# glassbeam™

# Glassbeam Powers PTC Thingworx with IoT Analytics

The Internet of Things (IoT) is a complex landscape consisting of smart systems ranging from small sensor driven equipment to large heterogeneous machines. These systems generate large amounts of data, which can come from multiple sources, in multiple formats, and at irregular/unscheduled intervals. This constant stream of both structured and unstructured data needs to be modeled, processed, and analyzed for both real-time and historical needs.

## Structured Data:

- Not complex
- Collected regularly on a scheduled basis
- Generated and sent in predictable ways and formats

## Unstructured Data

- Complex
- Generated from multiple sources
- Comes from irregular activity (e.g. anomalies, breakdowns, etc.)

**ThingWorx** is well-suited to aggregating, analyzing, and visualizing Instrumented (structured) Data.

**glassbeam™** can handle Machine Data, which includes both instrumented data and unstructured data.

By leveraging the strengths of both the Thingworx and Glassbeam IoT platforms it becomes possible to address analytics needs across all data sources, regardless of device complexity.

Some of the integration possibilities include:

## Real-time Streaming



Glassbeam hosts an ActiveMQ Broker to listen to real-time messages. Thingworx capability is enhanced using an ActiveMQ extension readily available on the Thingworx marketplace. Any ActiveMQ Thing can be made to send messages to the ActiveMQ Broker hosted in Glassbeam, which are then streamed for real-time analytics.

# FTP/SSH for batch transfer
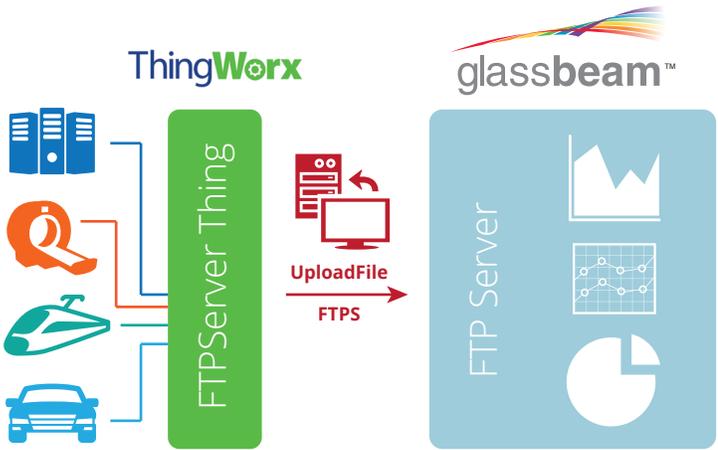


Glassbeam hosts an FTP Server where file drops can be configured. Thingworx capability is enhanced using an FTP extension readily available on the Thingworx marketplace. Encryption can be enabled using the FTP Secure protocol.

# Thingworx Composer/Visualization
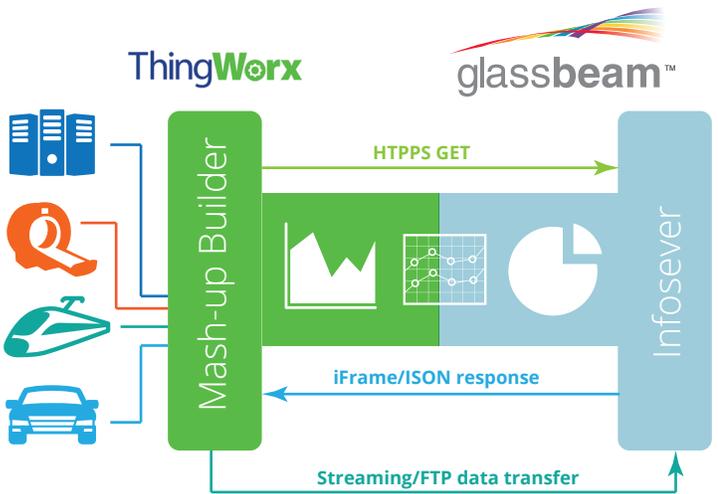


Both Glassbeam and Thingworx are capable of visualizing data within Thingworx mashup builder. Glassbeam can be used to generate visualization components as iFrames, which can then be embedded in a Thingworx mashup, or Glassbeam can act as a REST based web server (Infoserver) for the Thingworx mashup to query JSON data using HTTPS REST and visualize using Thingworx's own visualization features.

# Thingworx Machine Learning
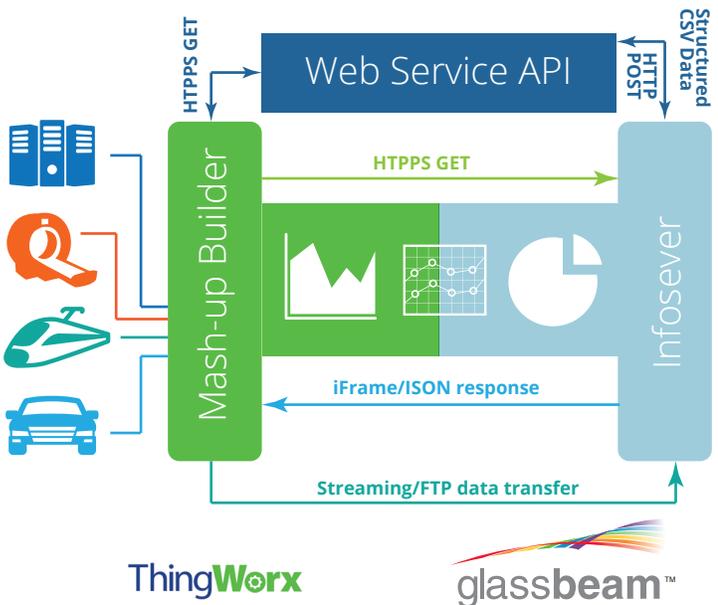


Thingworx Machine Learning takes a specific format of structured input in order to model and apply predictive analytics on the data – which is where Glassbeam comes in. Using any of the methods outlined in the diagram, Glassbeam can now translate the semi-structured machine data into a structured CSV that Thingworx Machine Learning can process and then feed that data into Thingworx Machine Learning using REST based web services. Thingworx mashup builder can then use the output of Thingworx Machine Learning's analysis in order to create interactive visualizations.