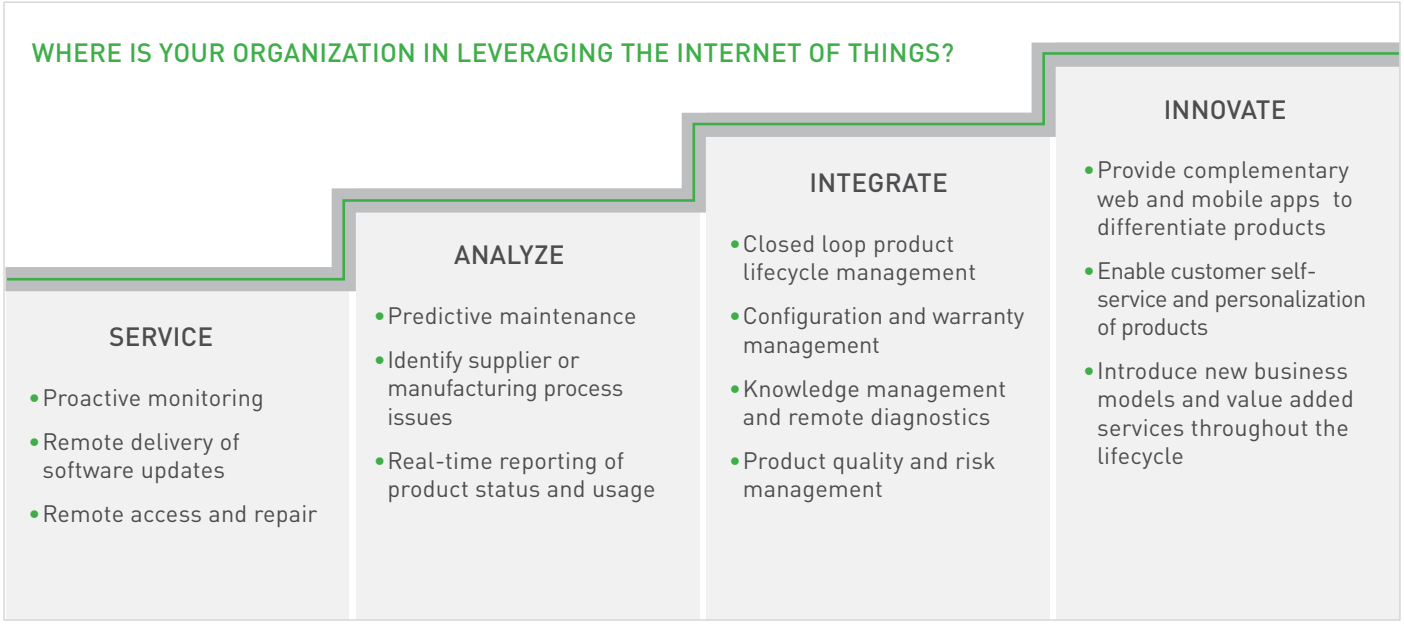

Figure 1: The Connected Product Maturity Model – Levels 3-6.

Requirements: At this level, understanding what's possible and the underlying technologies is critical. Embedded software, network communications, device protocols, provisioning, and real-time data processing technologies combine with advanced Web Services, security, and data management to strain the skills of most IT organizations and development teams. Few companies have all these specialized people on staff, so IoT projects can get stalled or off track—if they are ever started at all. Increasingly, companies are coming to the conclusion that they should focus on their core competency, dismiss the idea of the internal "build," and conduct an educated "buy" with faster, short-term ROI and time to market.

Implementation: Level 1 starts with planning. The first step is "getting connected" which is a broad term with different meanings depending upon the environment of the product and the economics of the solution. And while IoT isn't new, the fundamentals of a connected product initiative are incredibly complex. Basic enablement, network connectivity, security, middleware services, cloud services, application development, and other device management functions are all needs that must be addressed when organizations seek to launch a connected product initiative. ThingWorx™, a PTC business, provides the features and functionality to help your organization connect, as well as the infrastructure to support an IoT environment with domain experts and proven cloud services. ThingWorx also offers Innovation Workshops which will help you define and launch your connected products program and help your key business and technical groups work together to develop a common point of view. After you describe your key business and IT objectives and challenges, ThingWorx subject matter experts collaborate with your team on the key elements of an IoT strategy, especially as they apply to your current environment. Innovation Workshops are offered at your business location, or at ThingWorx offices in Foxboro, Massachusetts, or Exton, Pennsylvania. To request an Innovation Workshop, please contact your account manager.

