Open Source

in the Corporate World

# Monitoring & Profiling

Monitoring with open source tools

CHARIOT SOLUTIONS

# Agenda

- Monitoring
  - Applications
  - Infrastructure
  - Protocols & Tools
- Profiling
  - Application profiling
  - Service profiling
- Stress Testing

# Monitoring

- Application
  - JMX
  - Logging
- Infrastructure
  - SNMP

# JMX

- Java Management Extensions – an API and framework for manageable services
  - Defines manageable objects called MBeans
  - Defines attributes, operations and notifications
  - Part of J2EE 1.4 specification
  - J2EE 1.4 also defines JSR 77 and 88 for application monitoring and deployment respectively
  - JSR 160 created a standard for remote JMX that does not require client stubs or the direct use of RMI

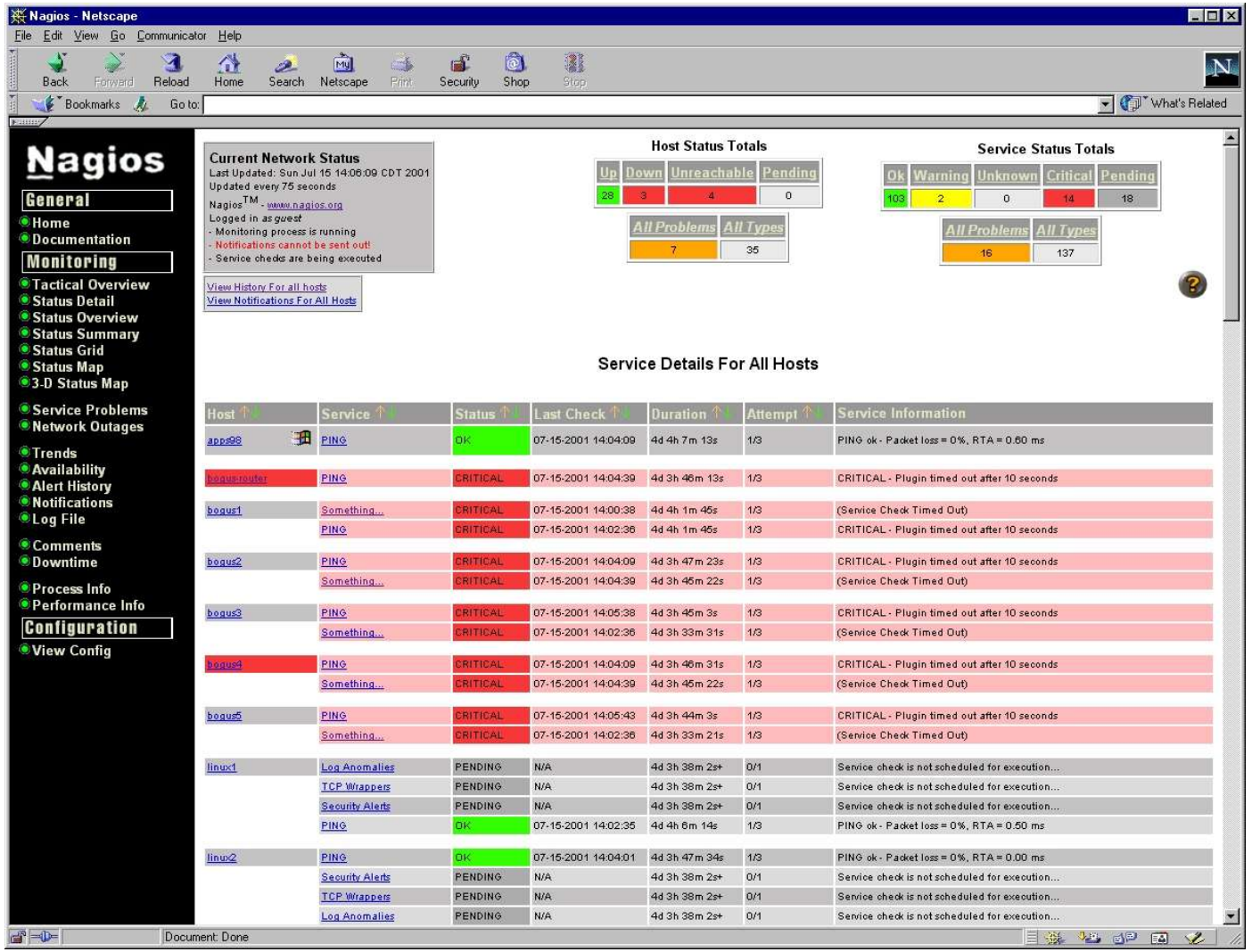
# Monitoring Tools

- Nagios
- JMeter
- MC4J
- Commons Modeler
- Chainsaw
- Chires

# Nagios

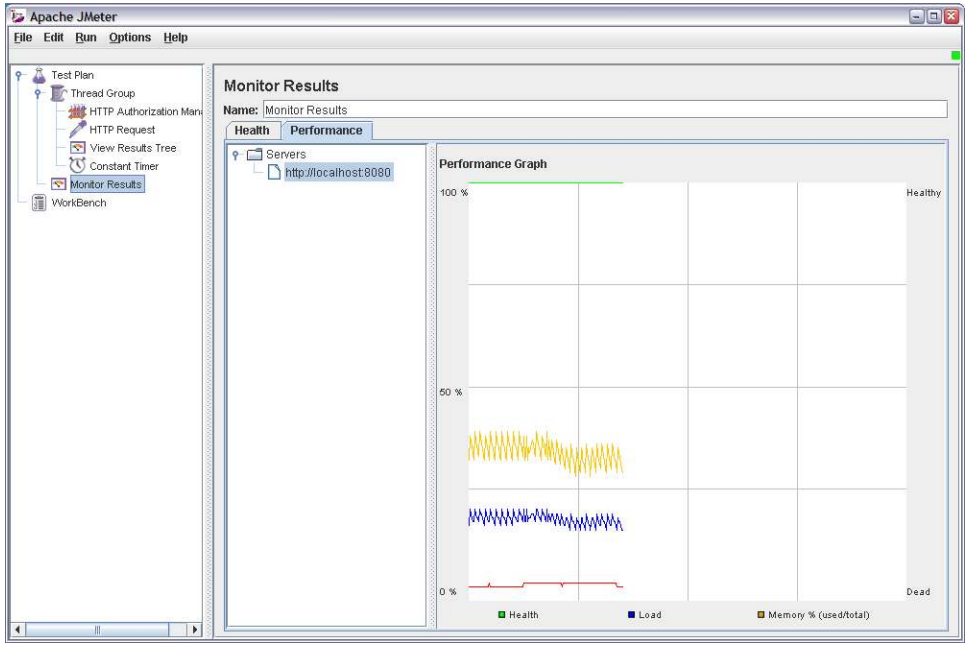
- Network and application monitoring
  - Web-based interface
  - Service monitoring: SMTP, POP3, HTTP, Ping, NNTP
  - Resource monitoring: disk, CPU, memory
  - Contact notifications (pager, email)
  - Problem history reporting
  - Log access

# Nagios



# JMeter

- Very basic monitoring for Tomcat servers
- Monitors threads and memory usage
- More useful for stress testing than monitoring

