Your systems.
Working as one.

Connext DDS Tools

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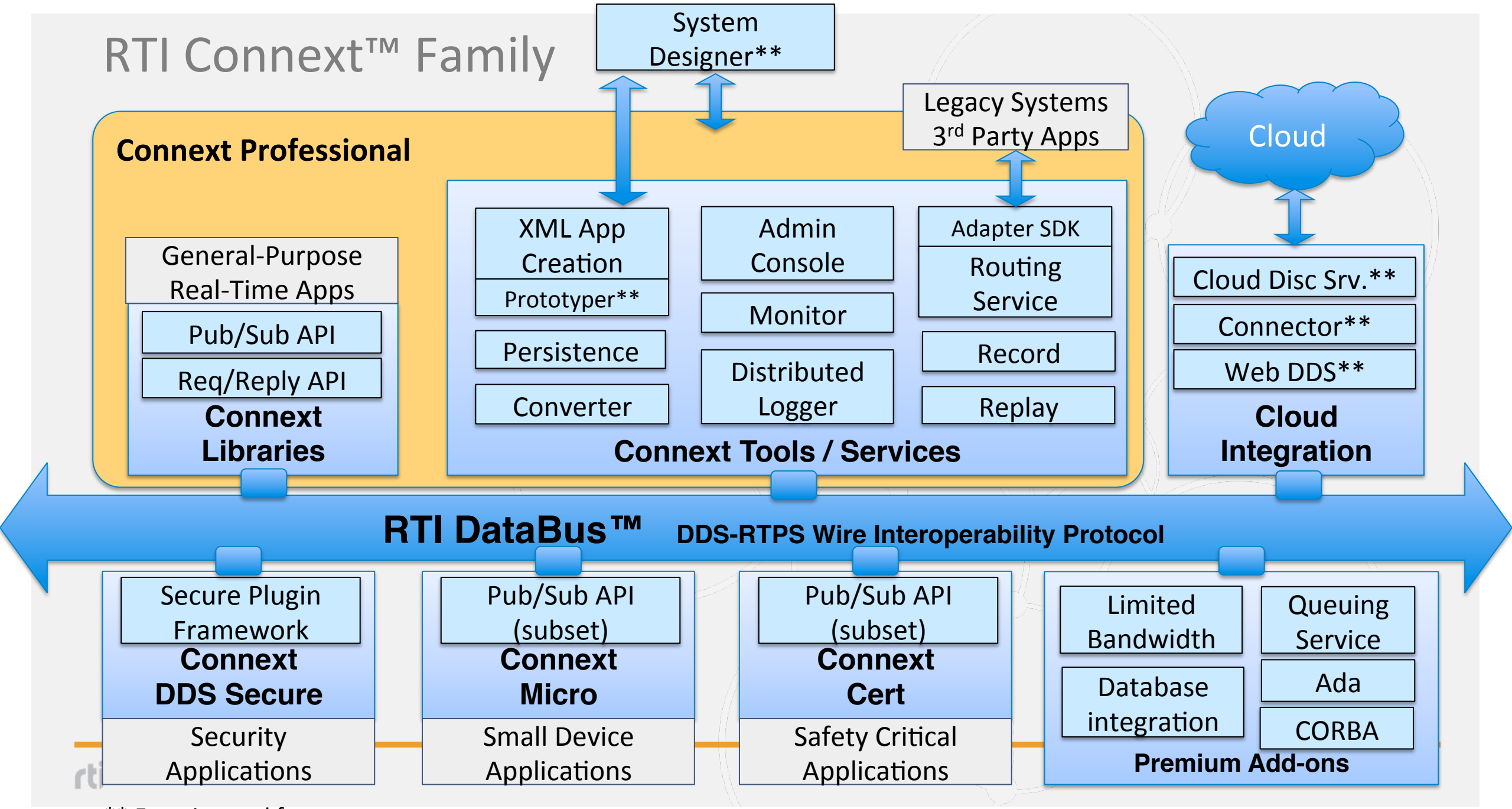
Outline

- Very brief biography
- Available tools
- Demonstrations
- Questions & Answers
- Resources

Very brief biography

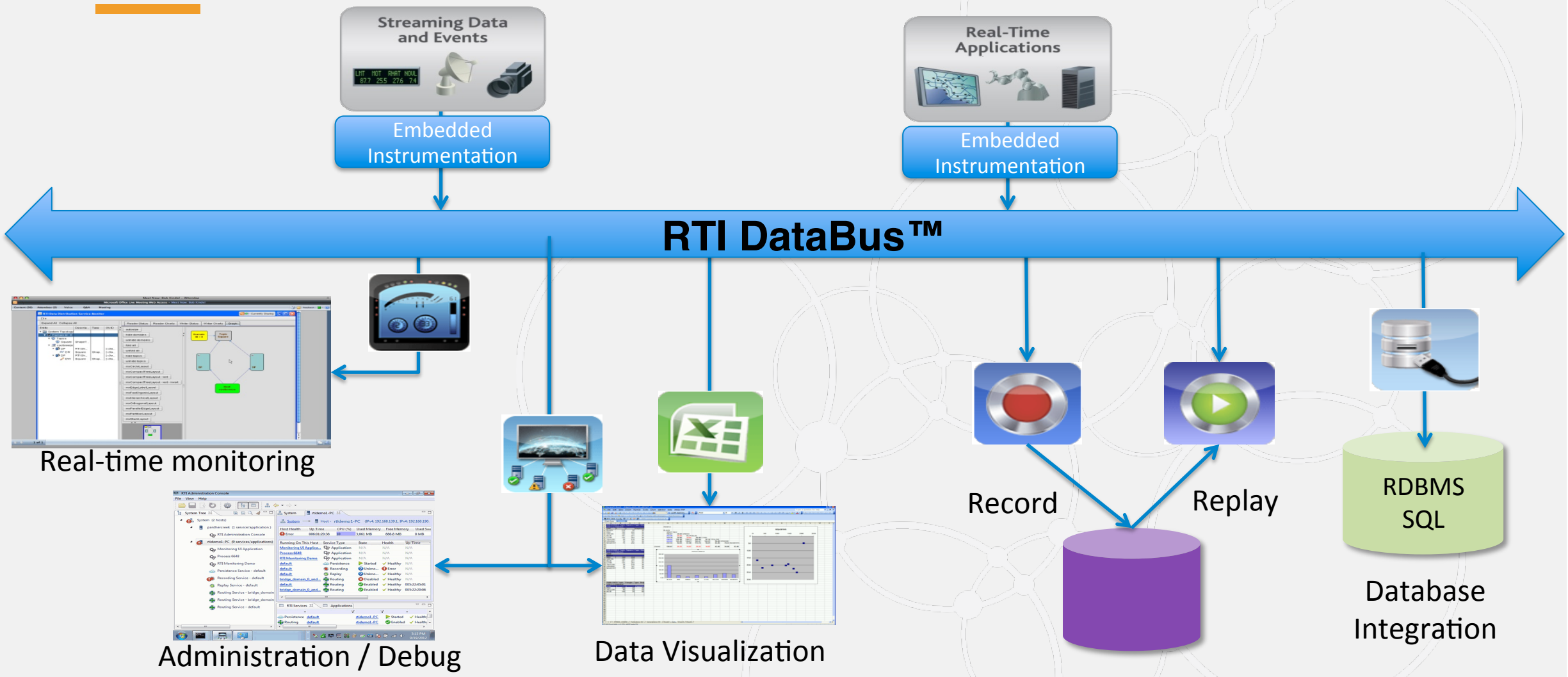
- Former RTI customer
- Joined RTI 11 years ago as a Services Engineer
- Started developing tools 7+ years ago
- Started the Tools Team 6 years ago which I currently lead

