

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»

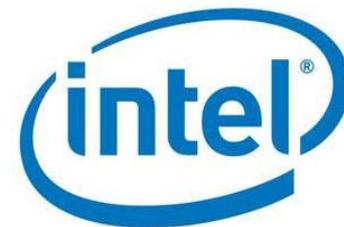
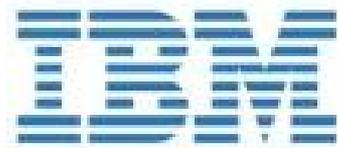
■ Сенсоры, Устройства

■ Приложения

1 млрд
2010



Игроки на рынке IoT



Платформа разработки для Интернета вещей

ThingWorx™
A PTC® Business

 PTC®



ThingWorx™
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



Управление устройствами и подключениями

Датчики и устройства

Управление устройствами на низком уровне:
ThingWorx Edge MicroServer

Примеры: умный трафик

The screenshot displays the ALL TRAFFIC SOLUTIONS web application interface. The main view is a map of Boulder, Colorado, showing various data collection sites and equipment locations. The interface is divided into several sections:

- Navigation Menu:** Home, Management, Reports, Map, Admin.
- Equipment List:** A table listing equipment with columns for Name, Equipment, Messages, Sites, Images, Alerts, and Routes. The list includes items like ATSO101, ATSO103, ATSO104, ATSO105, ATSO106, ATSO107, ATSO108, and ATSO109.
- Message Library:** A section for viewing messages, with a filter set to 'Accident Alerts'. A message titled 'Data Collection Site: atsENG-E' is selected.
- Data Collection Site Details:** A detailed view of the 'atsENG-E' site, showing its location on the map and associated data.
- Map:** A Google Map of Boulder, CO, with various markers indicating equipment locations and data collection sites. A legend in the bottom right corner explains the markers: Normal Operation (green), Unknown/missed log in (grey), Alert within last 24 hours (yellow), Equipment and Site Conflict (red), and Data Collection Site (blue).

Data Collection Site: atsENG-E

Tags	Applications: ATS
GPS	48 0653 -105.2717
Reports	View

Devices at Site

Status	Nickname	Last Login	Est. Next Login
Normal Operation	atsENG-E	2013-08-14	2013-08-14 14:30:27

Device Alerts

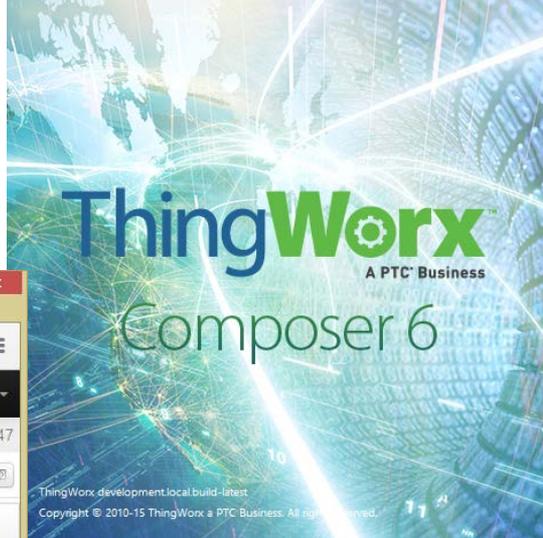
Device Errors

This sign is more than a feet from its assigned site

Actions

Solutions	Link
Change Data Collection Site	
Add new Site at this Location	

Примеры: умный трафик



The screenshot displays the ThingWorx Composer 6 web interface. The browser address bar shows 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 bar with options like "New Entity", "Import/Export", "Monitoring", and "Help". A progress bar at the top indicates the completion status of various tasks: "Create a Thing" (0/54), "Create a Mashup" (0/69), "Add widgets" (0/109), "Add Services" (0/143), and "Finish Mashup" (0/147). The main content area shows a map of the Philadelphia region with a red box highlighting a specific location. Below the map, there is a section titled "Closest MBTA Stations By Location" with a search bar and a "View:" dropdown menu. The left sidebar contains "ENTITY INFORMATION" with sub-sections for "General Information", "Mashup Preview", "PERMISSIONS", "CHANGE HISTORY", and "DEPENDENCIES".

