

Одиннадцатая независимая научно-практическая конференция «Разработка ПО 2015»

22 - 24 октября, Москва



DIY: Сапоги-скороходы, скатерть-самобранка и кошелек-самотряс

Дмитрий Кирьянов



Продуктивные Технологические Системы

Прогноз роста «Интернета вещей»

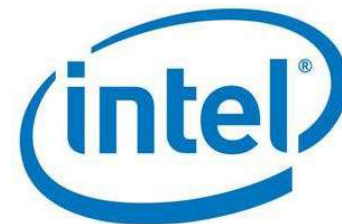
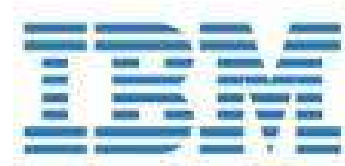
■ Сенсоры, Устройства

■ Приложения

1 млрд
2010



Игроки на рынке IoT



Платформа разработки для Интернета вещей

ThingWorx™
A PTC® Business

 PTC®



ThingWorxTM
A PTC Business

Основана в 2009

Платформа для приложений IoT

Широкое применение

Уменьшение стоимости разработки
IoT/M2M приложений в 10 и более раз

“ThingWorx is re-defining the concept of connected platforms and creating a new market meta-category”

HR Harbor Research
San Francisco | Boston | Zurich

Recognized as Industry Leader



Most Innovative Product



Best Application Platform



Приложения

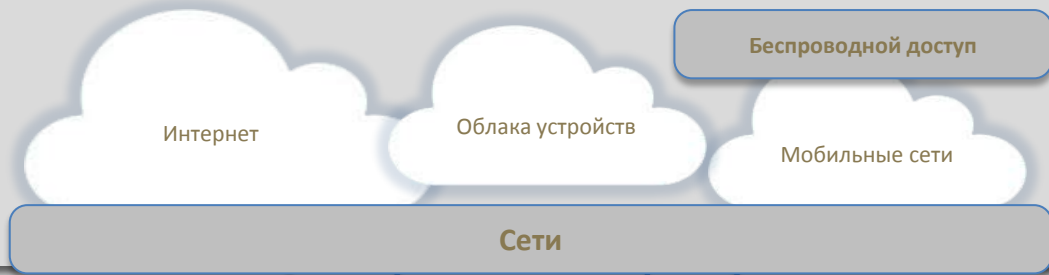


Разработка приложений



- ▶ Сложный код программ
- ▶ Громоздкая поддержка
- ▶ Высокая цена и риски
- ▶ Барьер для инноваций

Элементы инфраструктуры связи



Датчики и устройства



Приложения



Вертикальная архитектура приложений и полная интеграция с бизнесом

Разработка приложений

ThingWorx™
A PTC Business



Средства для онлайн-разработки приложений

Элементы инфраструктуры связи

Интернет

Облака устройств

Мобильные сети

Беспроводной доступ

Сети

Управление устройствами и подключениями

Датчики и устройства



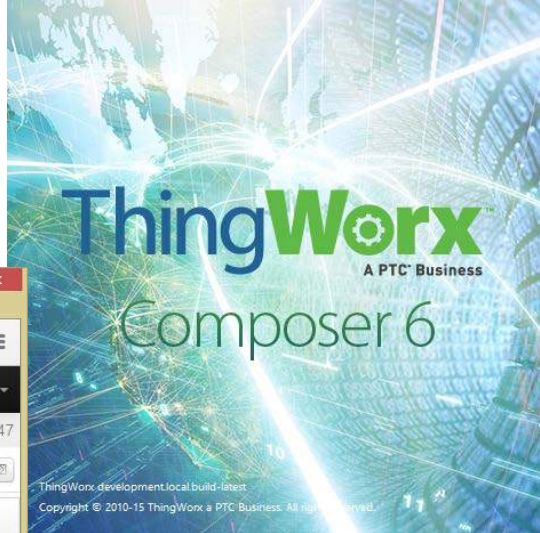
Управление устройствами на низком уровне:
ThingWorx Edge MicroServer

Примеры: умный трафик

The image displays the ALL TRAFFIC SOLUTIONS web application interface, which is used for managing traffic data collection sites. The interface is divided into several sections:

- Navigation Bar:** Includes links for Home, Management, Reports, Map, and Admin. The user is logged in as Scott Johnson.
- Left Sidebar:** Contains navigation options for Equipment, Messages, Dependent Messages, Sites, Images, Alerts, and Routes.
- Equipment List:** A table listing equipment IDs (e.g., ATSO101, ATSO102) and their associated messages.
- Message Library:** A section for viewing and managing messages, with filters and options to edit or delete.
- Data Collection Site Detail:** A pop-up window for a specific site (atsENG-E) showing:
 - Tags:** Application: ATS, GPS: 48 0663 -106.2717, Reports: View
 - Devices at Site:** A table with columns for Status, Nickname, Last Login, and Est. Next Login. One device is listed: atsENG-E, last login on 2013-08-14 at 14:30:27.
 - Device Alerts:** A section for alerts.
 - Device Errors:** A section for errors, with a message: "This sign is more than a foot from its assigned site."
 - Actions:** A table with columns for Solutions and Link, containing options like "Change Data Collection Site" and "Add new Site at this Location".
- Map:** A Google Map showing the location of the data collection site in Boulder, Colorado, with various markers and a legend.

Примеры: умный трафик



The screenshot shows the ThingWorx Composer 6 web interface. The browser address bar displays the URL: `ge2-393.cloud.thingworx.com/Thingworx/Composer/index.html?guided=true&model=connectedcar&`. The page title is "MBTAMashup". The interface includes a navigation menu on the left with sections for "ENTITY INFORMATION", "PERMISSIONS", "CHANGE HISTORY", and "DEPENDENCIES". The main content area shows a map of the Philadelphia area with a red box highlighting a location. Below the map, there is a section titled "Closest MBTA Stations By Location" with a search bar and a "View:" dropdown menu. The top navigation bar includes options like "New Entity", "Import/Export", "Monitoring", and "Help".

Standard Filters None of 54 Active Filter(s) [+ Add Filter](#)