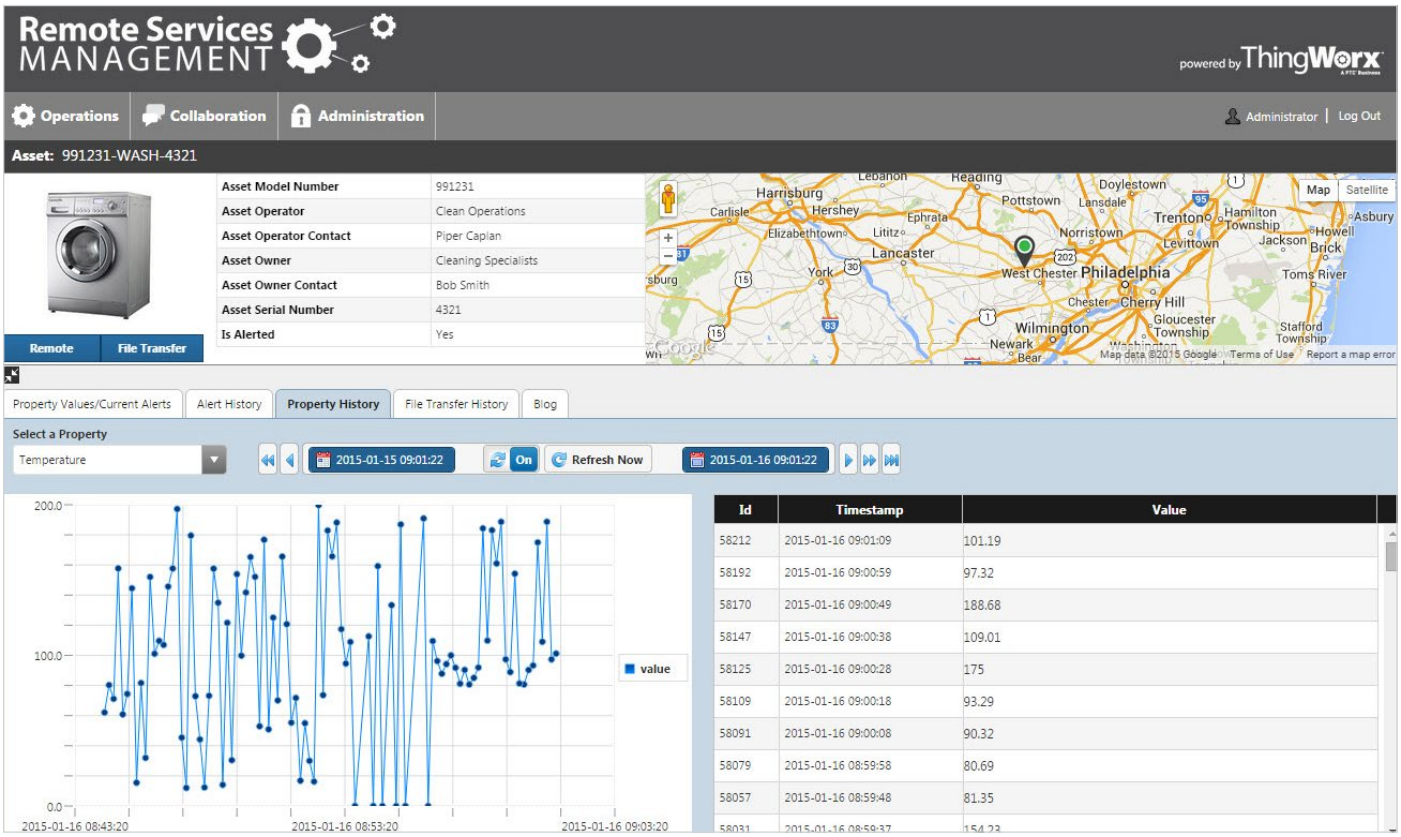

Figure 2: ThingWorx provides a comprehensive set of tools to remotely identify, diagnose and repair problems with devices and paves the way for proactive and predictive customer service.