RTI Connext™ Family



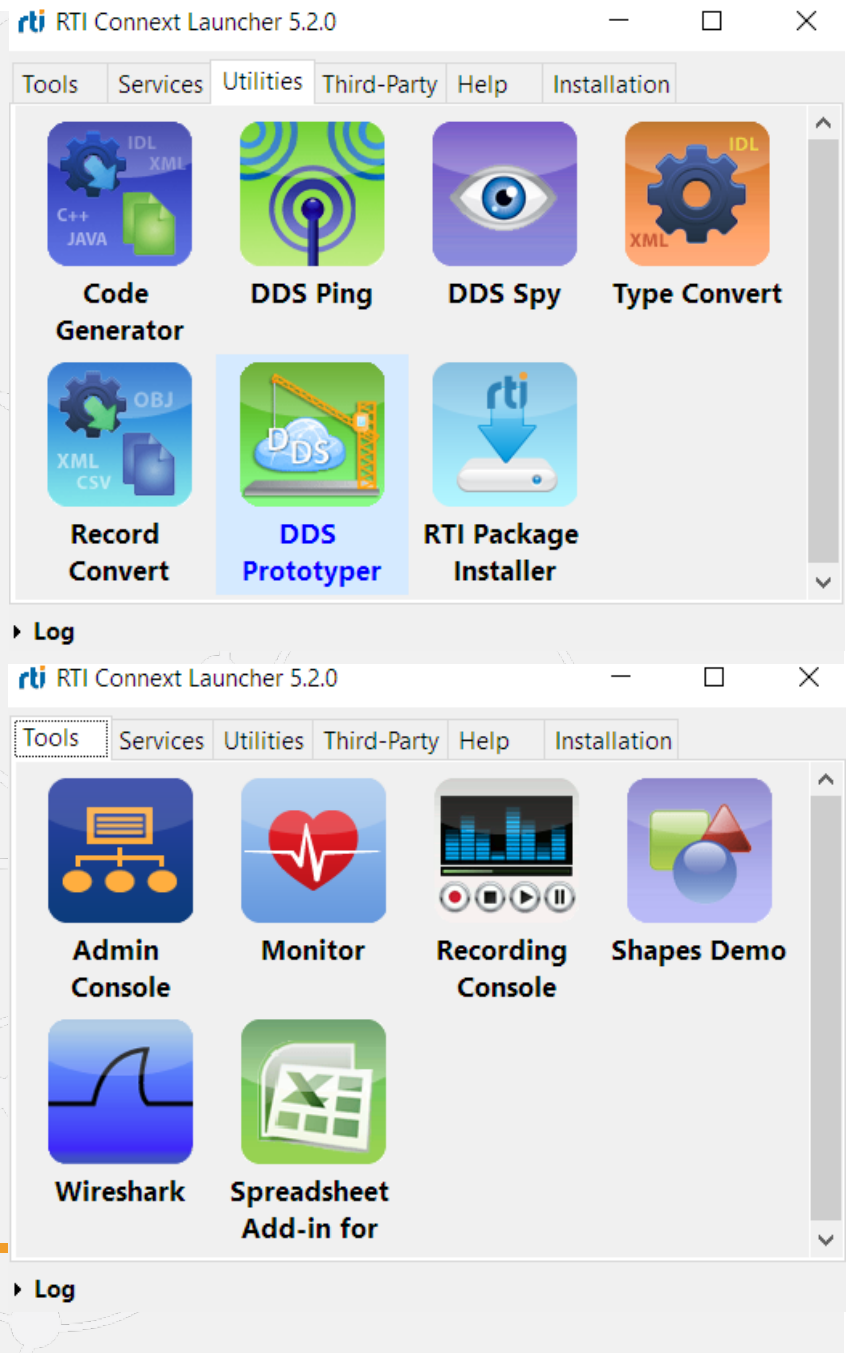
** Experimental feature

Flexible Application Monitoring Solution



Tools

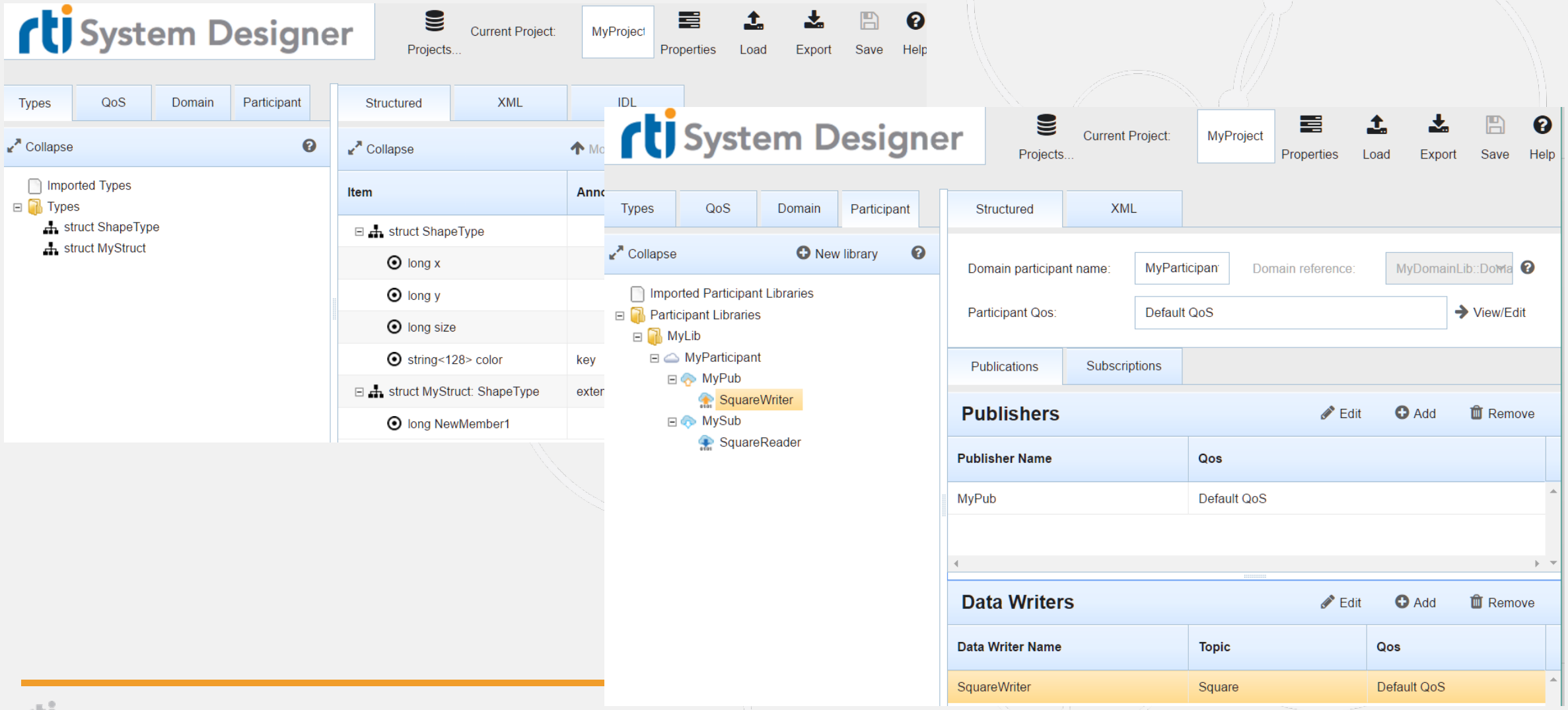
- Design
  - System Designer
- Utilities
  - Launcher, Ping, Spy, & Log Parser
- Visualization & Debugging
  - Admin Console
  - Monitor
  - Distributed Logger
  - Spreadsheet Add-in
  - Wireshark