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

Rental Locations

Acme Rental - Airport

Rental Car Address
5757 Wayne Newton Boulevard
City

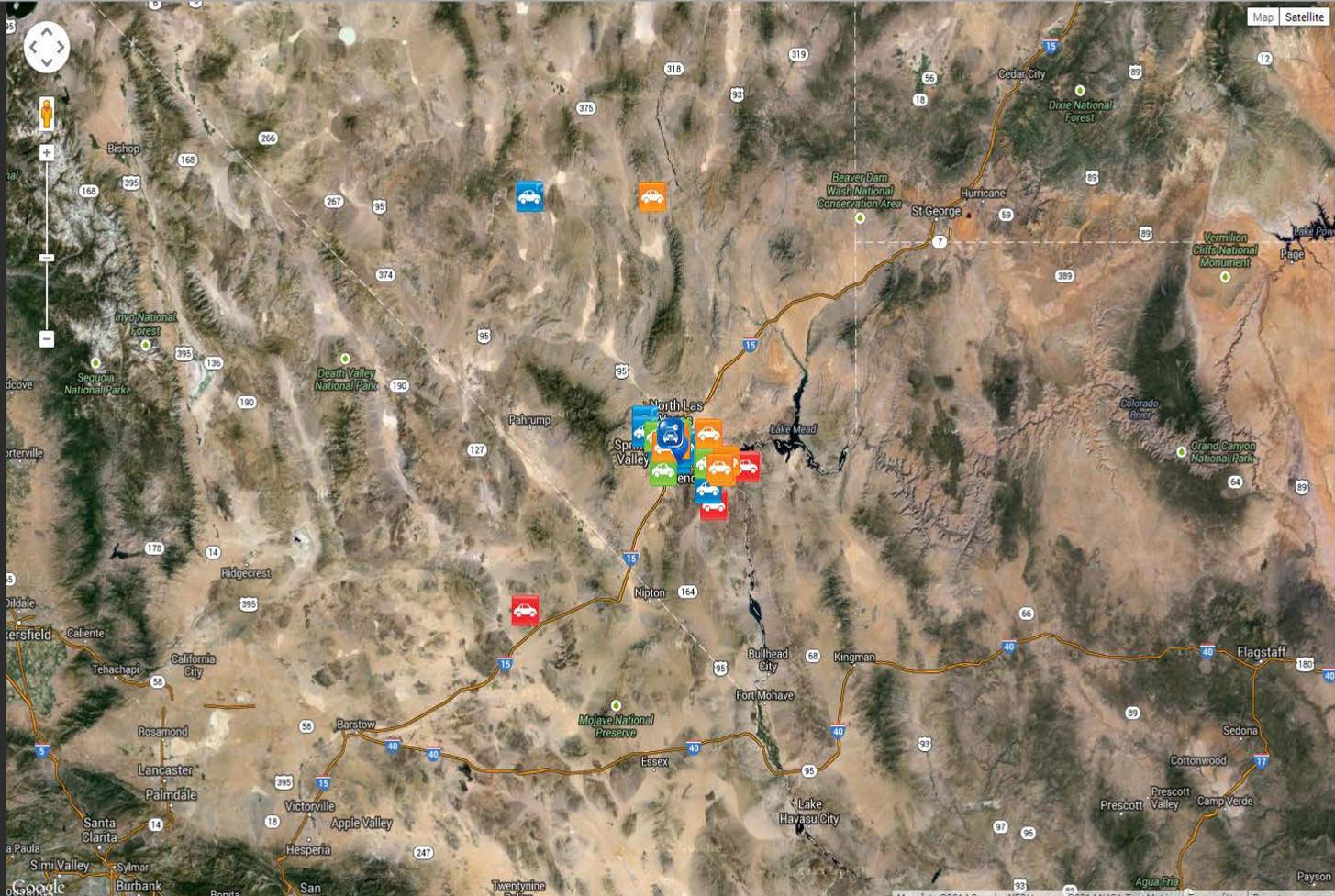
Phone Number
484-797-0443

Customer Filters

Return vehicles within radius

Customer Name

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



