Introduction to MINA

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Agenda

• Overview
• In-depth View
• Implementation Demo
• Future
• Conclusion
Overview

A Multi-purpose Infrastructure for Network Applications
What is MINA?

• Java network application framework
• High productivity
  • Easy-to-learn
  • Elegant application design
• High performance
  • Asynchronous · Event-driven
Elegant Application Design

- Unit test friendly
  - You can test your application without a real client or server via mock objects.
- Extensible
  - Runtime modification of application behavior using ‘filters’
- Maintainable and Reusable
  - Separation of networking code (MINA), protocol codec, and business logic
Who Uses MINA?

- The Apache Directory Project
  - LDAP
  - Kerberos
- QuickFIX - QuickFIXEngine.org
  - Financial Information eXchange Protocol
- RED5 Server - OSFlash.org
  - Macromedia Flash Media RTMP
- JStyx - JStyx.sf.net
  - Styx, a file sharing NFS-like protocol
- Proprietary SMS · MMS servers
In-depth View

A Multi-purpose Infrastructure for Network Applications
At a Glance

- **IoSessionManager**
  - Where real I/O occurs
- **IoFilters**
  - Filters I/O events · requests
- **IoHandler**
  - \(<Your protocol logic>\)
- **IoSession**
  - Represents a connection
IoSessionManagers

Server-side: Accepts clients

Client-side: Connects to a server

And their implementations

Server-side implementations:
- nio::SocketAccept
- nio::DatagramAccept
- vmpipe::VmPipeAccept

Client-side implementations:
- nio::SocketConnect
- nio::DatagramConnect
- vmpipe::VmPipeConnect
IoFilters

• An event & request interceptor
  • Reusable
  • Hot-deployable

• SSL · TLS
• Thread pool
• SASL
• Performance profiler
• Lightweight firewall

• Peer blacklist
• Logger
• Authorization
• Traffic shaper
• Overload detector
IoFilters: ThreadPoolFilter

No thread pool: single thread setting for minimal latency

One thread pool: general setting for high throughput

More than one thread pool: special setting for CPU-intensive jobs
IoFilters: ProtocolCodecFilter

• Clear separation and reusability

• Business logic - IoHandler
• Protocol codec - ProtocolCodecFilter

• Out-of-the-box
  • Object serialization
  • Text line
IoFilters: ProtocolCodecFilters (Cont’d)

Remote Peer

IoSessionManager

IoFilterChain

ProtocolCodecFilter

IoSession

IoHandler

Legend

- Core
- Extension Point
- Protocol Implementation

POJO → ByteBuffer

ByteBuffer → POJO

⇒ Business Logic Only!
In-VM Pipe

I/O events are converted into

‘Direct Method Invocations’

⇒ No protocol codec
⇒ No network latency
⇒ Using the same API
Implementation Demo

A Multi-purpose Infrastructure for Network Applications
Reverse Echo Server

- Echo server which reverses a line
- Using a built-in text line protocol codec in MINA
1. Create an IoHandler.
Future

A Multi-purpose Infrastructure for Network Applications
MINA as a Platform

Real-Time Management System

- HTTP
- FTP
- SMTP
- ... ...
- Rapidly Prototyped Protocol
- Visual Protocol Designer (ASN.1-based)
- Kerberos
- LDAP

Popular Protocols

Others

ASN.1 Codec

MINA

Future
Real-Time Management System

- A universal management view
- JMX console and Web browser
- Real-time access
  - Server traffic
  - IoFilter Hot-deploy
  - Which client is sending what message now?
  - Which message takes too long to process?
  - And <what you want to monitor>
We Need Your Participation!

• Sounds exciting?
• Please help MINA team!
  • Try MINA
  • Ask questions
  • Criticize
  • Report bugs
  • Benchmark
  • Contribute code
  • Contribute a tutorial
Conclusion

A Multi-purpose Infrastructure for Network Applications
Conclusion

- MINA is an extensible network application framework that helps you implement your network application elegantly without compromising productivity.

- MINA will be a full-featured network application dev. & mgmt. platform if we get our efforts together.
Resources

• Homepage
  • Tutorial
  • More useful examples

• Mailing List
  • [dev@directory.apache.org](mailto:dev@directory.apache.org)
    (Please use ‘[mina]’ prefix)
Thank You!

Q & A