System Designer (I)

This feature is in the Prototype stage

Live demo later



System Designer (II)

This feature is in the Prototype stage

Live demo later

Export Project

```
<?xml version="1.0" encoding="UTF-8"?>
<dds>
  <!-- DDS Types -->
  <types>
    <struct name="ShapeType">
      <member name="x" type="long"/>
      <member name="y" type="long"/>
      <member name="size" type="long"/>
      <member name="color" type="string" stringMaxLength="128" key="true"/>
    </struct>
    <struct name="MyStruct" baseType="ShapeType" extensibility="mutable">
      <member name="NewMember1" type="long"/>
    </struct>
  </types>
  <!-- Qos Libraries -->
  <qos_library name="MyLibrary">
    <qos_profile name="MyProf" is_default_qos="true">
      <participant_qos>
        <participant_name>
          <name>MyParticipant</name>
        </participant_name>
      </participant_qos>
    </qos_profile>
  </qos_library>

  <!-- Domain Libraries -->
  <domain_library name="MyDomainLib">
    <domain name="Domain0" domain_id="0">
      <register_type name="ShapeType" kind="dynamicData" type_ref="ShapeType"/>
      <topic name="Square" register_type_ref="ShapeType"/>
    </domain>
  </domain_library>

  <!-- Participant Libraries -->
  <participant_library name="MyLib">
    <domain_participant name="MyParticipant" domain_ref="MyDomainLib::Domain0">
```

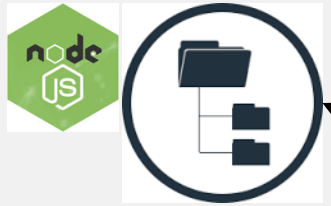
Integration with XML App Creation

Copy document to clipboard, or Download it as a file

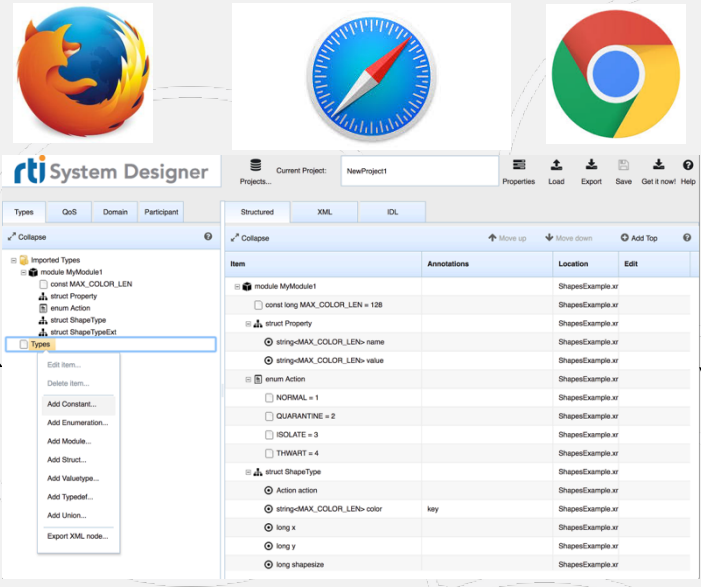
Close

System Designer Architecture

System Designer Server

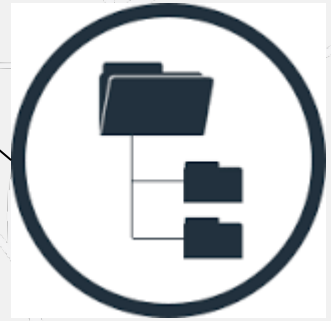


System Designer Client



HTTP

User's file system



Browser Sandbox

DDS Ping

Live demo later

- Command-line tool for connectivity experiments.
- Great for checking if discovery is not working in your configuration.
- Can be run directly on your target machines.

DDS Spy

Live demo later

- Command-line tool to see what's running and can print live data.
- Can be run directly on your target machines.
- Great for smaller systems and relatively low data rates.

Log parser

```
Remote Address          | In/Out   | Local Entity    | Message
------------------------:|---------|:---------------:|--------
       H1.A1.P1         |  --->    |   R-K_800000    | Received DATA [1
                        |          |                 | *Warning: Missin
       H1.A1.P1         |  --->    |   R-K_800000    | Received DATA [1
       H1.A1.P1         |  --->    |   R-K_800000    | Received HB [347
       H1.A1.P1         |   <---   |   R-K_800000    | Sent NACK [353]
       H1.A1.P1         |  --->    |   R-K_800000    | Received DATA [1
```

```
## Warnings:
 0. 447x [LP-11] DataReader exceeded resource limits
 1. 428x [LP-10] DataWriter exceeded resource limits
 2. 1x 3 discovery samples lost for subscription SED_SUB_READER (3 in total)
 3. 1x 2 discovery samples lost for publication SED_PUB_READER (2 in total)
 4. 1x 14 discovery samples lost for subscription SED_SUB_READER (17 in total)

----------------------
## Errors:
 0. 236x [LP-8] Cannot serialize sample
 1. 10x [LP-5] Try to get key from unkeyed type.
 2. 64x [LP-13] Write maximum blocking time expired
 3. 2x [LP-14] Cannot write because DataWriter has been deleted
 4. 2x [LP-15] Cannot delete 2 FlowControllers from delete_contained_entities
 5. 1x [LP-3] Cannot write unregistered instance
```

```
## Config:
0. 14x File NDDS_DISCOVERY_PEERS not found
1. 14x Environment variable NDDS_DISCOVERY_PEERS not found
2. 1x Version of NDDSCORE is 5.2.0.0
3. 1x Version of NDDSC is 5.2.0.0
4. 1x Version of NDDSCPP is 5.2.0.0
5. 1x Valid interface: enp0s25
6. 1x Environment variable NDDSHOME not found
7. 1x Environment variable NDDS_QOS_PROFILES not found
8. 1x Enabled interface: lo (with multicast)
9. 1x Enabled interface: enp0s25 (with multicast)
10. 1x Enabled interface: wlp3s0 (with multicast)
11. 1x Enabled interface: virbr0 (with multicast)
12. 1x Enabled interface: tun0 (with multicast)
13. 1x Initial peers: builtin.udpv4://H1, builtin.udpv4://H2, builtin.shmem://
14. 1x Local address: 10.70.1.247 21988
```

```
01347), dataRcvd.lead(0,1347), next

der oid 0x80000004 received HB for
0000003
der oid 0x80000004 sent ACK of bitm
```