Map Satellite

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

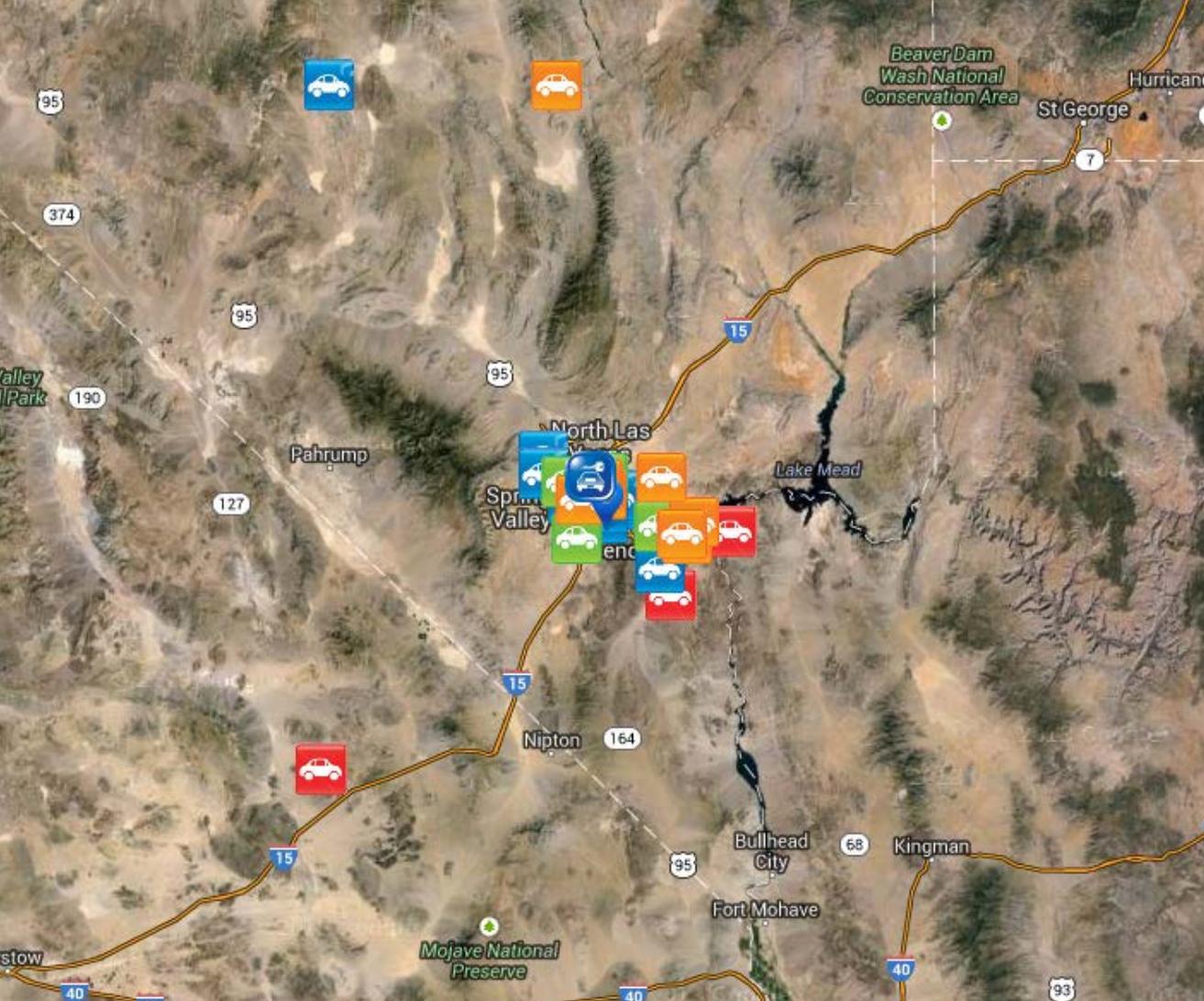
Customer Driving Score



Alerts

Message to Driver

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



[Equipment](#)
[Messages](#)
[Dependent Messages](#)
[Sites](#)
[Images](#)
[Alerts](#)
[Routes](#)