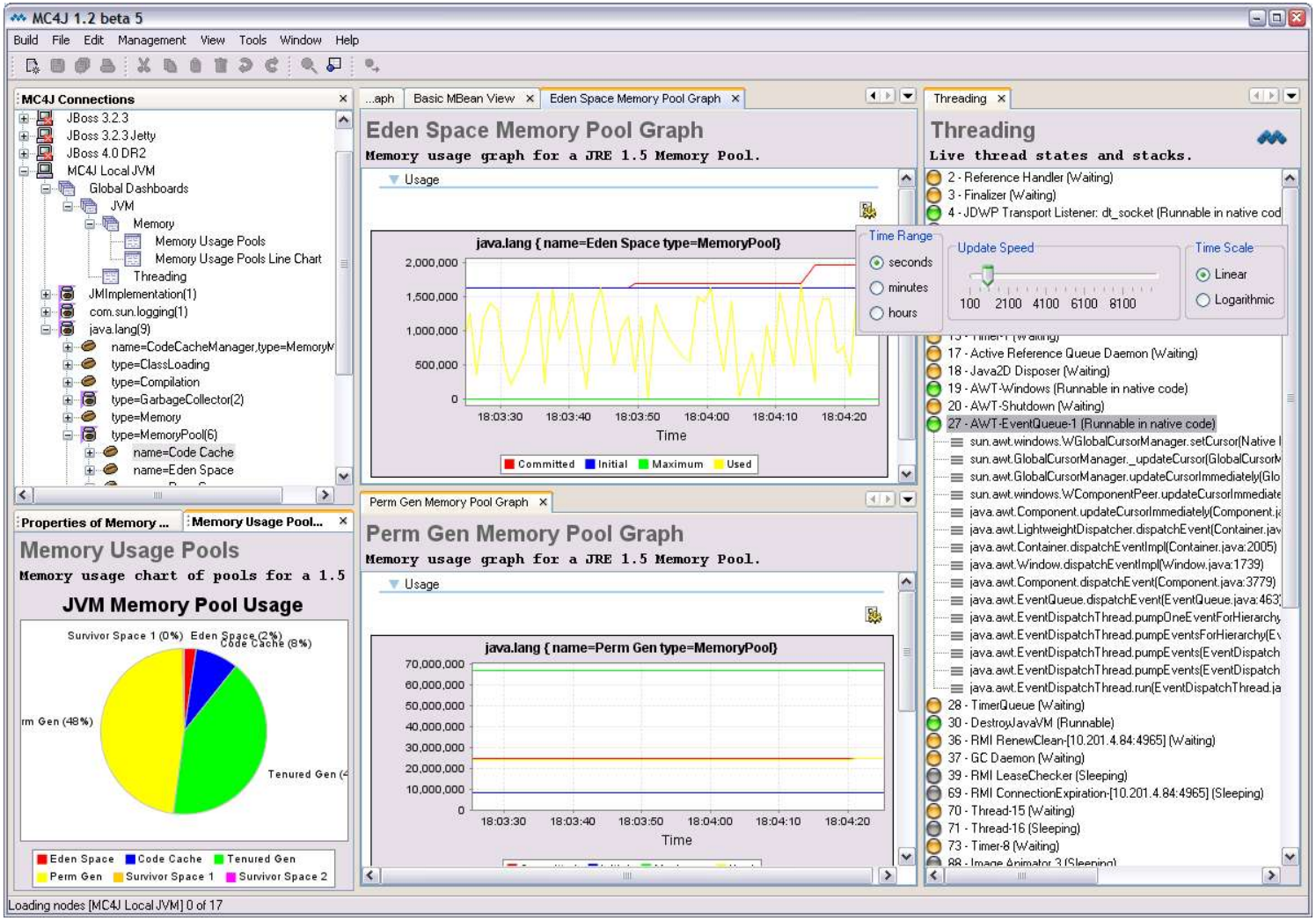


# MC4J

- Disclaimer – presenter is author

- JMX Management console
  - Supports all major J2EE application servers
  - Supports parts of JSR 77 for contextual application monitoring and statistics
  - Can directly monitor any Java 5 JVM and supports standard JVM monitoring such as threads, memory pools and GC
  - Can graph numerical and statistical values
  - Can perform supported operations and configurations on a server
  - Supports customized dashboard views for service tailored interfaces