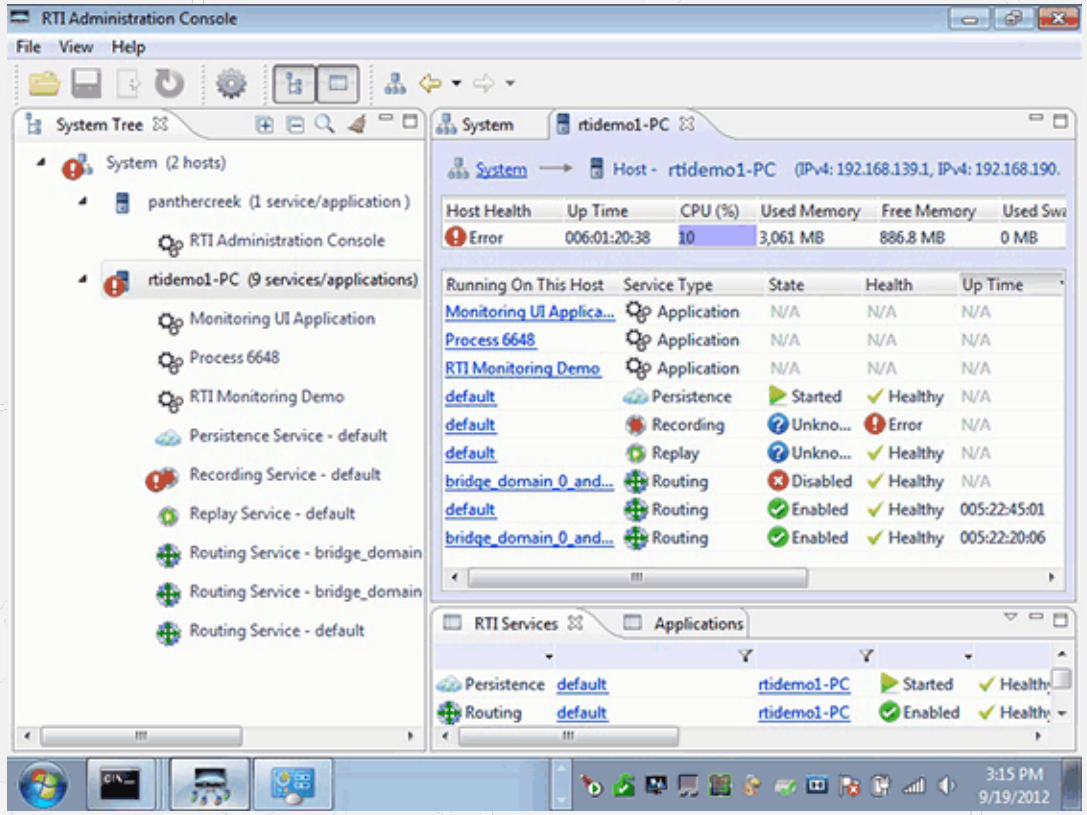
```
        * Participant H3.A2.P1: 1
    * App H3.A1: 21988
        * Participant H3.A1.P1: 1
* Host H2: 127.0.0.1

Number of hosts: 6
Number of apps:  2
Number of participants: 2
```

Admin Console

Live demo later

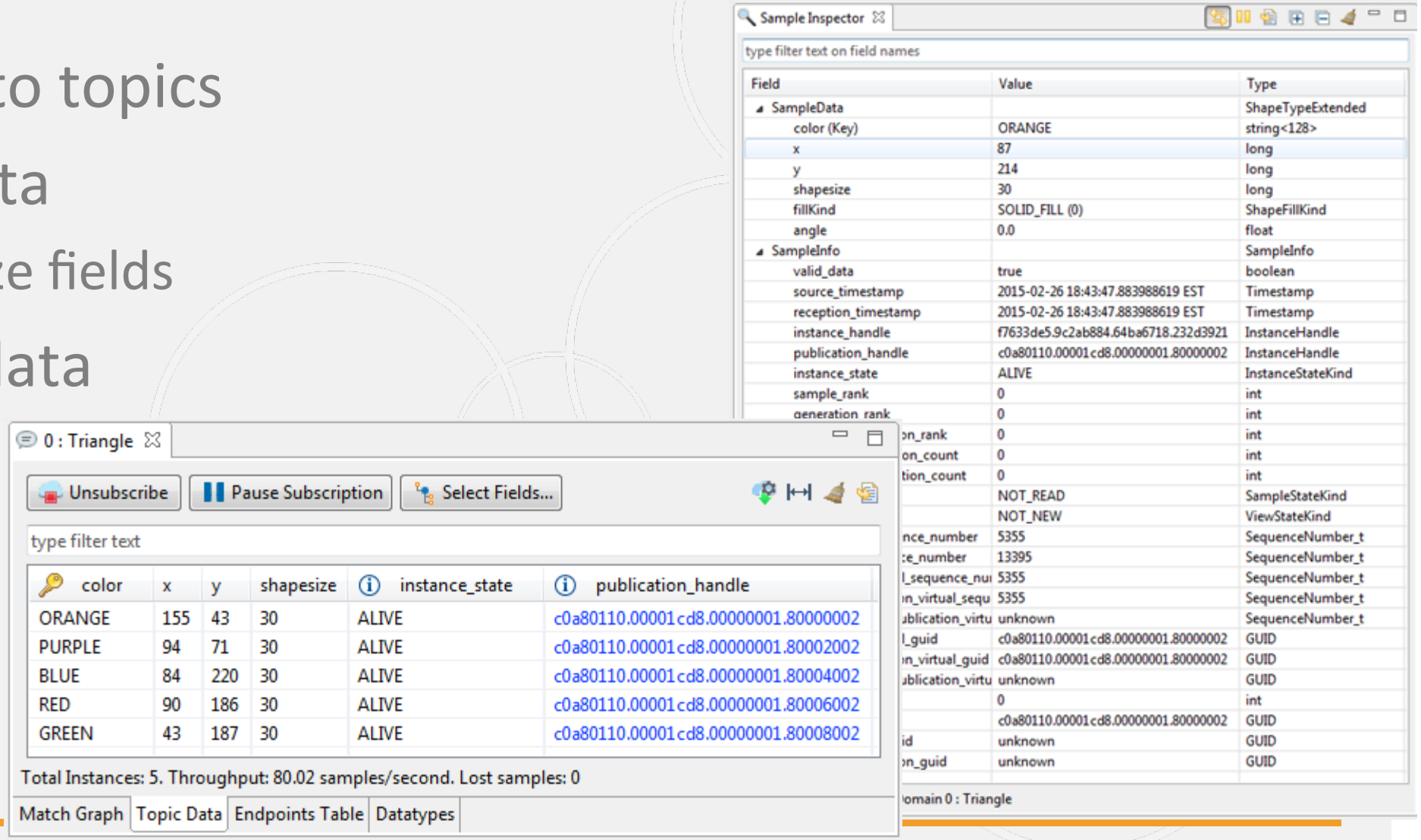
- System Awareness
  - Who/What/How?
  - Exactly data types published/ subscribed?
  - System performance*
- Debugging
  - QoSes and/or types mismatches.
  - View/administer the log messages
- Administration
  - Control RTI Services remotely.
- Data Visualization



Admin Console: Data Visualization

Live demo later

- Subscribe to topics
- See live data
  - Customize fields
- Compare data
- Store data