Equipment

Name	Product	Power	Assigned Site	Signal Strength	Settings	Pending SmartMove
ATS0101	Radar Speed Sign 12"		Jason's House, SB		Waiting for sync	Jason's House, SB
ATS0103	Radar Message Sign 18"		South Boulder Road at Cherrvale, NB		Waiting for sync	
ATS0104	Radar Speed Sign 18"		Arapaho @ Scott Carpenter Park, EB		Up to date	
ATS0105	Radar Message Sign 24"		Jason's House, SB		Up to date	
ATS0106	Variable Message Sign 18"		200 Block Manhattan Drive, SB		Up to date	
ATS0107	Variable Message Sign 24"		Arapaho @ Scott Carpenter Park, EB		Up to date	
ATS0108	Variable Message Sign 24"		Arapaho @ Scott Carpenter Park, EB		Up to date	
ATS0109	Variable Message Sign 24"		Arapaho @ Scott Carpenter Park, EB		Up to date	

Selected Equipment Details: ATS0101

[Edit Settings](#)


Sign Mode: Display Off

Speed Limit: 50

Average Speed: 25 85th Percentile: 31

Last Login: 8/6/2013 3:54 PM

Estimated Next Login: 8/6/2013 6:56 PM (past due)

There are setting changes awaiting sync.

SmartMove

[Cancel](#) [List](#)

There is a pending SmartMove to:

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

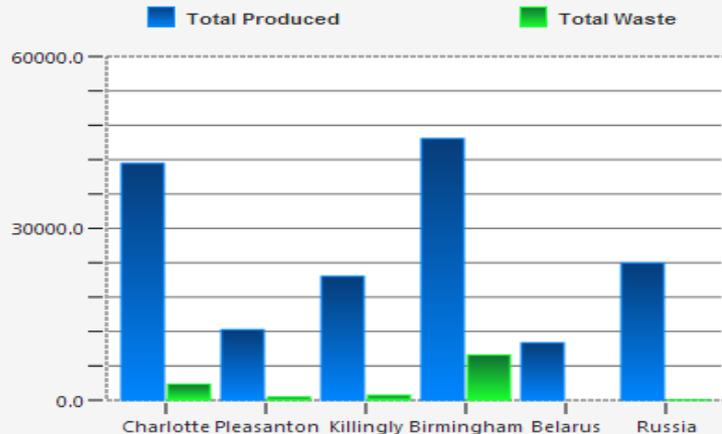
75

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 Libelium Improves Wine Production in Spain

Sat, 07 Dec 2013 20:25:56 +0000

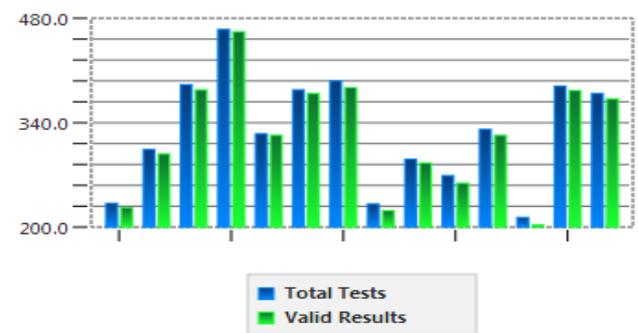
ThingWorx Leads IoT Excitement at ThingMonk