# MC4J



# Commons Modeler

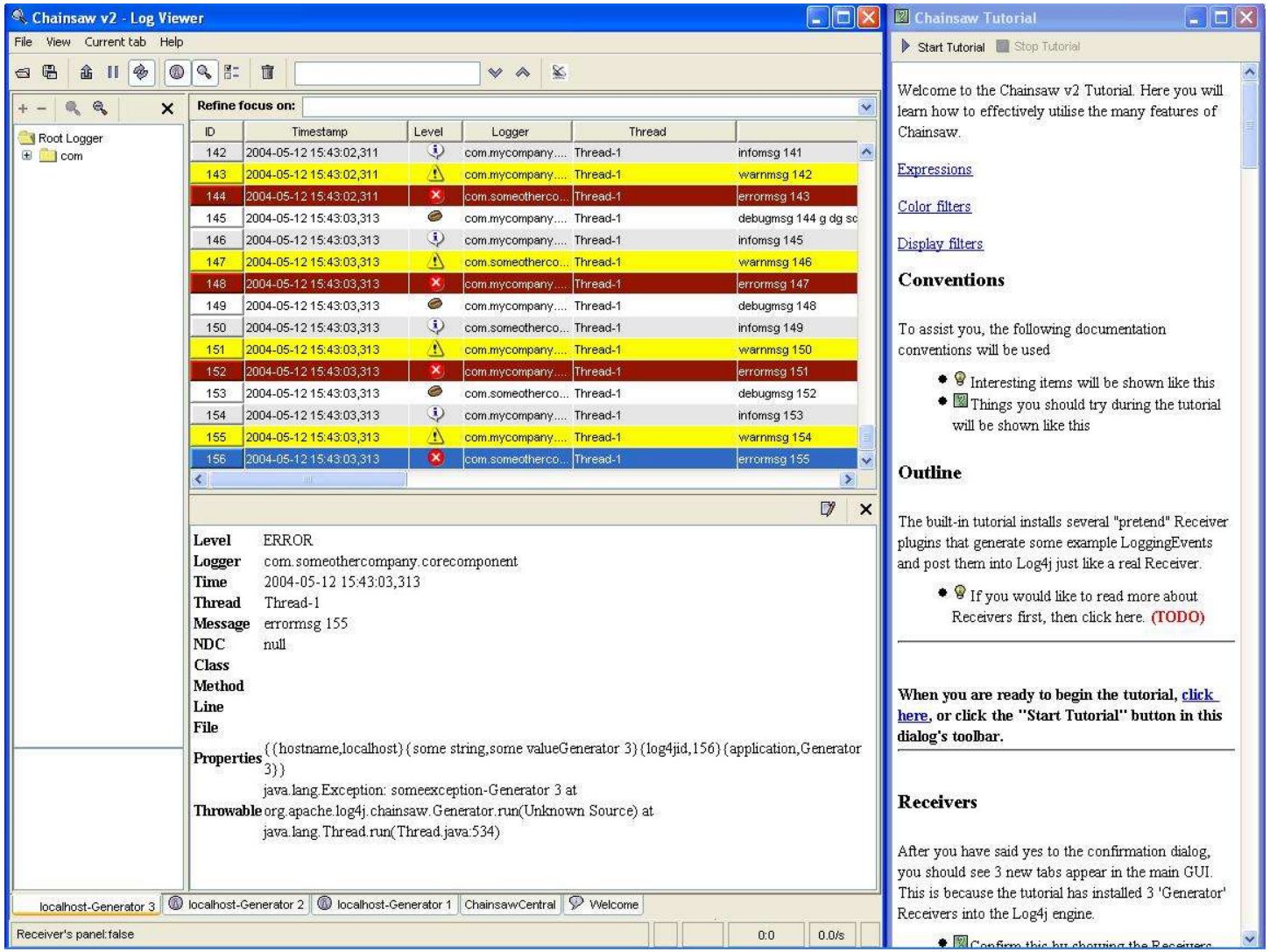
- Simplifies the exposure of objects to JMX
- Externalizes MBean metadata into XML
- Declaratively choose which attributes and operations are exposed

```
URL url= this.getClass().getResource
         ("/org/chires/model/history/generic/mbeans-descriptors.xml");
Registry registry = Registry.getRegistry(this,null);
registry.loadMetadata(url);
registry.registerComponent(
         this,
         "Chires:type=GenericModel,name=" + key,
         "org.chires.model.history.generic.GenericModel");
```

# Chainsaw

- Utility for browsing and searching log files
- Quickly filter by logger and highlight important messages through expressions
- Can read XML files or receive messages via socket connections from server processes