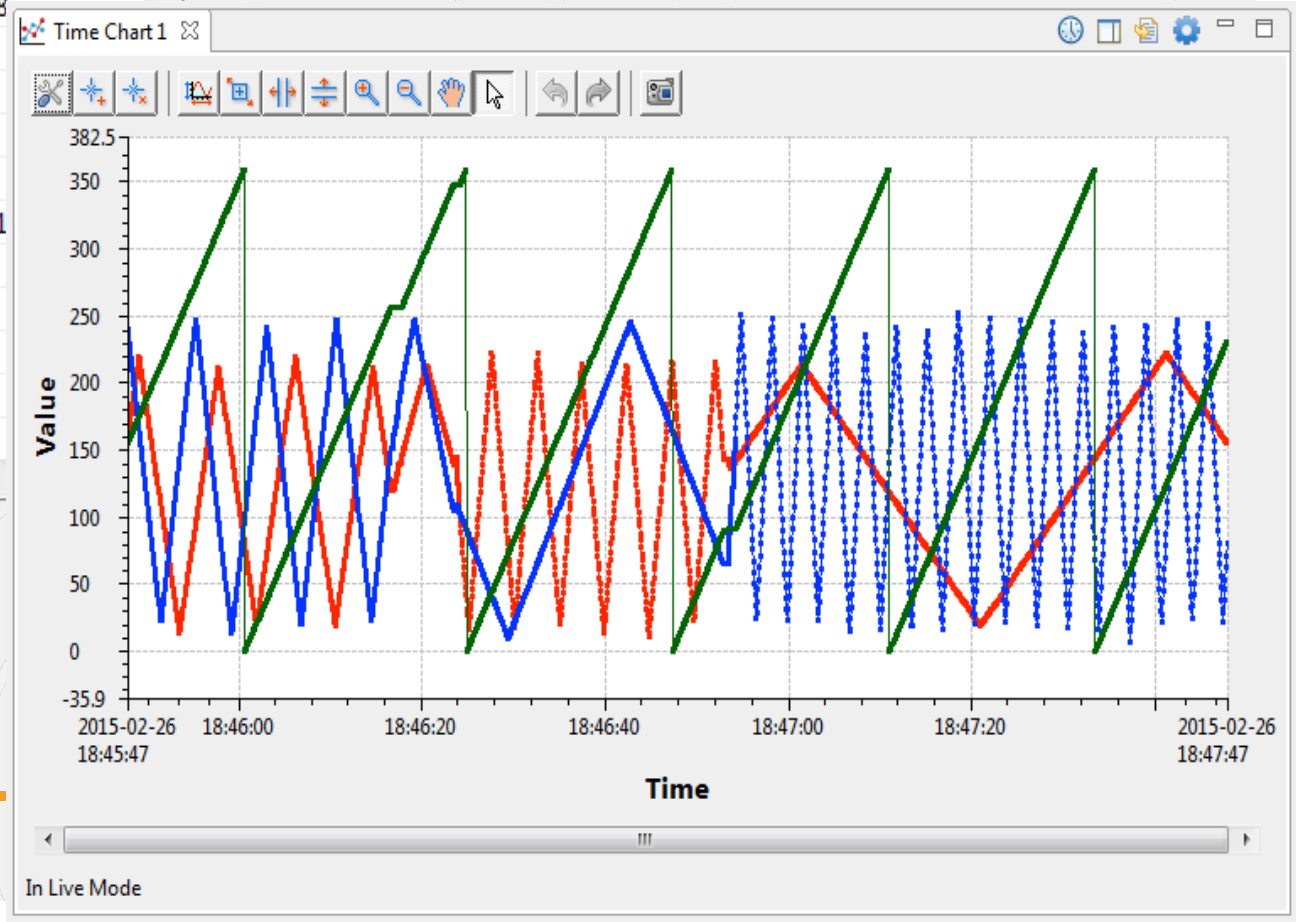


Admin Console: Data Visualization (2)

Live demo later

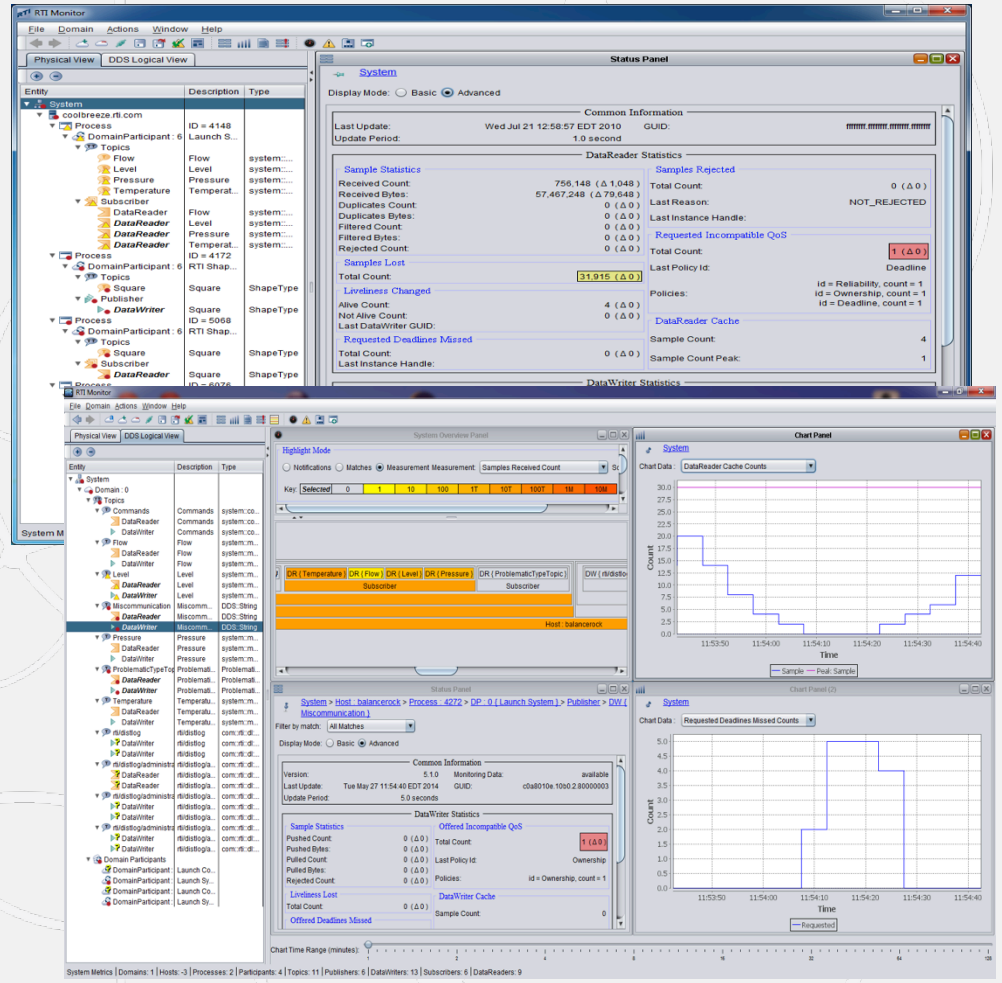
Sample Log 1

Index	Topic	Instance	Source Time	Value of selected fields
1540	Triangle	ORANGE	2015-02-26 18:44:45.478993834 EST	x=104, y=148
1541	Triangle	PURPLE	2015-02-26 18:44:45.478993834 EST	x=197, y=55
1542	Triangle	BLUE	2015-02-26 18:44:45.478993834 EST	x=53, y=15
1543	Triangle	RED	2015-02-26 18:44:45.478993834 EST	x=43, y=142
1544	Triangle	GREEN	2015-02-26 18:44:45.478993834 EST	x=56, y=214
1545	Triangle	ORANGE	2015-02-26 18:44:45.541993023 EST	x=103, y=151
1546	Triangle	PURPLE	2015-02-26 18:44:45.541993023 EST	x=200, y=50
1547	Triangle	BLUE	2015-02-26 18:44:45.541993023 EST	x=51, y=15
1548	Triangle	RED	2015-02-26 18:44:45.541993023 EST	x=46, y=142
1549	Triangle	GREEN	2015-02-26 18:44:45.542993010 EST	x=54, y=218