Rental Locations

Acme Rental - Airport

Rental Car Address
5757 Wayne Newton Boulevard
City

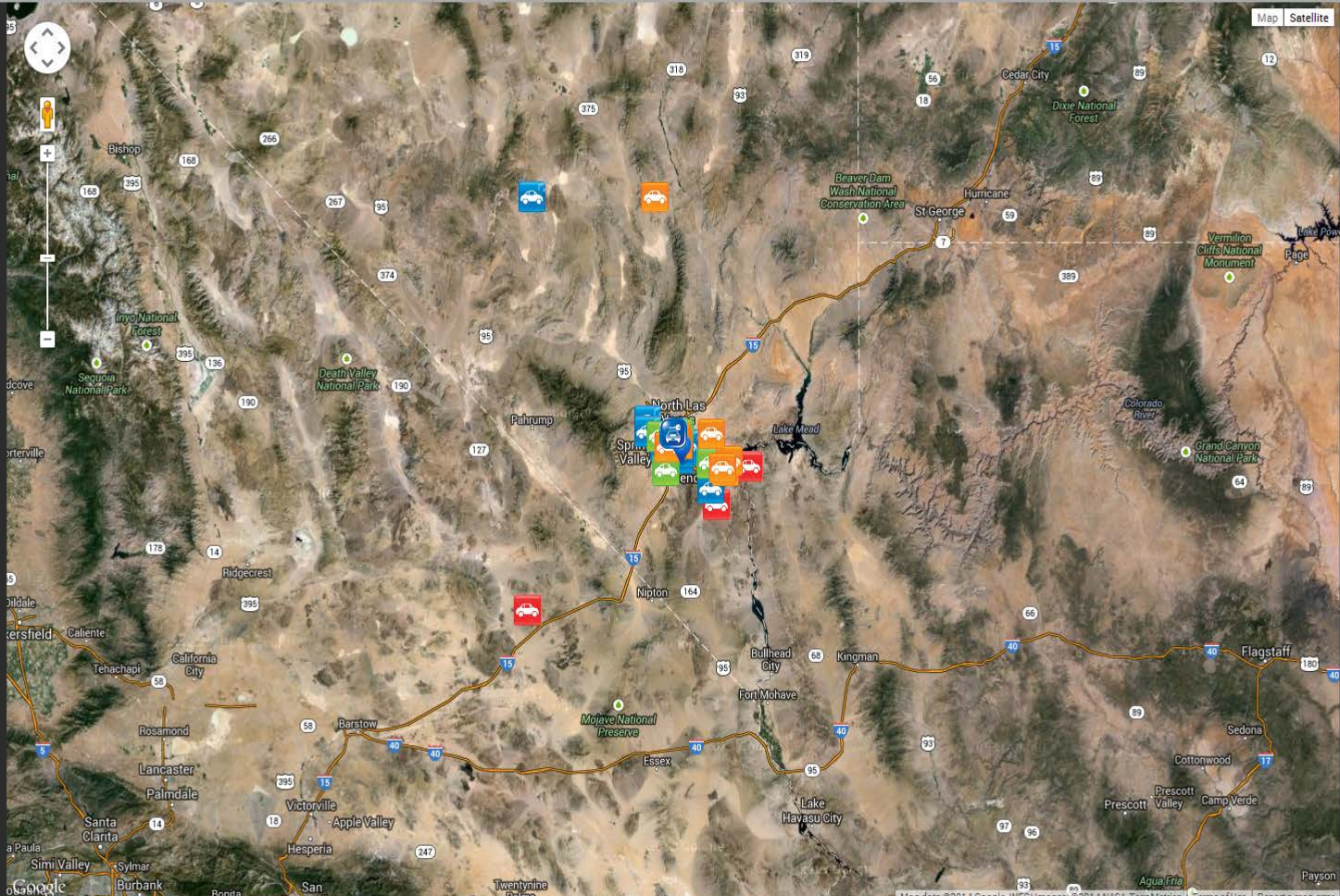
Phone Number
484-797-0443

Customer Filters

Return vehicles within radius

Customer Name

[Reset Filter](#) [Apply Filter](#)



Selected Vehicle [Details](#)

VIN
JT1WHZJ7308000691
Customer Name
John Simms
Customer Address
250 Barclay Crt, Newtown, CA 90046
Customer Phone Number
+1484-797-0443
Customer Email