# Chainsaw



# Chires

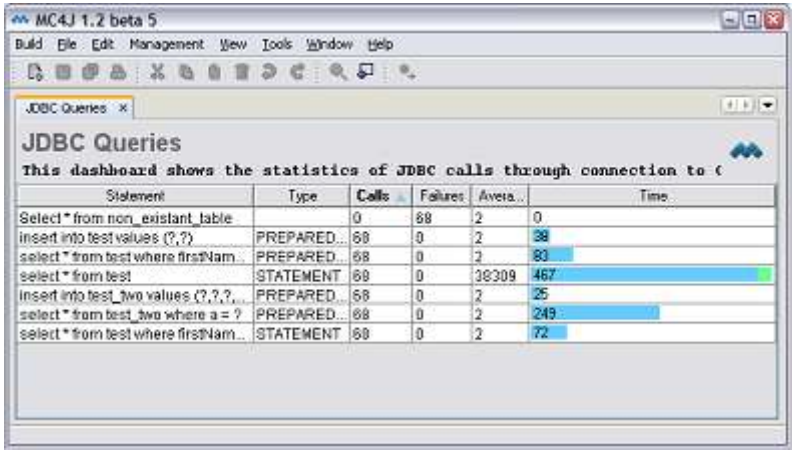
- Utilize AOP to introduce JMX MBean support into plain old Java objects
- Automatically registers objects on creation or lifecycle events
- Configured via annotations or XML
- May introduce value monitoring and call execution

```
@MxBean(
    description = "I am an auto-managed bean. Hello.",
    objectName = "name=ManageMe")
public class AutoManageMe {

    @MxAttribute(
        description = "This is an attribute that is only backed by a simple field",
        isReadable = true, isWritable = false)
    private String infoFieldAttribute = "Some other default text";

    @MxOperation(description = "This is a basic operation", impact = "info")
    public String getMeAString() {
        return nonAttributeField;
    }
}
```