Tue, 03 Dec 2013 12:46:19 +0000

Overview **Instrument Details** FileTransfer Software Update

Test Result Summary

- OrthoClinical
 - 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: ☰ ☰ ☰

Sort by: 📅 ✍️ 💬 ★

Примеры: «умная вода»

VEOLIA WATER

TidworthRegion

- TidworthWaterSystem
 - TidworthBoreholes
 - Chalkpit
 - Clarendon
 - MathewTanks
 - SwintonTank
- TidworthWastewaterSystem
 - TidworthSTW
 - AshdownSPS
 - BuagrymLPS
 - BuagrymLPS
 - FalaiseRdSPS
 - HedgeEndSPS
 - LambdownSPS

Map Satellite

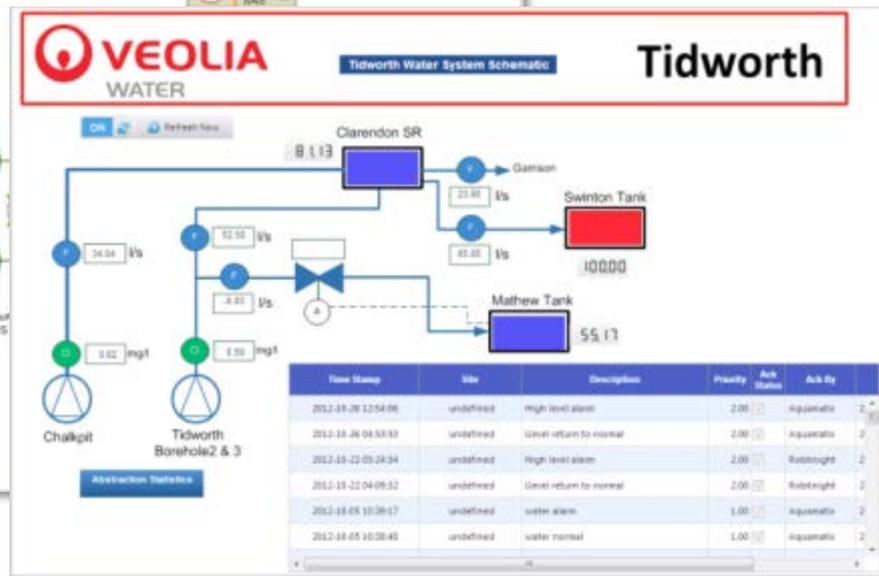
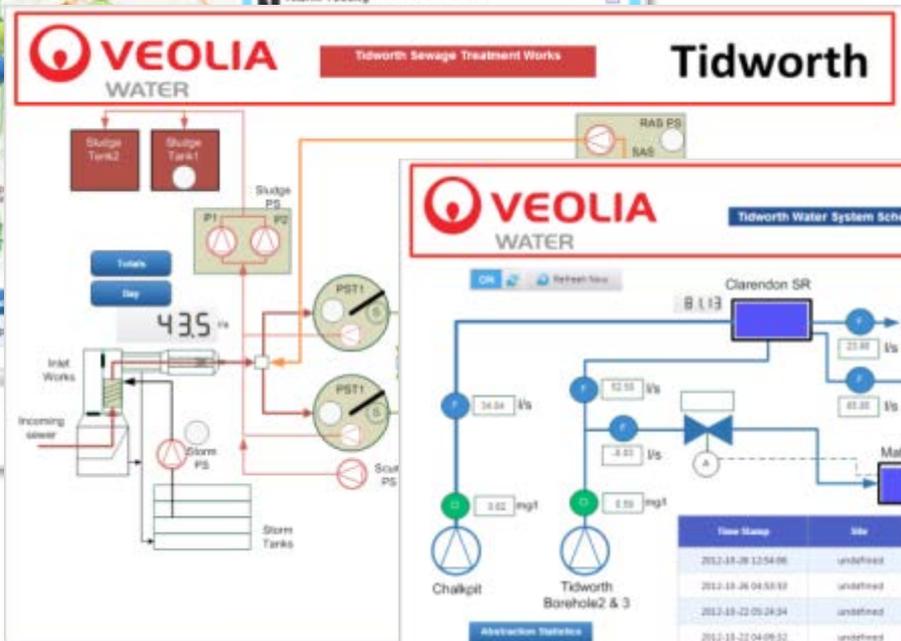
TidworthOperationsBlog