Rental Start Date	Rental End Date
2013-04-01 19:55:03	2013-04-30 19:55:03

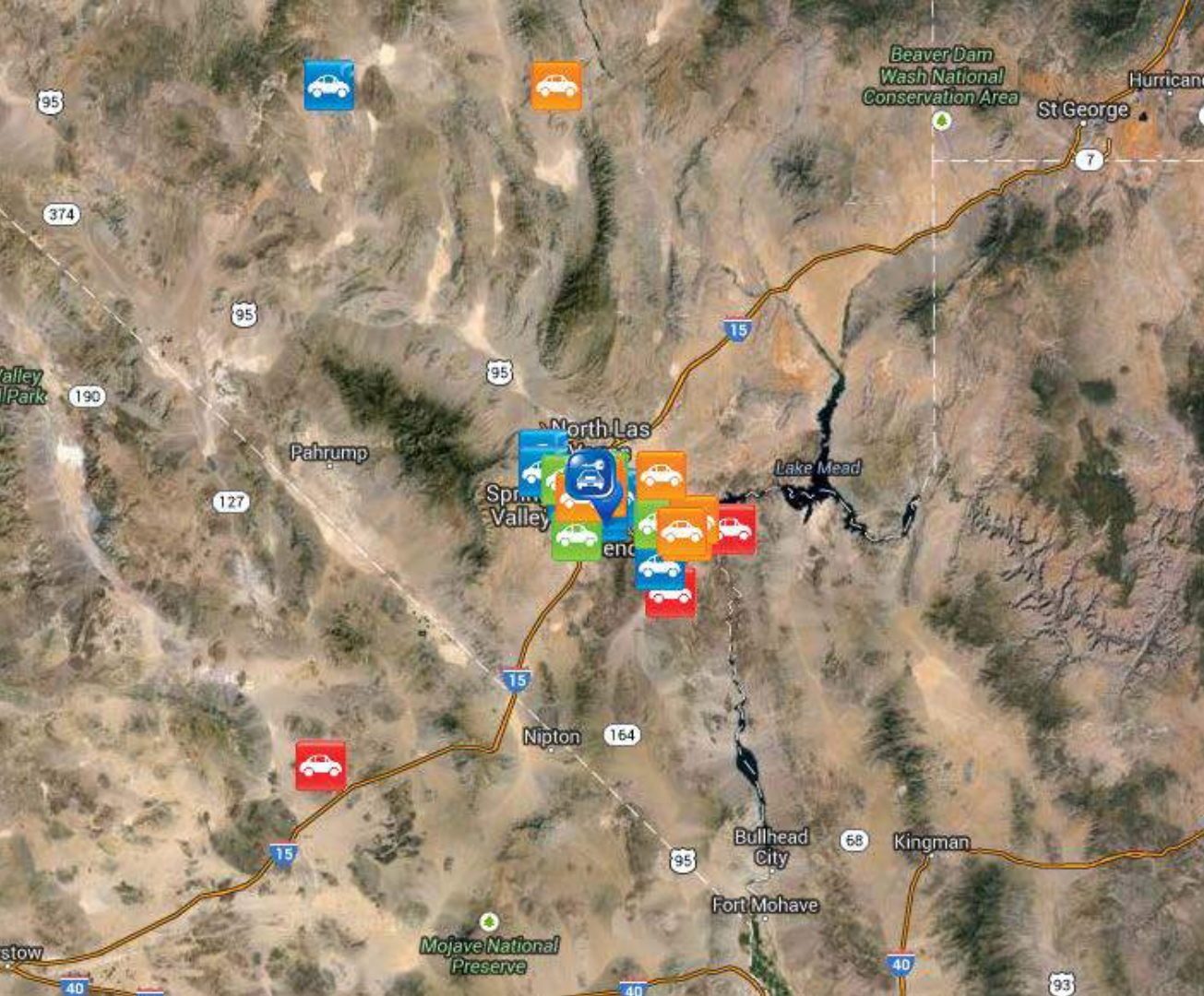
Customer Driving Score



Alerts

Message to Driver

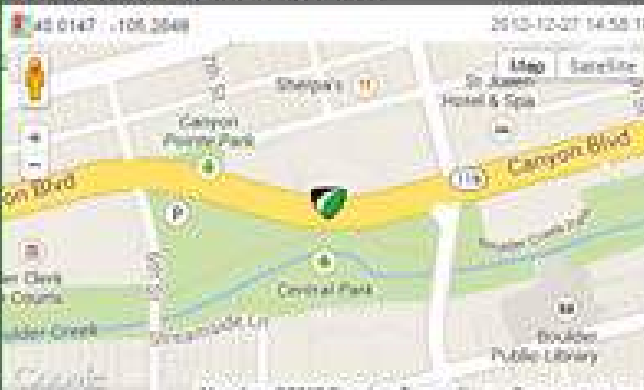
[Call](#) [Email](#) [SMS](#)



- Equipment
- Messages
- Dependent Messages
- Sites
- Images
- Alerts
- Routes

Name	Product	Power	Assigned Site	Signal Strength	Settings	Pending SmartMove
AT50101	Radar Speed Sign 12"		Jason's House, SB		Waiting for sync	Jason's House, SB
AT50103	Radar Message Sign 18"		South Boulder Road at Cherrvale, NB		Waiting for sync	
AT50104	Radar Speed Sign 15"		Arapaho @ Scott Carpenter Park, EB		Up to date	
AT50105	Radar Message Sign 24"		Jason's House, SB		Up to date	
AT50106	Variable Message Sign 30"		200 Block Manhattan Drive, SB		Up to date	
AT50107	Variable Message Sign 24"		Arapaho @ Scott Carpenter Park, EB		Up to date	
AT50108	Variable Message Sign 24"		Arapaho @ Scott Carpenter Park, EB		Up to date	
AT50109	Variable Message Sign 24"		Arapaho @ Scott Carpenter Park, EB		Up to date	

Selected Equipment Details - AT50101 [Edit Settings](#)



40.0147, -105.2648 2012-12-27 14:58:10

Sign Mode: Display Off

Speed Limit: 50

Average Speed: 25 85th Percentile: 31

Last Login: 8/4/2012 3:58 PM

Estimated Next Login: 8/4/2012 6:56 PM (past due)

There are setting changes awaiting sync.

SmartMove [Cancel](#) [Edit](#)

There is a pending SmartMove for:

- Jason's House, SB

World Overview

- AcmeCo
 - USRegion
 - Charlotte
 - Killingly
 - Pleasanton
 - Birmingham
 - EastenEurope
 - Belarus
 - Russia

Charlotte

Plant Detail


Plant Manager

 Dean Blast

Plant Address
 2911 Nevada Blvd,
 Charlotte, NC

[Send Msg](#)

