XAL and Open XAL Introduction

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XAL Background

- Developed for SNS
- Environment for building Accelerator Physics Applications and Services
  - Commissioning
  - Operation
- Pure Java
- http://www.ornl.gov/~t6p/Main/XAL.html

Original Core XAL Team

- John Galambos
- Paul Chu
- Chris Allen
- Andrei Shishlo
- Wolf-Dieter Klotz
- Tom Pelaia
- Several other collaborators

Open XAL Background

- Port of XAL
  - Generalized beyond SNS
  - Simpler, more powerful build system
  - Easier maintenance
  - Eliminates compiler warnings with strict checking

- http://xaldev.sourceforge.net

Minimal Runtime Requirements

- ✓ Java J2SE 6
- ✓ JRuby 1.6
- ✓ Jython 2.5

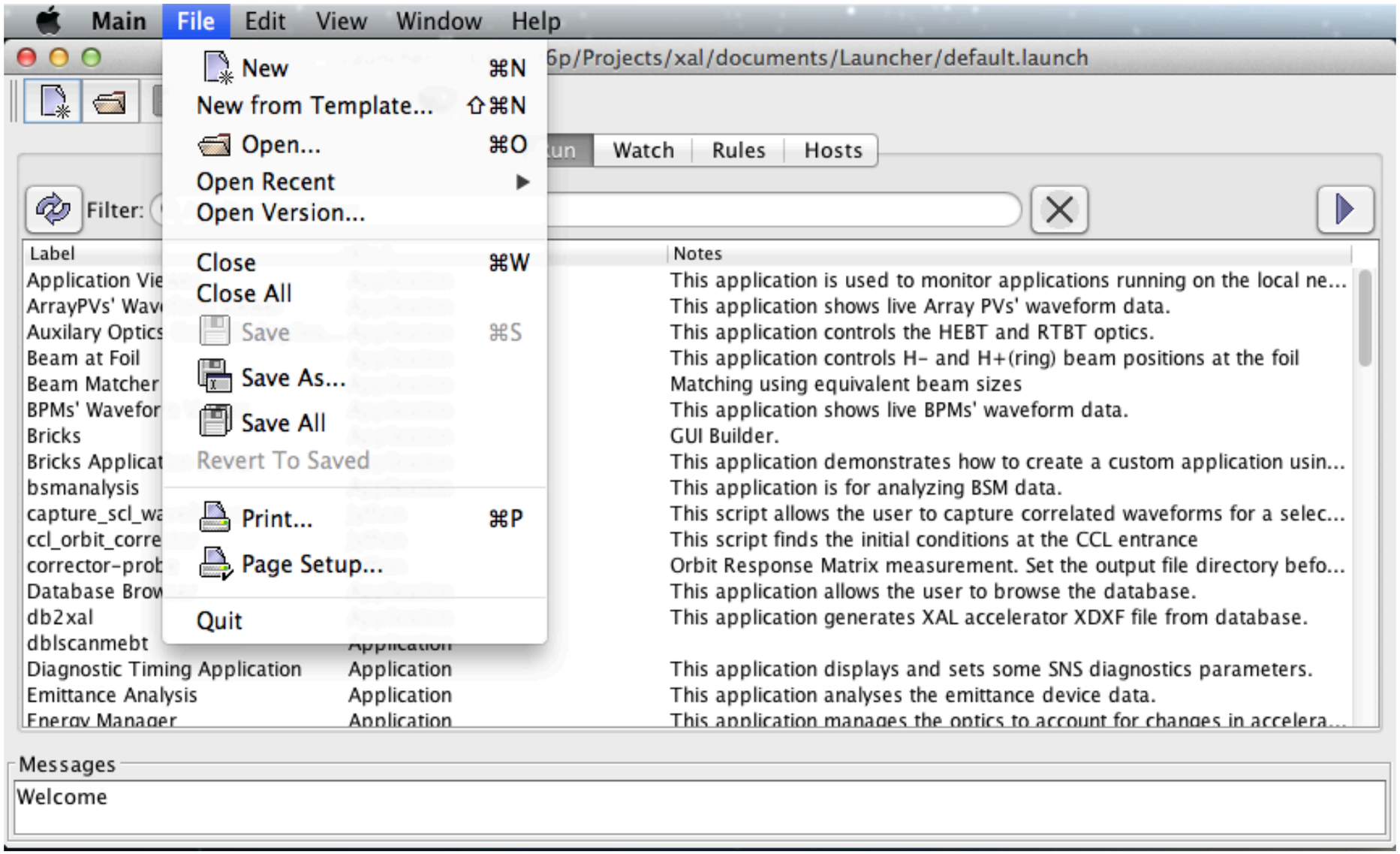
Minimal Developer Requirements

- ✓ JDK 6
- ✓ Ant 1.7
- ✓ JUnit 4.10
- ✓ Git 1.7
- ✓ JRuby 1.6
- ✓ Jython 2.5

Application Support

- Application Framework
  - Standard Desktop Applications
  - Provides standard application features and hooks
    - copy, cut and paste
    - online help
    - console with persistent logging
    - templates and versioning
  - Common Look and Feel
  - Extensible
- Bricks GUI Builder
  - WYSIWYG editor to XML
  - True Model-View-Controller architecture
  - Works with both applications and scripts