Level 2 – Connect

Description: Once connected, organizations begin to realize a new means to generate growth and achieve a sustainable service position. Connected product services typically generate a recurring revenue stream, require less fixed capital, and provide potentially higher margins.

Requirements: Connecting products to a network is not always trivial. Keeping up with device proliferation and the numbers and types of devices produced by manufacturers continues to grow rapidly. The focus here should be on developing a solution that is resilient to change and allows applications to capitalize on, rather than be hindered by, product differences.

Implementation: Reaching Level 2 is accomplished by connecting a product to a network (internet, cellular, or satellite) and enabling data transmission back to an enterprise server or system for processing. ThingWorx provides IoT Connectivity Services that include software agents and toolkits that enable your organization to establish connectivity between products or assets and the ThingWorx Platform, while allowing a choice of communication methods and hardware to suit the requirements of any IoT solution. As a result, your organization can connect to any product over any communication channel—cellular networks, the Internet, Wi-Fi, or satellite.

Level 3 – Service

Description: Each and every product requires some level of service and support. Service organizations are increasingly adopting remote service solutions to identify, diagnose, and resolve issues remotely. Remote Service Management Applications fit that need in helping to deliver proactive service to their range of devices—improving uptime, slashing service costs, and paving the way for value-added services based on the devices' data.

Requirements: Organizations require an application enablement platform and suite of tools to monitor assets, remotely login, and manage remote content. The solution would handle hosting, security, and scalability, and have flexible APIs so that they are unencumbered by infrastructure and can focus on the value of the solution.

Implementation: Reaching Level 3 is accomplished by enabling remote access and service. ThingWorx provides a secure and scalable platform to process and store machine data, and applications to deliver remote service. The service includes web-based purpose-built connected product management applications for monitoring, remote login, desktop sharing, software management, and remote content distribution. See Figure 2.

Level 4 – Analyze

Description: Here, the focus quickly turns to analyzing the data and developing user-facing tools and applications that facilitate data analysis, provide insights, and improve business functions. With the right IoT reporting and BI solution, your company can run reports, query the data, create dashboards, or feed the data into your data warehouse and BI environments.

Requirements: Many organizations, including service, engineering, finance, compliance, QA, product management, and sales, need visibility into product usage, performance, and behavior. The data from the connected products needs to be organized and stored in a way that makes it is easy to report on and analyze.

Implementation: Reaching Level 4 is accomplished by enabling reporting and analytics. With ThingWorx dashboards, , your organization can easily build and deliver ad-hoc queries, professional reports, and dashboards that articulate success metrics and KPIs, with reporting functionality that demonstrates the value of connected products. With a powerful business intelligence engine and easy-to-use report and dashboard building tools, your organization can understand the "what" and "why" of your IoT data.

Level 5 - Integrate

Description: Organizations who were early in bringing their products online are now realizing that the real "gold" in IoT is taking that data and integrating with enterprise systems such as CRM, ERP, PLM, or data warehouses—optimizing critical business processes and essentially "IoT-izing" their business.