Plant Manager Phone
 1-484-797-0443
Latest Weather

 Cloudy 57.00

Total Produced
4 1339

Total Waste
2807

OEE
72

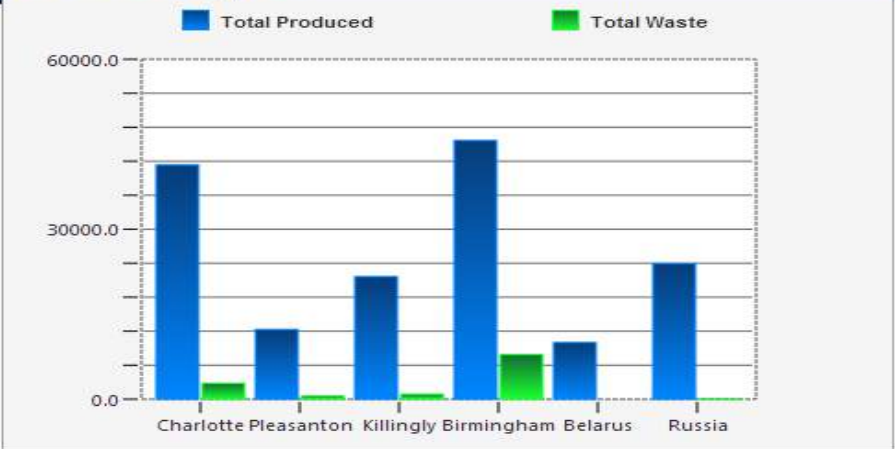
TE
74

NE
75

Pause Rotation Next Plant



Plant Production Comparison

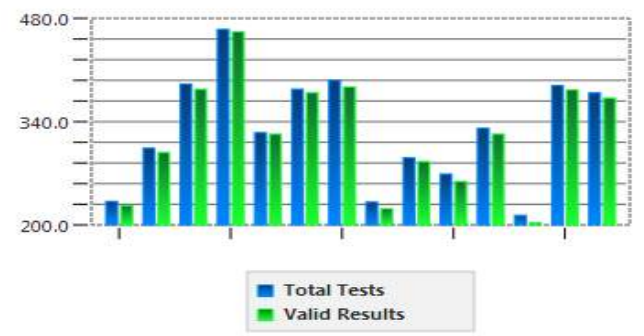


News

- Mon, 30 Dec 2013 21:20:58 +0000
 PTC Acquires Leading Internet of Things Platform Provider ThingWorx
- Tue, 17 Dec 2013 11:00:55 +0000
 RailComm Selects ThingWorx to Advance its M2M and Industrial Internet Solutions for the Rail Industry
- Sun, 08 Dec 2013 03:11:04 +0000
 ThingWorx Partner Libellum Improves Wine Production in Spain
- Sat, 07 Dec 2013 20:25:56 +0000
 ThingWorx Leads IoT Excitement at ThingMonk
- Tue, 03 Dec 2013 12:46:19 +0000

Test Result Summary

- OrthaClinical
 - Customer_1
 - Vitros4600_0004
 - Customer_2
 - Vitros4600_0008**
 - Vitros4600_0006
 - Vitros4600_0002
 - Customer_3
 - Vitros4600_0007
 - Vitros4600_0001
 - Customer_4
 - Vitros4600_0005



Service Requests

RequestId	Status	Customer	SerialNumber	Description	Date
SR2832	CLOSED	Customer_2	576903	Potential_interferent	2013-03-12
SR6280	CLOSED	Customer_2	576903	Potential_interferent	2013-03-12
SR5213	CLOSED	Customer_2	576903	Potential_interferent	2013-03-12
SR7992	CLOSED	Customer_2	576903	Air_Filter_Failure	2013-03-12
SR4734	CLOSED	Customer_2	576903	Air_Filter_Failure	2013-03-12
SR2420	OPEN	Customer_2	576903	Potential_interferent	2013-03-12
SR3398	OPEN	Customer_2	576903	Potential_interferent	2013-03-12
SR8632	CLOSED	Customer_2	576903	Air_Filter_Failure	2013-03-12
SR9015	CLOSED	Customer_2	576903	Air_Filter_Failure	2013-03-12
SR9354	CLOSED	Customer_2	576903	Potential_interferent	2013-03-12
SR4304	CLOSED	Customer_2	576903	Potential_interferent	2013-03-12

Ortho Clinical Community Add New Post

View: Grid Table

Sort by: Relevance Created Comments Starred



Connect

Connectivity and Device Management



Device Cloud

Private Device Cloud



Application Enablement

Application Enablement



Composer

Rapid Application Development



Marketplace

Smart Extensions and Applications



Converge

Product-Aware Extension, Utilities and Integration Hub



Neuron

Predictive Analytics for Big Data



Augmented Reality*

Visual Interface for IoT-Enabled Apps.



Digital Twin*

Linking the Digital and Physical worlds for closed loop lifecycle management.