Example: Standard XAL Menus
Launcher



Application Categories
Over Five Dozen XAL Applications

- Controls
  - Knobs, SCORE, Loss Viewer, Scan 1D, Scan 2D
- Machine Simulation
  - Virtual Accelerator, MPX
- Machine Characterization
  - Profile Tools and Analysis, SLACS, RTBT Wizard, Orbit Correction

Scripting

- Java Scripting Languages
  - JRuby
  - Jython
- GUI support using Bricks

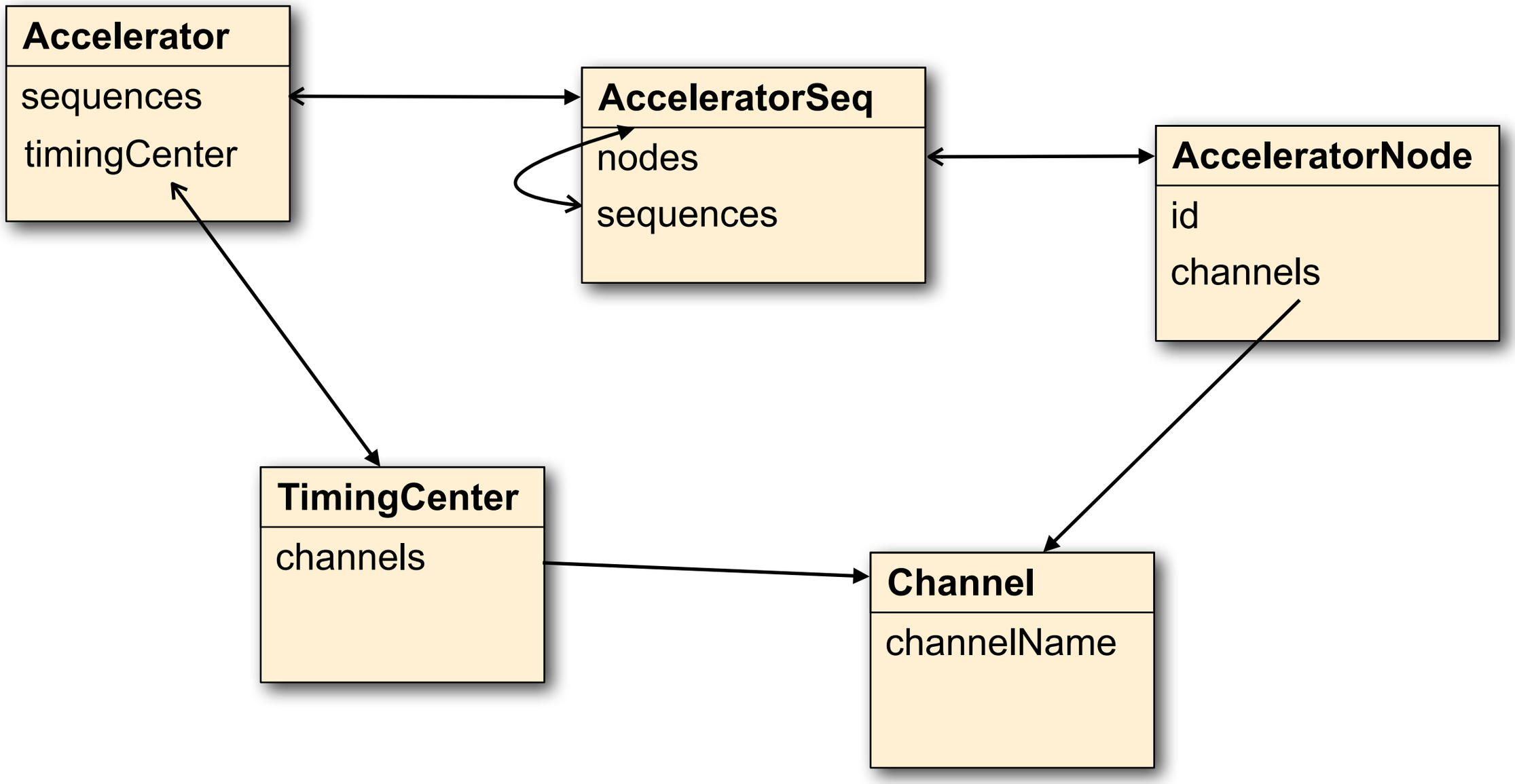
Service Support

- Service Package
- Abstracts underlying protocols
  - JmDNS for discovery
  - JSON-RPC (Open XAL)
  - XML-RPC (XAL)

XAL Services

- Every Application
- PV Logger
- MPS First Faults
- RF Trip Monitor
- Errant Beam Capture

Accelerator Object Graph
Streamlined Diagram



Channel Access

- Wraps JCA/JNI and JCA/CAJ options
- Batch connection and get requests
- Channel Monitor Correlation
- Transforms for customization

Accelerator Physics Model
Chris Allen's Implementation

- Probe - Element - Algorithm architecture
- 6D phase space
- Simulation Engines
  - Particle, Envelope, Transfer Map
- Scenario Data Input
  - Design, Live, What-If

Many Generic Tools
Sampling

- Plotting
- Math and Statistics Packages
- Dispatch Package (concurrency)
  - libdispatch port
- Multi-algorithm Solver
- Message Center
- Data Adaptor
- Key-Value Table Model

Status

- Continuing XAL Development
- Porting to Open XAL
- Will Transition from XAL to Open XAL