Alarm system active

Alarm Testing

Group	Asset Name	Description
Wastewater	Ashdown SPS	Ashdown SPS 2 p

Water System Wastewater System



Aquamatrix



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

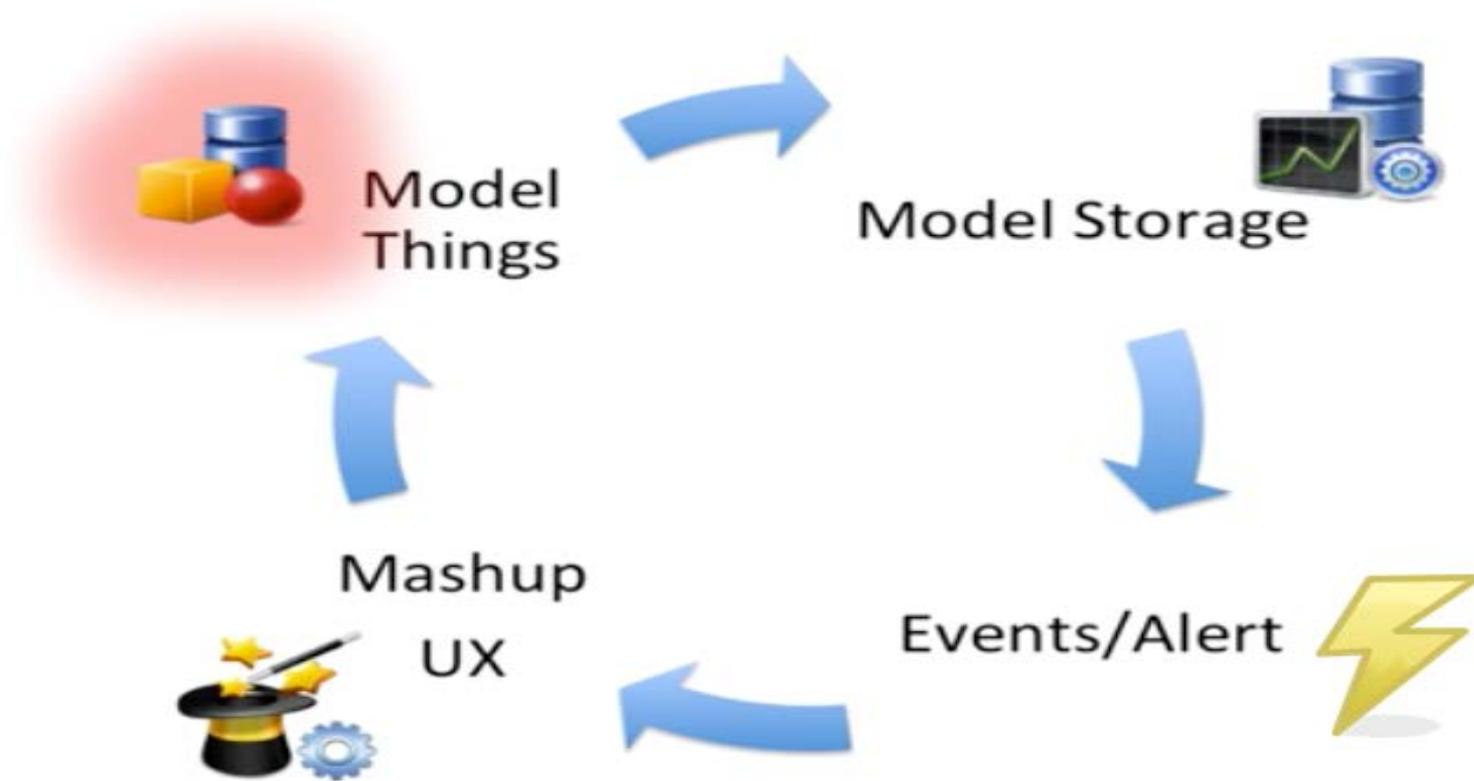
*beta

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 for a mashup named 'HTU21DMashup'. The main workspace shows a 'LED Display' widget being configured. A tooltip for 'Things_HTU21DThing' is visible, showing the 'GetProperties' method and the 'Temperature' property.