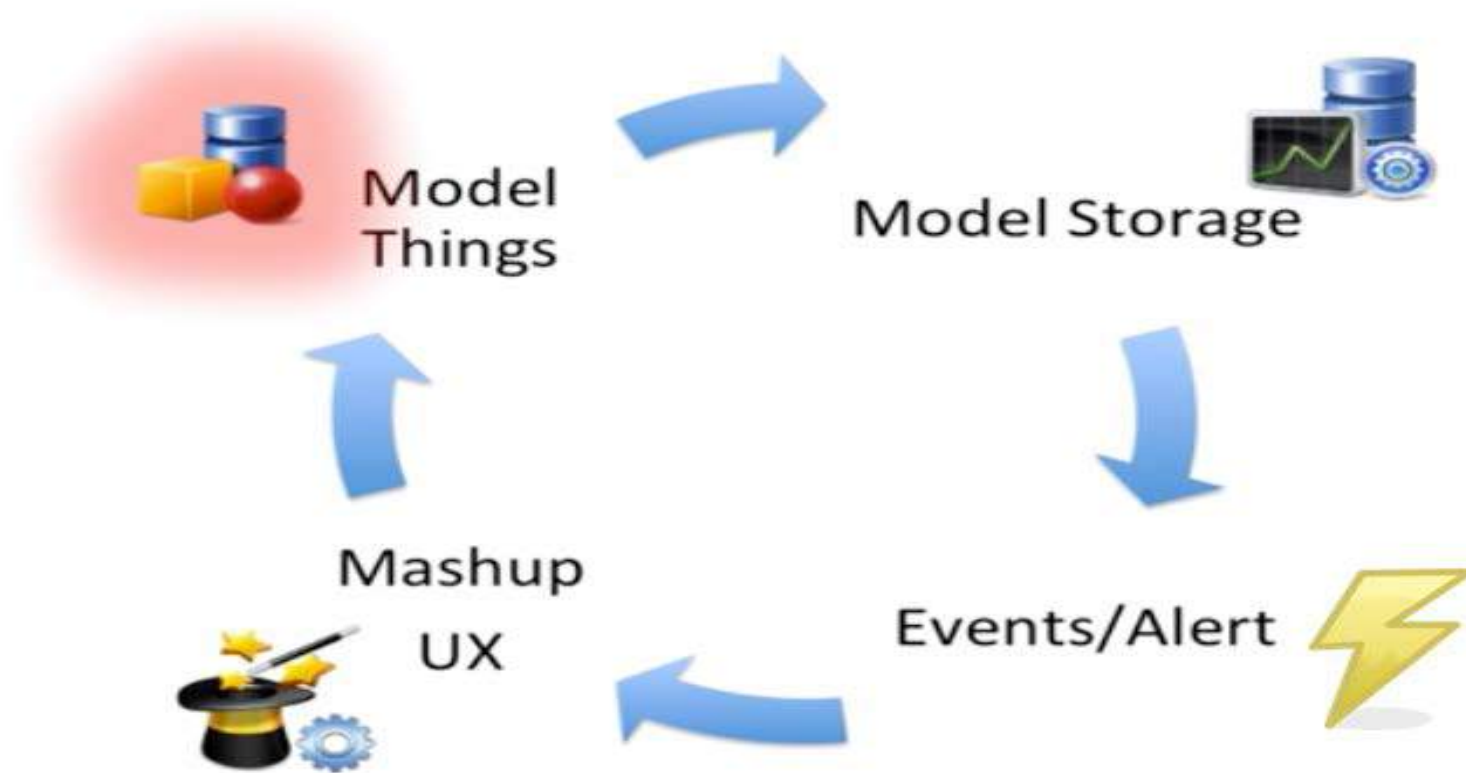
*beta

Обзор инструментов разработки

- A Complete Solution
- Data Modeling
- Data Storage
- Application Logic
- User Interface Design
- Device Communications
- Security and User Management
- Extensibility & Integration



Замкнутый цикл разработки



Как быстро разработать приложение?

Разработка на основе моделей уменьшает стоимость в 10X раз

ThingWorx предлагает разработку без написания кода, позволяющую учесть модель взаимодействия и обслуживания устройств, а также хранения и обработки массивов производимых ими данных.



Mashup Builder: визуальное средство разработки для IoT

Mashup Builder – это интегрированная среда, позволяющая разработчику создавать приложения в визуальном режиме и включающая средства аналитики, искусственного интеллекта и обработки «больших данных».



Гибкие возможности подключения устройств

Удобная разработка, дающая возможность быстрого подключения огромного числа типовых устройств, без сложной настройки и написания кода на микро-уровне.



- **Mashup Builder**– это средство для разработки Mashup-ов страниц HTML5, которые содержат виджеты (визуальные компоненты).

The screenshot displays the Mashup Builder interface. At the top, there are tabs for 'HTU21DThing' and 'HTU21DMashup'. Below the tabs, there are buttons for 'Design', 'Info', 'View Mashup', 'Save', and 'Cancel Edit'. The main workspace shows a central area with a dashed box around an LED Display widget. A context menu is open over the widget, listing 'Things_HTU21DThing' and 'GetProperties' with a sub-item 'Temperature'. On the left, there is a 'Widgets' panel with a search bar and a list of widgets, including 'LED Display'. Below the widgets panel, there is a 'LEDDisplay-2' panel with a 'Filter Properties' search bar and a table of properties.