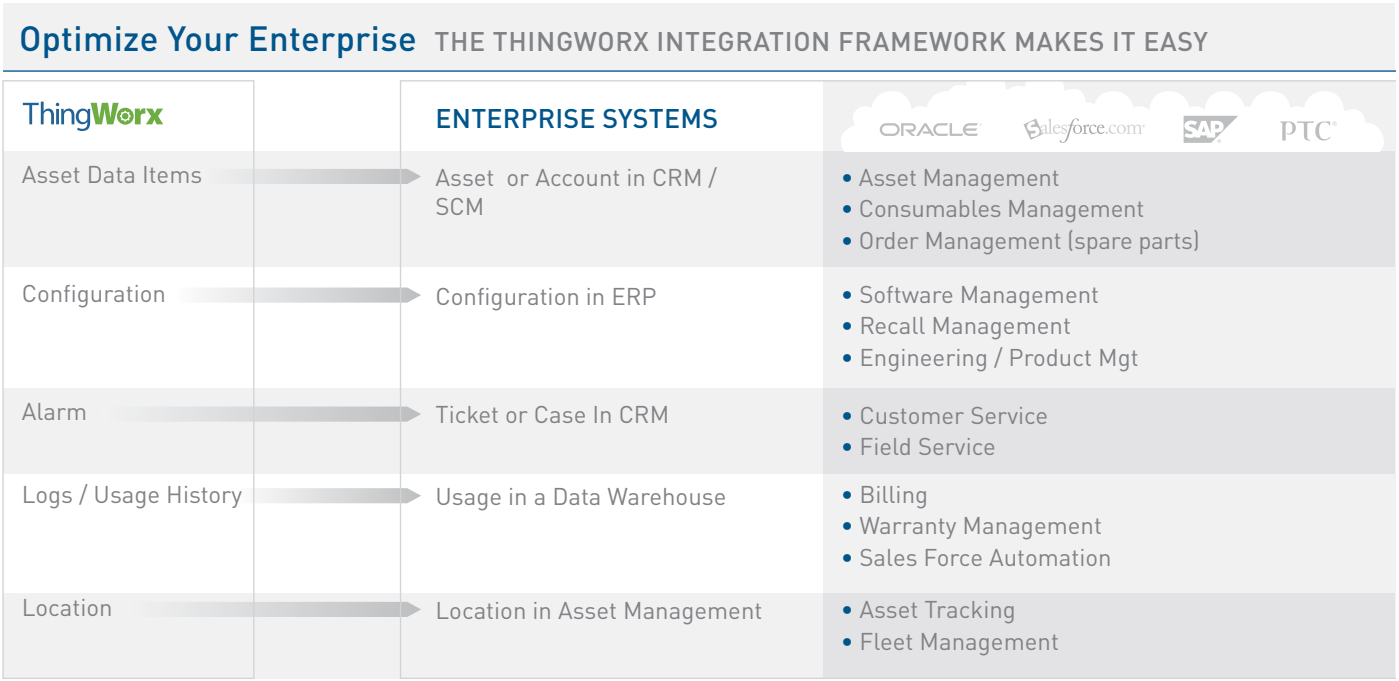

Figure 3: Companies that were early in bringing their products online are now realizing that the real "gold" in IoT is taking that data and integrating into enterprise systems such as CRM, ERP, PLM, SLM or data warehouses – optimizing crucial business processes and essentially optimizing their organizations.

Requirements: IoT data must be made available to integrate with other systems. The IoT data must deliver additional value by combining information from connected products with information from other complementary sources and systems to enable people and processes to collaborate and extract even more value. For example, product data flowing through a CRM system can be sent to billing or into a supply chain management system—eliminating error-prone manual steps and providing new sales opportunities for consumable replenishment or warranty renewals. Quality assurance or product management can help enhance product features based on real-world data that shows usage patterns or equipment issues—improving customer satisfaction and streamlining beta programs. The valuable IoT product data—now unlocked—can also guide engineering efforts in building more reliable products with differentiating features driven by customer demand.

Implementation: ThingWorx offers a framework to integrate with business systems by feeding IoT data into CRM/ERP/PLM systems to optimize business processes by enhancing service, billing, sales, inventory management, and product development. The framework includes web services APIs to read and write data as well as a standards-based message queue for asynchronous data transfers. Once integrated with ThingWorx, IoT data from connected assets, in collaboration with other enterprise systems, can provide visibility and automation across organizations not previously possible.

Level 6 – Innovate

Description: The ultimate goal for product manufacturers is to reach Level 6 innovate. This is where connected capabilities have the capacity to transform your business and increase customer loyalty. Innovation is achieved by enabling end-users and customers to reinvent their user experience through connected products.

Requirements: There are many types of custom applications that can enhance the utility of a product. For example, organizations can present data from the connected product to users and end-customers via portals that they can view while using equipment in real-time. This enables application leaders and developers to receive real-time technical and industry information

and develop a culture of innovation that motivates and rewards end-user feedback. Mobile applications for smart phone and tablets are also emerging as a way to put applications that interact with products in the hands of field personnel and end-users who need remote access from anywhere.