Monitor

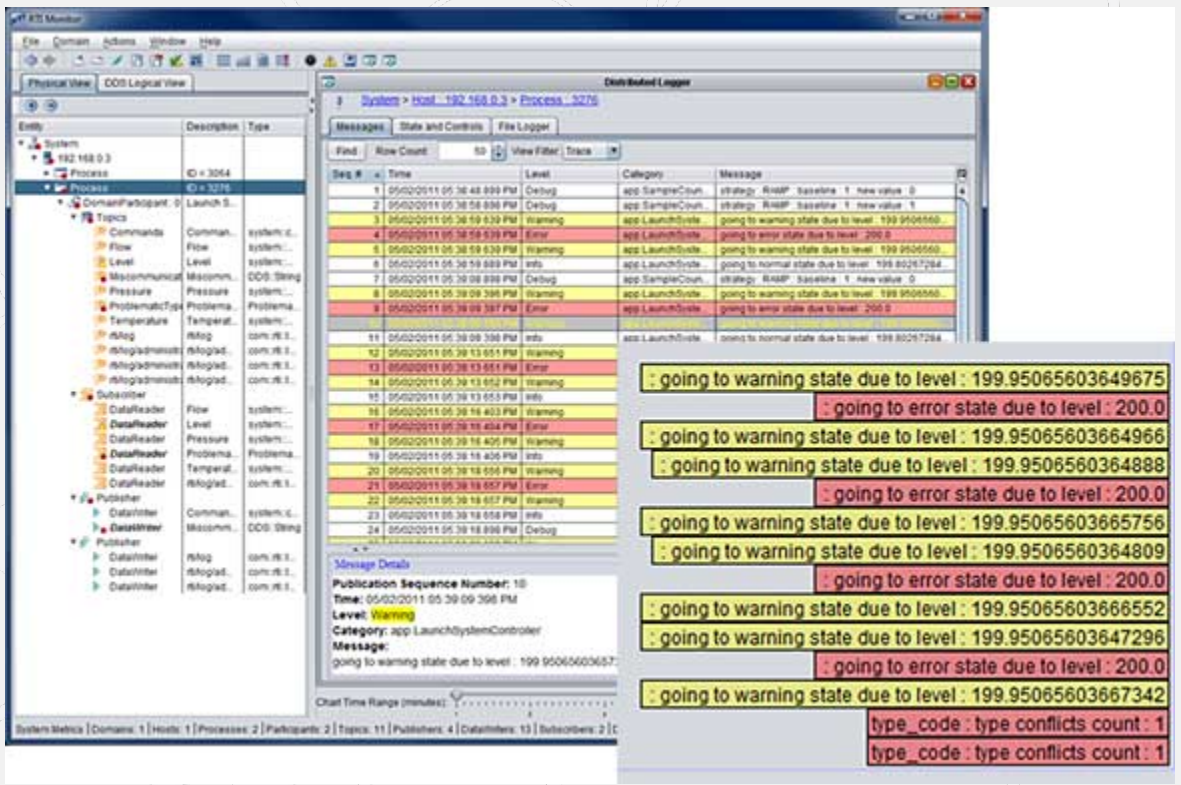
- Detailed statistics on:
  - QoS
  - Traffic
  - Errors
  - resource usage
- Detailed system topology display
- Diagnose and resolve performance issues
- Understand what's running across the entire system



Distributed Logger

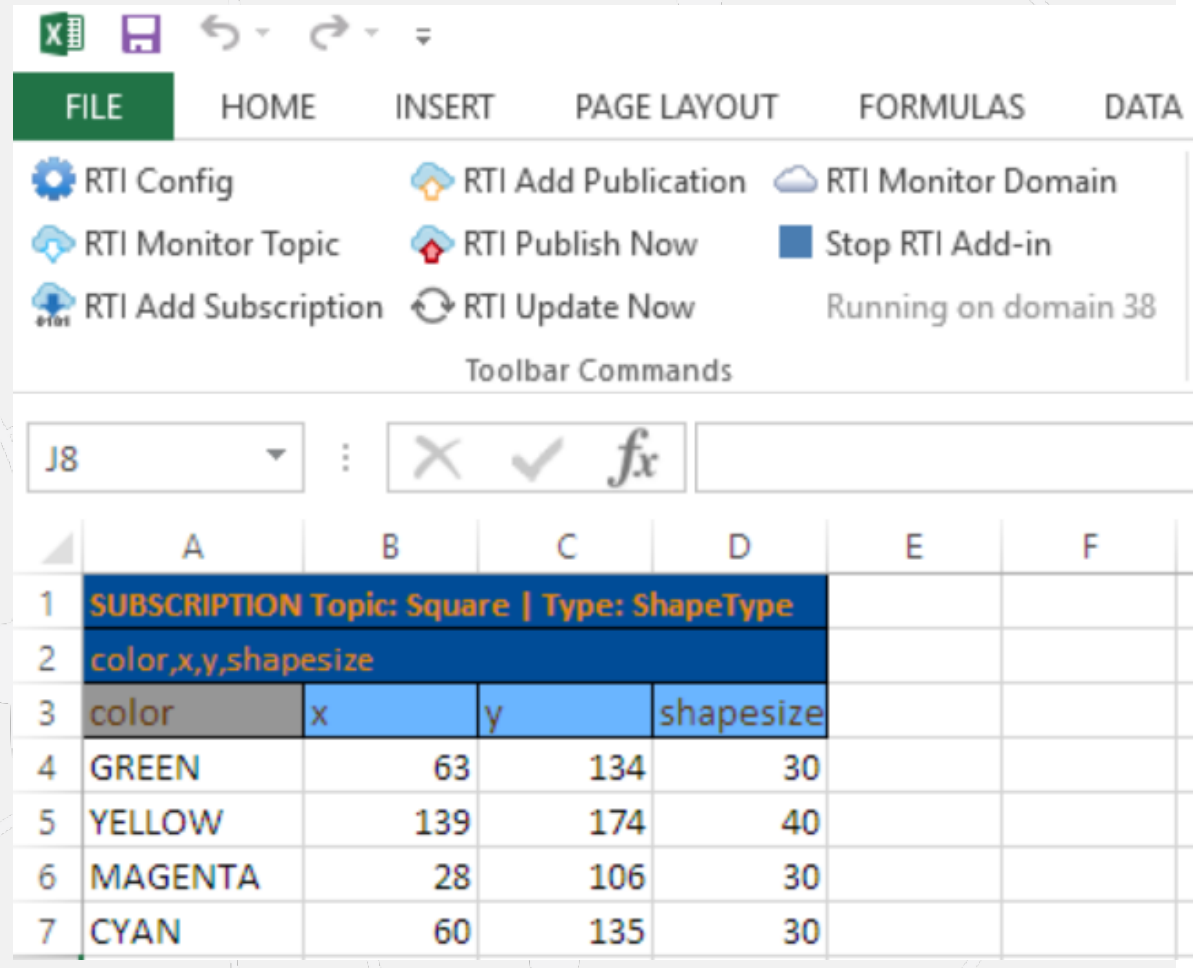
Live demo later

- Not *exactly* a tool…
- Enhance remote debugging from
  - Admin Console & Monitor
- Integrated with RTI services
- Includes an API so you can send your own application messages!