# Chires



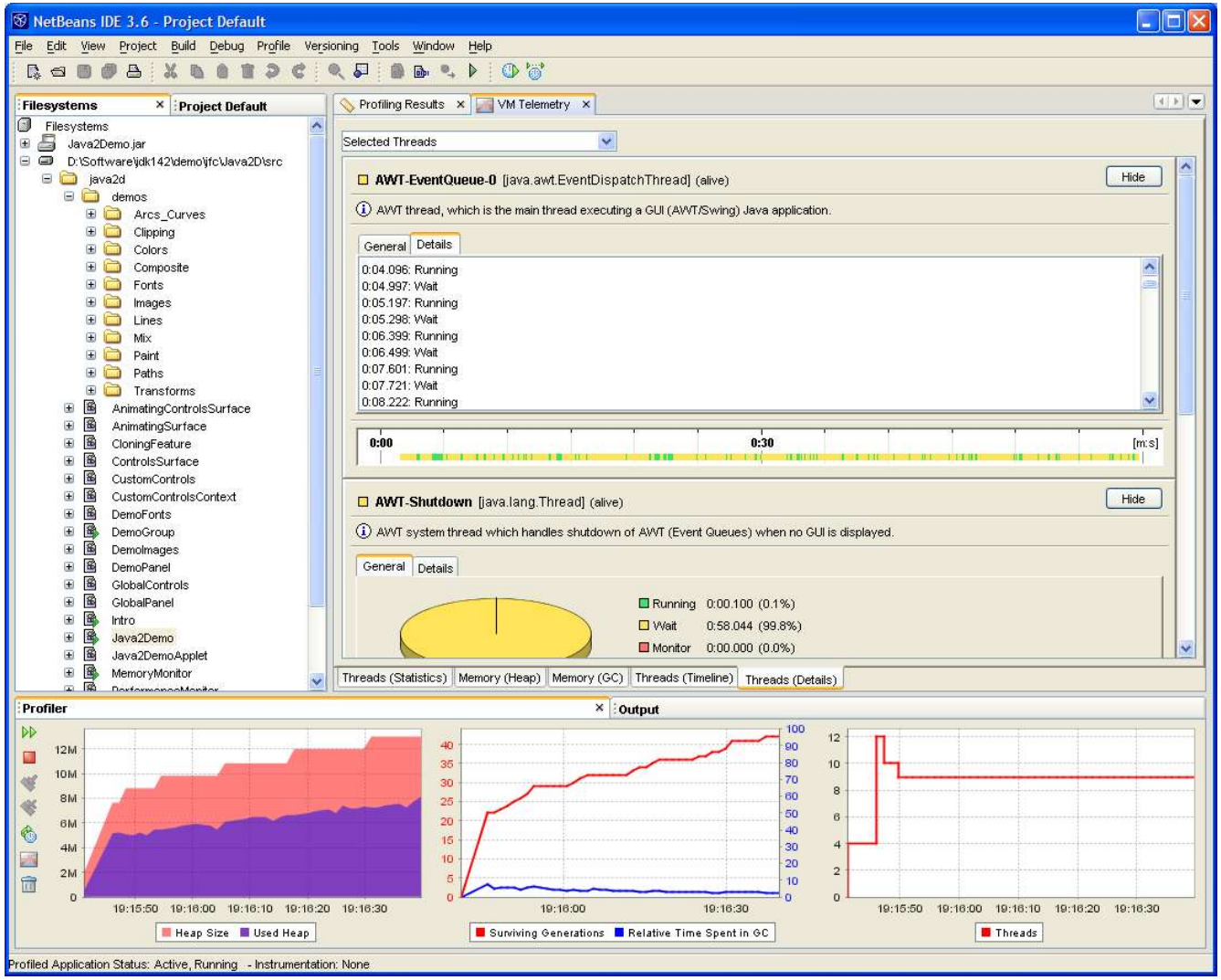
# Profiling Tools

- Application Profiling
  - NetBeans Profiler
  - Eclipse Profiler
- Service Profiling
  - P6Spy
  - Chires
  - Helios
  - JRat

# NetBeans Profiler

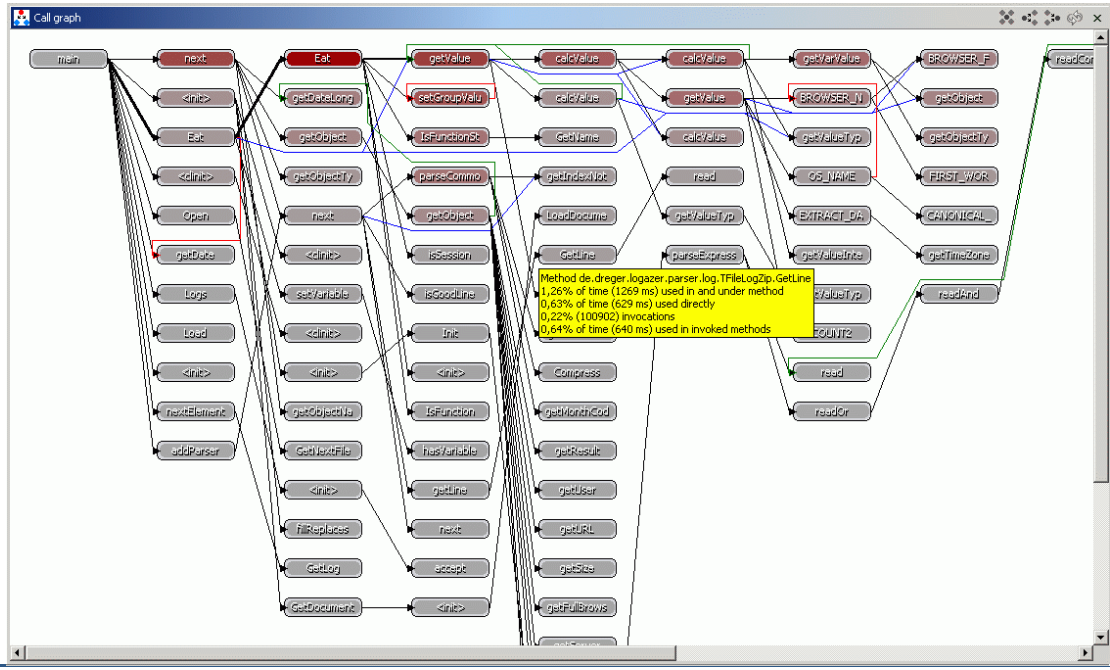
- Low overhead profiling
- Utilizes JFluid JVM technology for fast byte-code enhancement
- Requires use of special JVM
- Performance profiling – CPU time
- Memory profiling
- Thread profiling, concurrency

