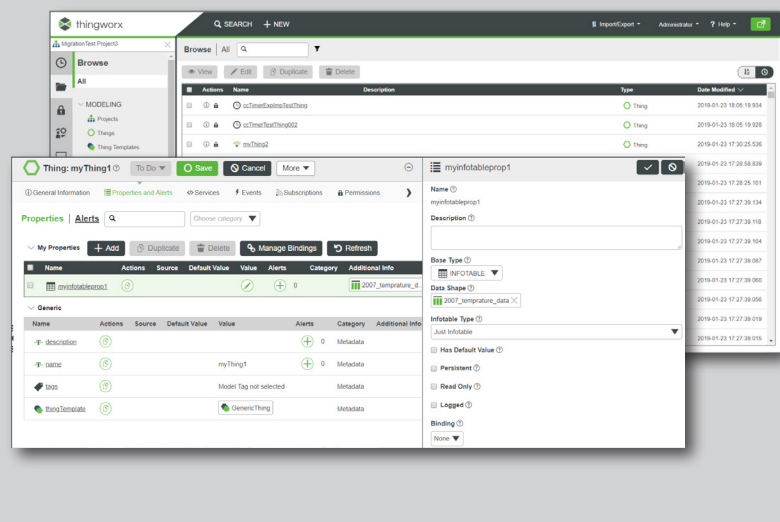


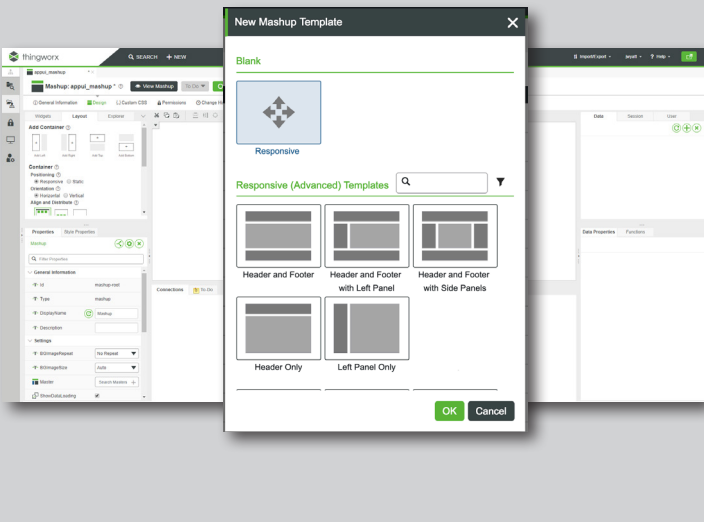
ThingWorx Foundation: Application Enablement

ThingWorx Foundation is purpose-built for the creation of scalable and secure solutions for industrial IoT that are easy to implement, accelerate time-to-market, and deliver compelling end-user experiences. It includes a design and runtime engine that simplifies the development of IoT applications with real-time, bi-directional connectivity to devices, systems, and processes.

Composer



Mashup Builder



Building IoT Solutions

ThingWorx Foundation connects to all components of the ThingWorx platform, as well as third-party systems and applications, enabling a seamless approach to the creation of comprehensive, feature-rich IoT solutions. Its Application Enablement Platform (AEP) uses model-driven, rapid application design functionality that requires minimal to no coding in the creation of IoT solutions that are easy to scale and maintain.

Components include:

Composer

The default user interface of ThingWorx provides an integrated visual modeling environment for administrators and developers

Mashup Builder

Drag-and-drop solution for the creation of applications, dashboards, workspaces, and mobile interfaces

Thing Model

A digital structure that models data to represent a physical asset, person, organizational element, or work process

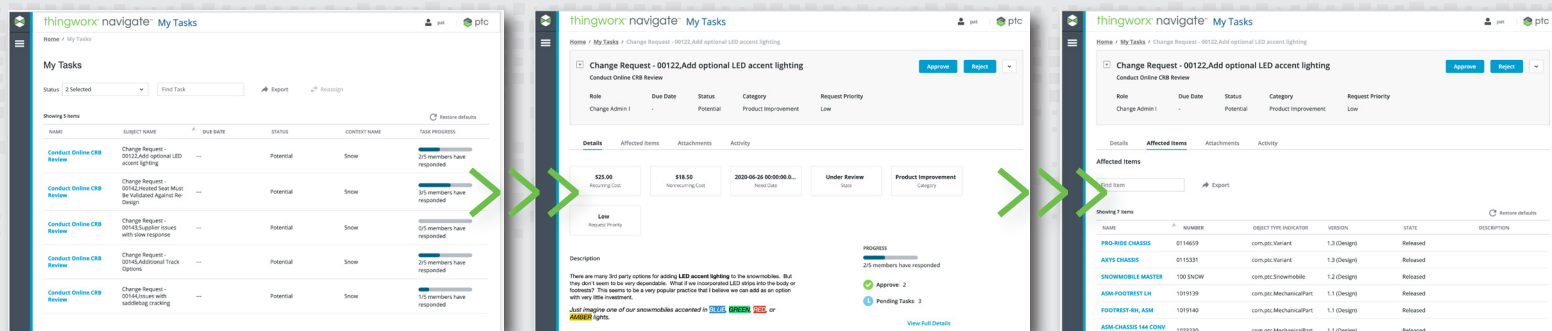
Connection Services

Services, software agents, and toolkits available to establish connectivity between devices, assets, and systems back to ThingWorx Foundation

Rapid Application Development

The ThingWorx platform is wholly oriented around the Thing Model, the digital view of a connected "thing." A key component of application enablement, the Thing Model originates in ThingWorx Foundation, where users create templates that define data properties of a Thing, or class of Things. A template establishes a consistent, digital representation of an entity that becomes the Thing Model - a single source of truth across platform components and connected applications. This model-based approach to application development produces solutions that are easy to use, manage, and scale, while increasing the speed and efficiency of the development process.

Completed Application Example



Model and Configure Applications

The default user interface for the ThingWorx platform, Composer is an integrated application development environment in which users configure the platform to effectively support the IoT application. It uses visual application modeling and modern browser concepts that facilitate comprehensive data synthesis, efficient service authoring, and simplified application management.

Functionality includes:

- Intuitive interface with drag-and-drop elements and streamlined workflows
- Access to connection services to define IoT sources and integrated systems
- Templates to model the properties, services, and events of Things that become the Thing Model
- Authoring of application logic - services, flows, events, and alerts
- Automatic identification of dependencies for ThingWorx applications
- Storage solutions for all application data, including relational, discrete, timeseries, events and alerts, media, and more
- Configuration of user access and security settings

Design and Build Application Components

Mashup Builder is a user-friendly solution that enables developers and business users alike to create graphical user interfaces for IoT applications using web, mobile, and augmented reality without requiring the user to be an expert in those technologies. User-friendly tools and intuitive functionality minimize the need for coding, which reduces development backlog and increases organizational responsiveness.

Functionality includes:

- Rapid creation of unique applications with collaborative workspaces, dashboards, and analytics scenarios
- Customizable interfaces, visualizations, and business logic
- Wide selection of pre-built widgets to easily add functions and graphical elements to an application
- Visual, drag-and-drop tools to simplify design, layout, and styling of applications
- Configurable connections that aggregate data from multiple data sources and map to widgets
- To-Do list to track tasks to be completed before mashup can be published

About PTC (NASDAQ: PTC)

PTC unleashes industrial innovation with award-winning, market-proven solutions that enable companies to differentiate their products and services, improve operational excellence, and increase workforce productivity. With PTC, and its partner ecosystem, manufacturers can capitalize on the promise of today's new technology to drive digital transformation.



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