Name	Value
-T- Id	LEDDisplay-2
-T- Type	LED Display
-T- DisplayName	LEDDisplay-2
-T- Description	
# Data	
# Digits	5
# Decimals	2

On the right side, there is a 'Data' panel with a 'Things_HTU21DThing' header and a 'GetProperties' section listing various properties:

- description
- Humidity
- isConnected
- lastConnection
- name
- tags
- Temperature
- thingTemplate



HTU21DThing

Thing

Save

Cancel Edit

To Do 1

ENTITY INFORMATION

General Information

Properties

Services

Events

Subscriptions

Home Mashup

PERMISSIONS

Visibility

Design Time

Run Time

CHANGE HISTORY

Change History

DEPENDENCIES

Entity Depends On

Uses This Entity

Subscriptions

+ Add My Subscription

X Delete

Me HTU21DThing

Alert

Temperature

Temperature.Alert

Subscription Info

Inputs/Outputs

Snippets

Me

Entities

WeatherNotifier x sendM x



All



SendMessage

Properties

Services

Events

CATEGORIES

All

-Uncategorized-

Alerts

Bindings

Name: SendMessage
 Description: Send a simple textual e-mail message

Parameters:

- 1: from / : STRING
- 2: to / : STRING
- 3: cc / : STRING
- 4: bcc / : STRING
- 5: subject / : STRING
- 6: body / : HTML

Output : NOTHING

Script



Search script

Find and replace

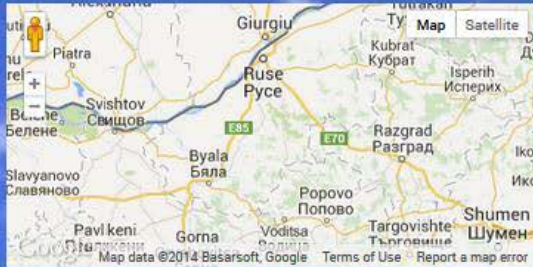
```

1 var params = {
  "from": "mihai@weather.com" /* STRING */,
  "subject": "Temperature is currently " + me.Temperature /* HTML */,
  "body": eventData.description /* STRING */,
  "to": "mihai@weather.com" /* STRING */
}

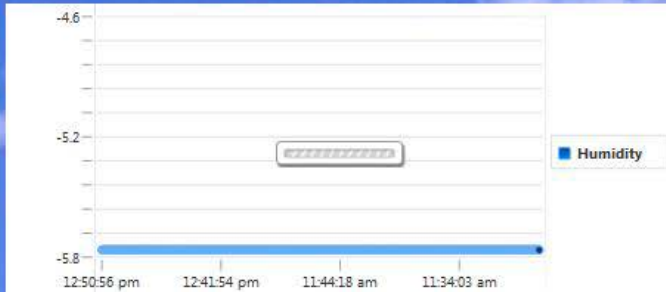
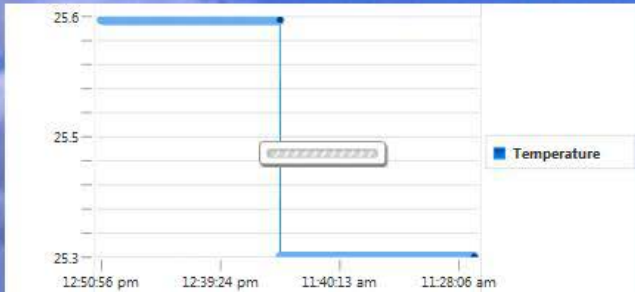
```

26.06

-6.00



On Refresh Now



Widgets Mashups Workspace

Category All

led

LED Display

Gauge-5

Name	Value
T- Id	Gauge-5
T- Type	Gauge
T- DisplayName	Gauge-5
T- Description	
# Data	
# MinValue	0
# MaxValue	100
ValueFormatter	State Formatting
FormatNeedle	<input checked="" type="checkbox"/>