Implementation: For the most progressive companies reaching the highest level, ThingWorx provides IoT applications services to rapidly create new innovative customer-facing applications that differentiate their offerings. The ThingWorx platform includes a rules engine, scripting engine, and robust APIs including RESTful and SOAP-based web services.

SUMMARY

The Internet of Things and Smart Connected Products are transforming how manufacturers create and exchange value with customers and the supply chain. This transformation is shifting the sources of value and differentiation to software, the cloud, and service, and spawning entirely new business models. To capture this great wave of value creation opportunity, manufacturers have an urgent need to rethink nearly everything — from how products are created, manufactured, sold, operated, and serviced. Those who don't are placing their current competitive advantage at risk.

Hundreds of leading companies rely on our Internet of Things solutions to power their connected products. Our IoT offerings have helped transform these businesses by improving customer experience, optimizing existing business processes, differentiating product and service offerings and unlocking new revenue streams. In the end, it's about making the right strategic choices, selecting the right partners, and rapidly enabling the right capabilities to create and sustain market leadership.

Reach out to PTC today and learn how to reduce the time, cost, and risk to deliver innovative new IoT applications at PTC.com/go/scp.

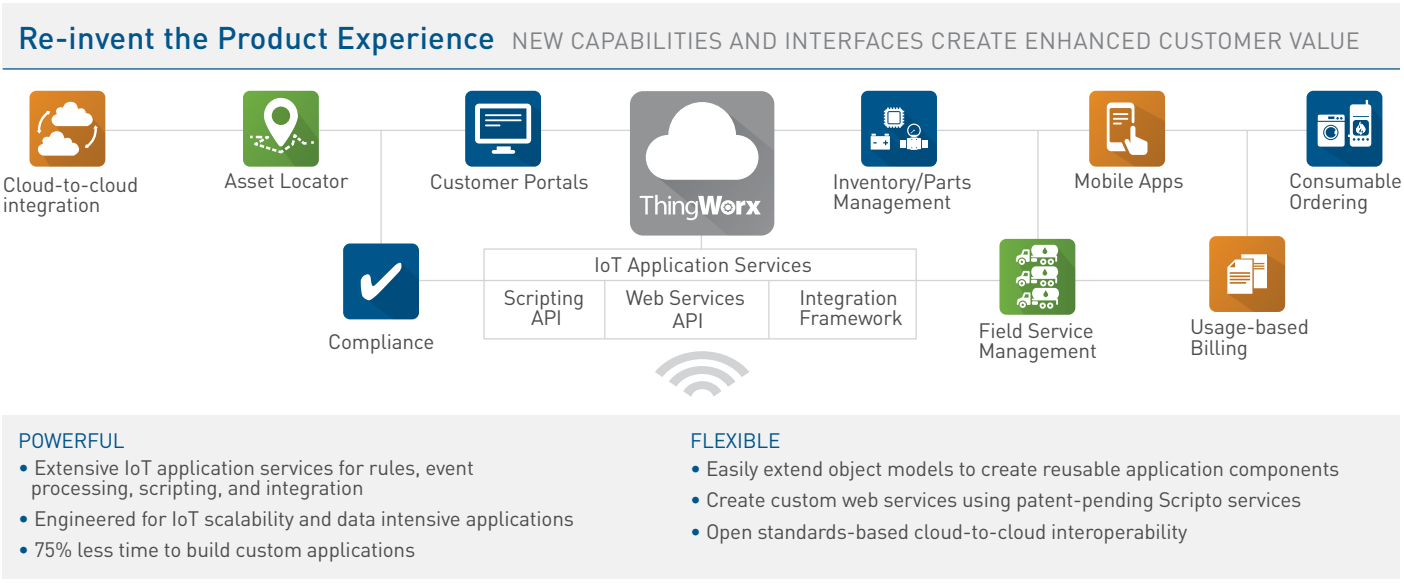

Figure 4: Differentiation and innovation is achieved by enabling customers to reinvent their user experience through connected products.

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