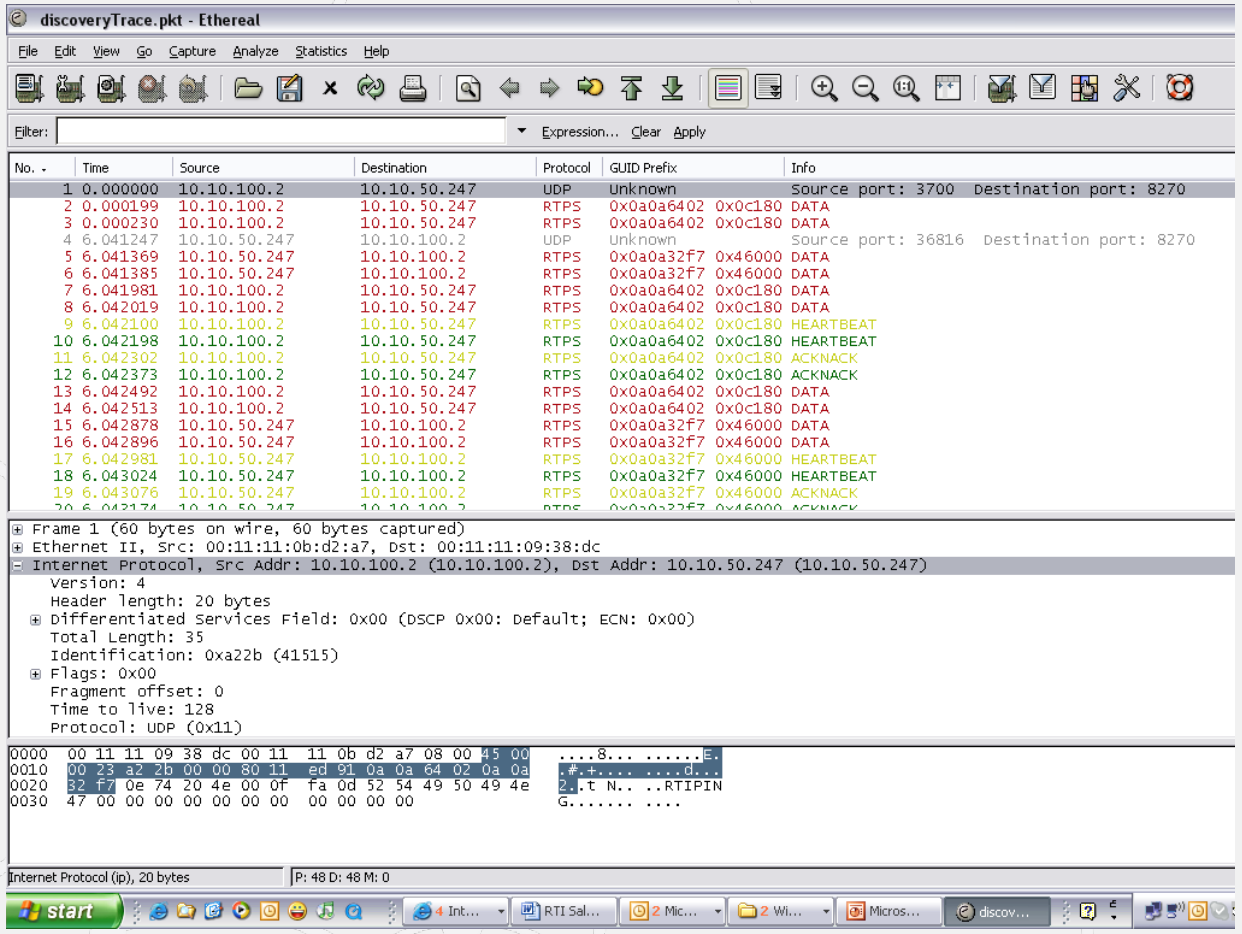
Spreadsheet Add-in

- Easy Integration with Microsoft Excel®
- Real-time updates
  - Spreadsheets
  - Charts
  - Formulas
- Dynamic type detection
  - Discovery
  - XML
- Configurable simplified usage



Wireshark Support

- RTPS2 dissector for Wireshark
  - Traps RTPS2 packets
  - Dissect discovery & user data
    - Heartbeats, acknowledgements,…
  - Destination & source check
- Totally non-invasive
  - No additional subscribers
- Customized filtering
- Debugging:
  - Capture & share your dissected traffic.
  - Including RTI TCP Control messages
- Supports most platforms