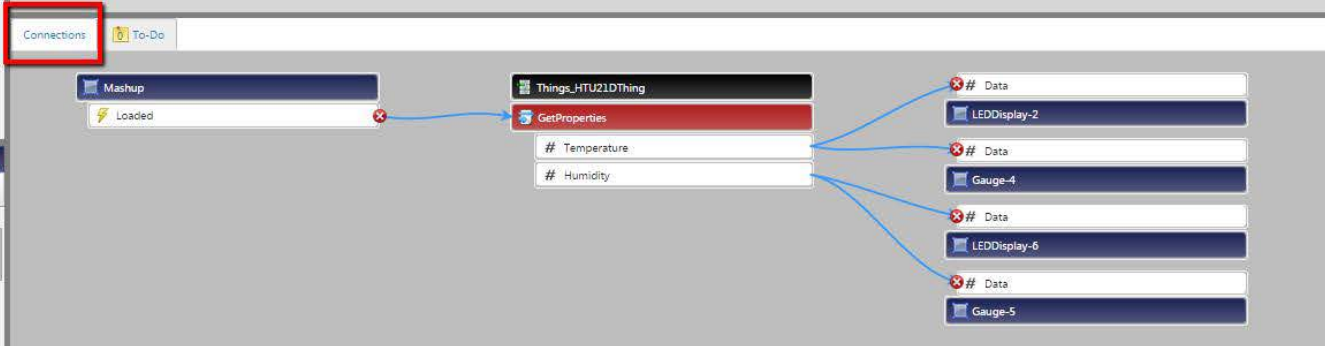
Preview Available Space Default Language

Click on the Service Name to see its bindings in the Connection area

Data Session User

Things_HTU21DThing

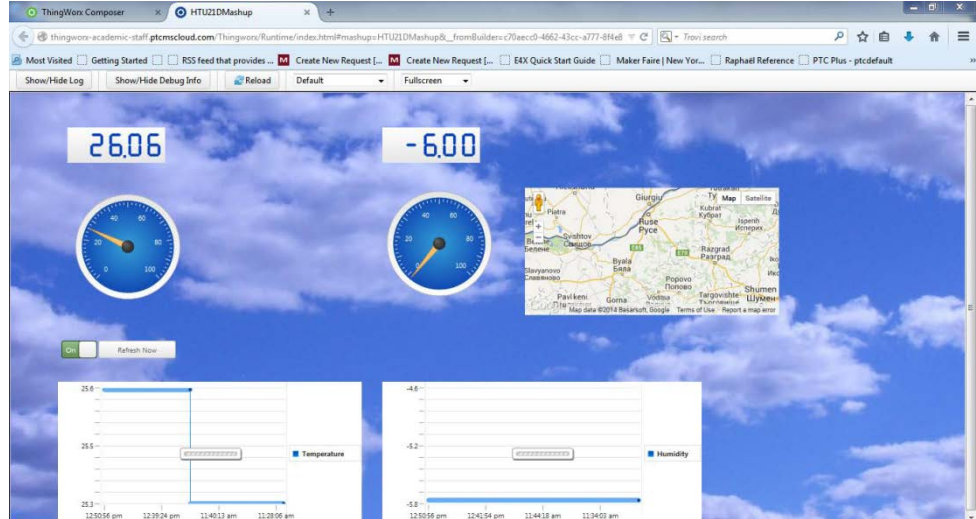
- GetProperties
- T- description
- # Humidity
- isConnected
- lastConnection
- T- name
- tags
- # Temperature
- thingTemplate



Things_HTU21DThing: GetProperties

Name	Value
ServiceInvokeCompleted	

Терминология



RefrigeratedTruckTemplate



RefrigeratedTruck1



RefrigeratedTruck2



RefrigeratedTruck3



Приложения ThingWorx объединяют мир



ThingWorx Marketplace™ – магазин решений для IoT



ThingWorx Marketplace – наиболее популярная площадка для продвижения решений для IoT

Где применяется ThingWorx?



Датчики и устройства, подключенные к Интернету

- Сельское хозяйство
- Умные города
- Системы мониторинга
- Транспорт
- Умные здания
- ...



Удаленные сервисы и аналитика

- Медицинская техника
- Производство
- Добыча сырья
- Строительство
- Системы безопасности
- Промышленное оборудование
- Предметы потребления



Индустрии, интегрированные с Интернетом

- Автопром
- Нефть и газ
- Пищевая промышленность
- Производство
- Торговля

ThingWorx – примеры применения в мировой индустрии



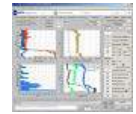
Connected Intelligence Specialty Steels



Cloud Managed Traffic Management



Embedded Smart Sensors for Structural Monitoring



Sensor-based Crop Management



Operational Analytics of Connected Equipment



Cloud-based Poultry Grow House Management



Remote Service for Connected Medical Analyzers



WaterWorx Cloud-based Water Management



Fleet Logistics for Connected Dairy Trucks





ThingWorx™

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Продуктивные Технологические Системы – реселлер PTC, Inc.

office@pts-russia.com

ООО "Продуктивные Технологические Системы" (ООО «ПТС»)
РФ, 119049, г. Москва, ул. Крымский Вал, д.3, стр.2, офис 305.

Проезд до ст. метро Октябрьская (кольцевая), выход в сторону Крымского вала.