# NetBeans Profiler



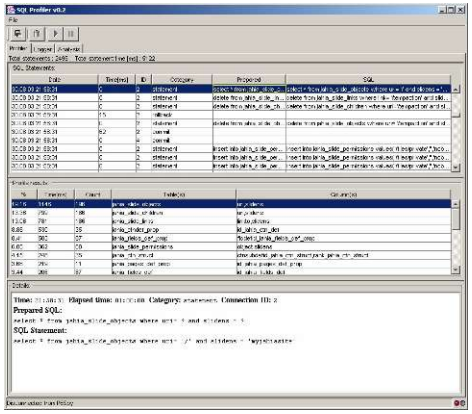
# Eclipse Profiler

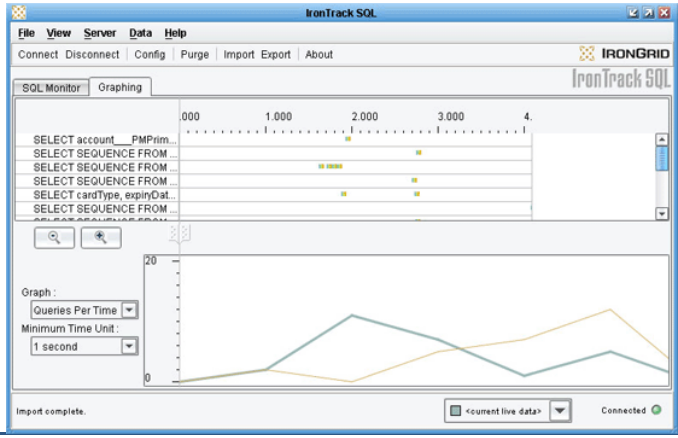
- CPU and heap profiling
- Limited thread profiling
- Visual call graph



# P6Spy

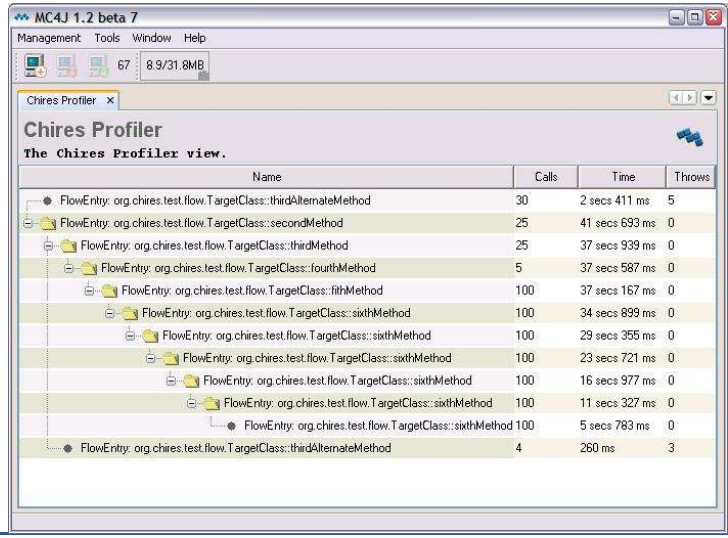
- P6Spy is a framework for intercepting JDBC calls
- It installs as a proxy to your real JDBC driver
- P6Log logs SQL statements as they are sent to the driver and can intercept anything using JDBC (e.g. EJBs)
- Two visual tools for tracking and monitoring SQL executions from P6Spy (Irongrid IronTrack and Sql Profiler)





# Chires

- An AOP and JMX monitoring framework
- Instruments any Java class through byte code alteration
- Provides JMX interface to statistics, state and operations without code changes



# Helios

- New project for JMX-based resource monitoring
- Supports real-time resource monitoring, aggregation and history reporting
- Will support Nagios reporting when completed
- Utilizes JRat for application monitoring

# JRat

- Java Runtime Analysis Tool
- Accummulate timing statistics
- Create trace logging
- Track response times of methods over time
- Can integrate via offline bytecode instrumentation (with an ant task)
- Supports JBoss 4 AOP
- Can also instrument via dynamic proxies

# Stress testing

- Purpose
  - Scalability
    - Finding failure point
    - Testing degradation
  - Failure
    - Failover behavior

# JMeter

- Pure Java Swing application
- Provides testing of HTTP, web services, JDBC, FTP and LDAP
- Offers configuration of test scripts via a proxy, allowing recording of browsing
- Supports form parameters from files
- Manages cookies
- Threaded load generation with remote engine control from a single GUI

# OpenSTA

- Windows only stress testing
- Supports distributed load generation
- Custom scripting language
- Weak proxy script generation to script

# Questions?

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