Widget Properties Table:

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

Things_HTU21DThing Properties Table:

Name	Value
-T- description	
# Humidity	
isConnected	
lastConnection	
-T- 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
 - Properties
 - Services
 - Events
- All
 - SendMessage
 - SendMe
 - SendMe



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

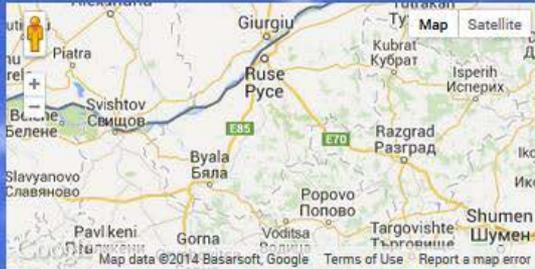
```

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

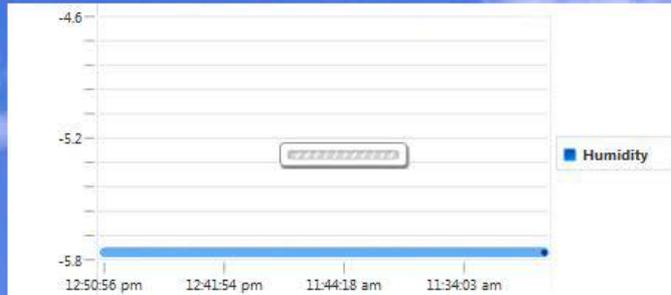
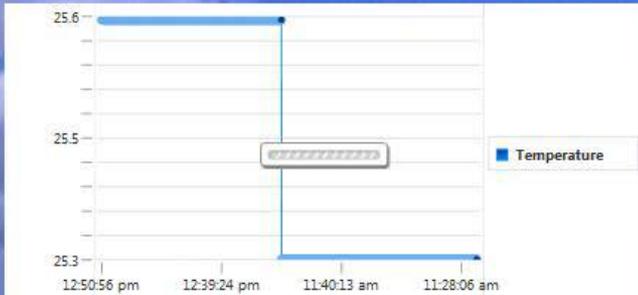
```

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"/>

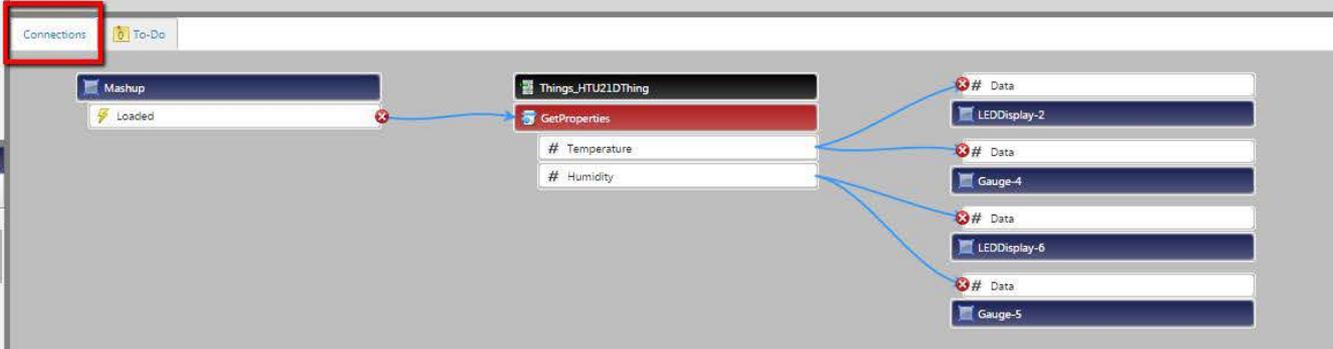
Preview Available Space Default Language