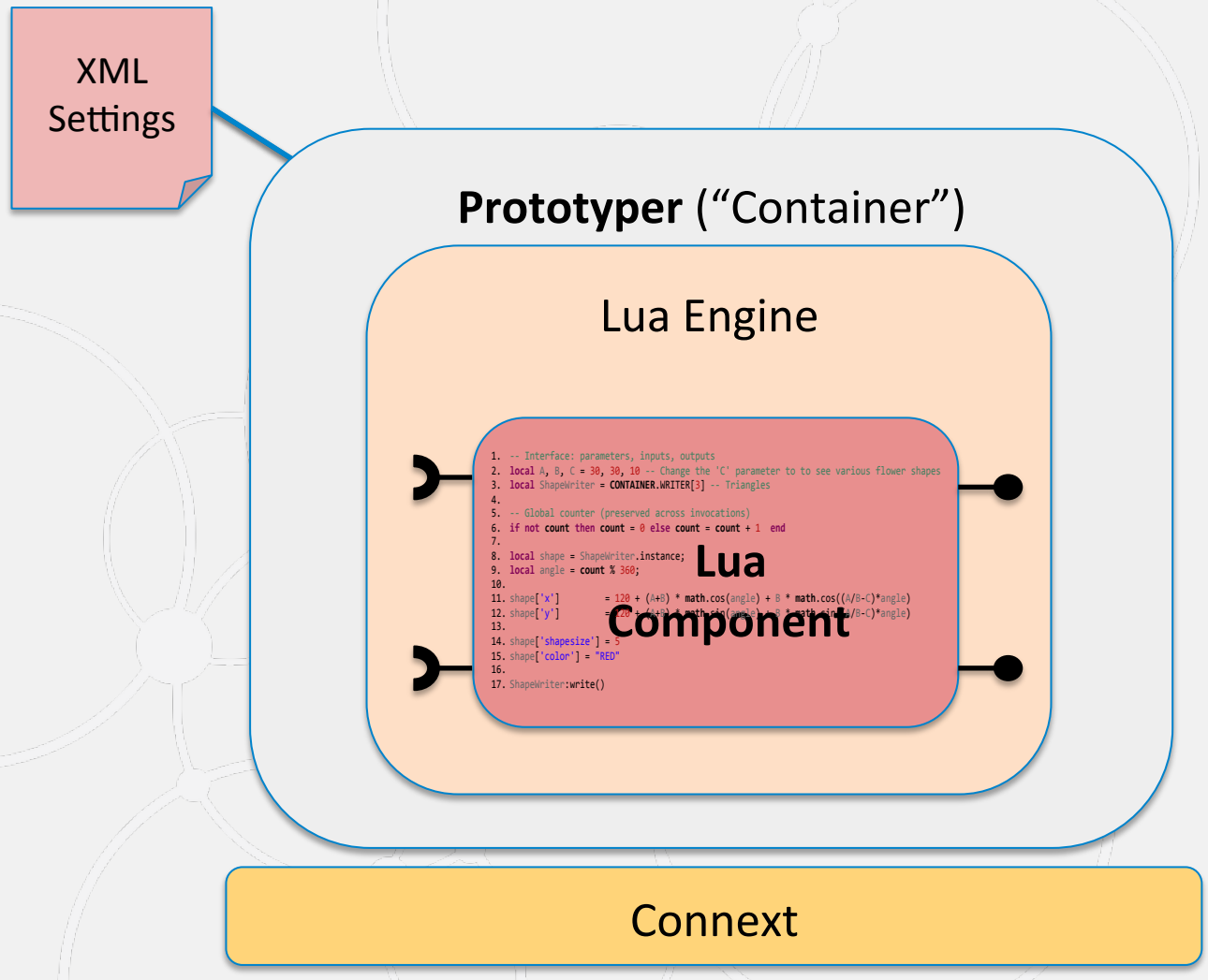


Used to analyze wire traffic and adjust parameters for optimal performance

Prototyper with LUA

This feature is in the Experimental stage

- Quick application creation:
  - Demo
  - Simulation
  - Integration/Testing
- Easy
  - XML description
  - Lua integration



This feature is in the Experimental stage

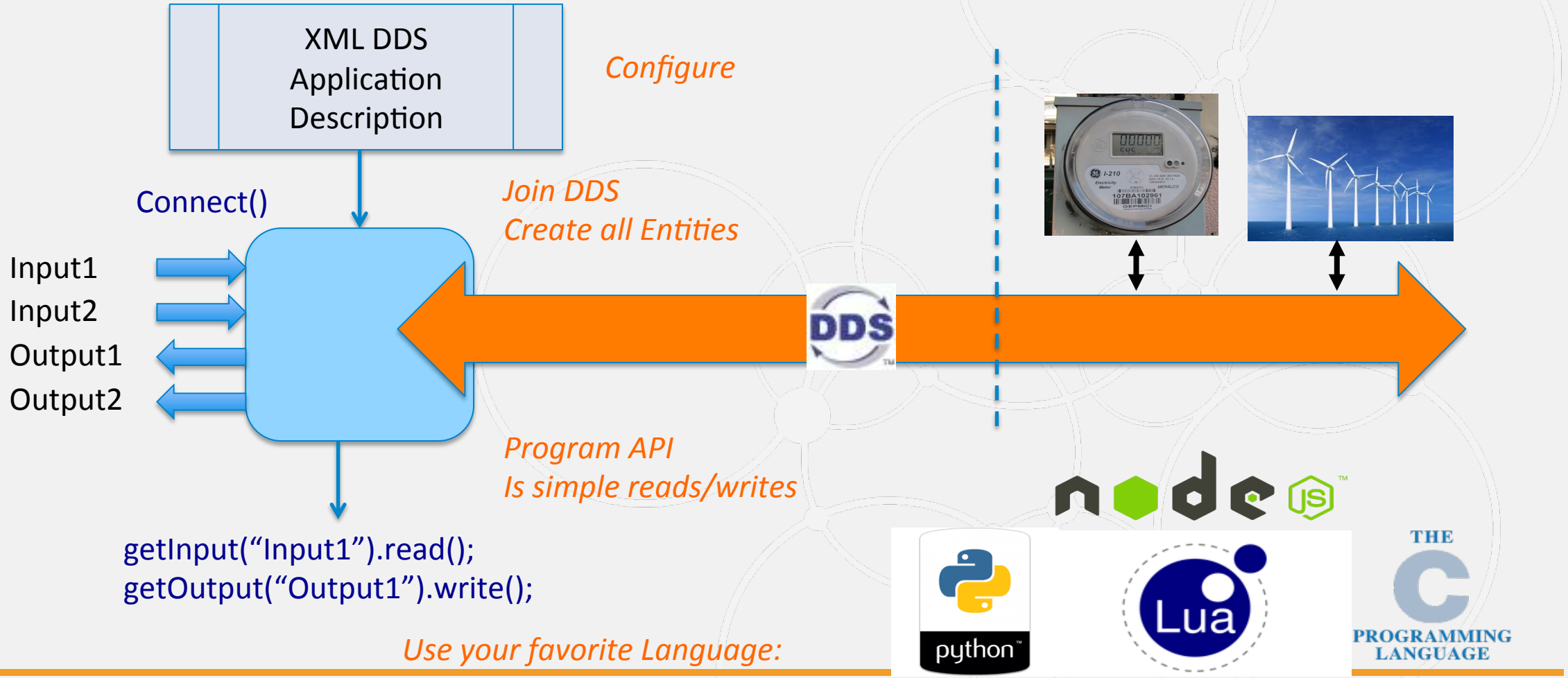
RTI DDS Connector

- Fast Development and Integration
- Support scripting
  - … and popular scripting languages (Python, Lua, …)
  - … Node.js (JavaScript)
- Minimalistic “declarative” API for testing, prototyping…
- Technology Foundation:
  - XML DDS Application Creation
  - DDS-XTYPES
- Available in our GitHub repository:
  - https://github.com/rticommunity/rticonnextdds-connector

This feature is in the Experimental stage

RTI DDS Connector Concept

App Definition is Simple XML



Connector Example

This feature is in the Experimental stage


```
conn =
rti.Connector("MyParticipantLib::Zero",
                      "./ShapeExample.xml");

out1 = connector.getOutput(”Pub::SqWriter")


for i in range(1,500):
    out1.instance.setNumber("x", i);
    out1.instance.setNumber("y", i*2);
    out1.instance.setNumber("shapesize", 30);
    out1.instance.setString("color", "BLUE");
    out1.write();
    time.sleep(2)
```


```
var connector = new
rti.Connector("MyParticipantLib::Zero”,
                    "./ShapeExample.xml");
var out1 =
connector.getOutput(”Pub::SqWriter");

var i;
for (i=0; i<500; i++) {
    out1.instance.setNumber("x",i);
    out1.instance.setNumber("y",i*2);
    out1.instance.setNumber("shapesize",30);
    out1.instance.setString("color", "BLUE");
    out1.write();
    sleep.usleep(1000);
}
```

Your systems.
Working as one.

Third Party Integration

Integration with 3rd Party Software

- Maintained by RTI

National Instruments
LabVIEW toolkit

- Windows and NI Linux (RT Targets)

Wireshark

Microsoft® Excel®

- Provided with Professional

IDL Generator for Enterprise Architect

-Experimental tool

- Maintained externally

Mathworks Simulink and Matlab

InformeDDS by Simventions.

- From Launcher

Rational Rhapsody

Your systems.
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Demonstrations

Resources

- Webinar:
  Accelerate Distributed Systems Development with Connext Tools
- RTI Community Downloads page
  - You can get Connector, Performance Test, Prototyper with Lua and a lot more there.
- Log Parser

Your systems.
Working as one.

Q&A

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Working as one.

Thank you!

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