

Technology Track: Platforms / Infrastructure

Presented by:

Bruce Baikie, Sun Microsystems

John Petze, Tridium

3:10 – 3:50 p.m.

Hondo Room

Platforms and Infrastructure for M2M

Presented by:

John Petze

Tridium Inc.

Challenges For Equipment Suppliers

- Provide Internet-enabled products
- Remote management via the Internet for commissioning, service, improved customer satisfaction, new revenue streams (M2M functionality)
- Connect to other systems (protocols) within a facility
- Time to market for new products that meet customer expectations
- Building solutions that meet these diverse needs with limited internal resources

Infrastructure

- **in·fra·struc·ture**

Pronunciation (n fr -str k ch r) *noun*.

An underlying base or foundation especially for an organization or system.

The basic facilities, services, and installations needed for the functioning of a community or society, such as transportation and communications systems, water and power lines, and public institutions including schools, and post offices.



Understanding Software Frameworks

- **frame·work**

Pronunciation: 'frAm-"w&rkFunction: *noun* Date: 1644

A basic conceptual structure <the *framework* of the constitution>

A structure for supporting or enclosing something else, especially a skeletal support used as the basis for something being constructed.

A fundamental structure, as for a written work.

A set of assumptions, concepts, values, and practices that constitutes a way of viewing reality

In object-oriented systems, a set of classes that embodies an abstract design for solutions to a number of related problems

- **Software frameworks** provide a platform to enable developers to more easily build end-use products
- An object-oriented framework is a set of cooperating software components that form an infrastructure for building applications
- The components encapsulate the functions needed to implement end-use applications – streamlining development and reducing time to market
- Frameworks also address usability issues by standardizing key interfaces for system commissioning, data visualization, operator interaction, etc.
- Frameworks are unlike software libraries and similar approaches which produce a piece of re-usable code, but do not include the overall design structure needed to solve the end-use problem

Requirements for an M2M software framework

- Ability to communicate with and model data from diverse systems via fieldbusses, wireless networks (mesh and cell), IP networks, etc.
- Real time control/decision engine
- Data logging, archiving, RDBMS integration
- Ability to communicate/integrate with Enterprise applications (web services)
- Support developers ability to independently create unique value-added applications
- Provide strong IP services, seamless, web-based user experience
- Embeddable in small low cost hardware (runs in more than just PCs)
- Extensible to embrace new technologies, devices, applications as they appear
- Integrated tools to support programming for both non-programmers (domain experts) and programmers

Common Approach

- “Roll your own” and custom engineered solutions for each application
- Substantial portion unique to every project
- High level of coding required for implementation
- Very limited re-use
- High cost
- Difficult to maintain
- N-N architecture

Component Model – The Foundation

- A unified component model to form the basis for all other required system functions
- Extensible component model and open API's to support extension of the framework itself by other developers



Economic Benefits

- Building on a framework:
 - Lowers costs
 - Lowers risk, improve consistency of applications
 - Speeds time to market
 - Provides greater functionality
- Change the buy vs build equation for M2M implementations
 - Operating Systems
 - Databases
 - TCP/IP stacks
 - Web Servers, Web Services Platforms
 - Now – software framework for application/product development
- Choose the platform and build the value added application/product – quicker, faster, at less cost

The Device-to-Enterprise Solution Stack

There's a lot of software in the in the D-to-E Stack