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

Data Session User

Things_HTU21DThing

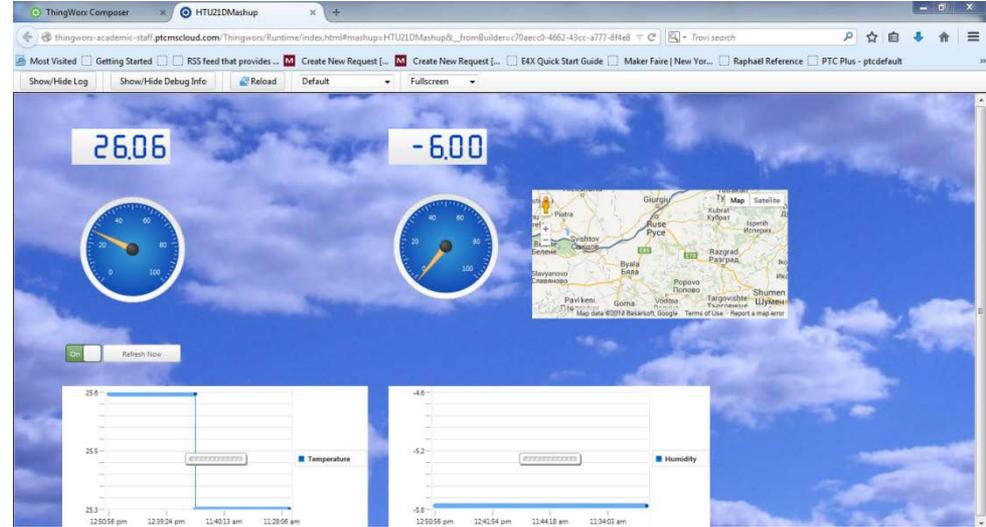
- GetProperties
- T- description
- # Humidity
- isConnected
- lastConnection
- T- name
- tags
- # Temperature
- thingTemplate



Things_HTU21DThing:GetProperties

Name	Value
ServiceInvokeCompleted	

Терминология



RefrigeratedTruckTemplate



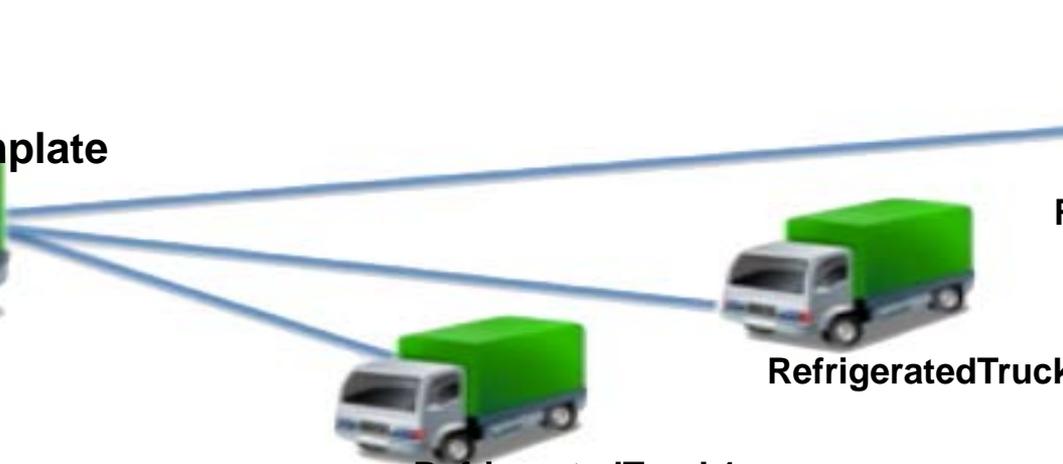
RefrigeratedTruck1



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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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.