

Introduction to MINA

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Agenda

- Overview
- In-depth View
- Demonstration
- Future
- Conclusion




Agenda: Overview

- Overview
 - What is MINA?
 - Advantages
 - References
- In-depth View
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What is MINA?

A **M**ulti-purpose
Infrastructure
for **N**etwork
Applications



What is MINA?

- Network application framework for Java
- Abstract API
 - Event-driven
 - Asynchronous
- Implementations
 - NIO Socket & Datagram
 - *<Your favorite transport>*

Advantages: Productivity

- Unit test friendly
 - Abstract API + mock objects
- Extensible
 - Runtime modification of application behavior using 'filters'
- Maintainable and Reusable
 - Separation of networking code (MINA), protocol codec, and business logic

Advantages: Performance

- AMQP Test
 - Client and server
 - 4 dual-core Opterons
 - Via Gigabits Ethernet
 - 10 clients
 - Payload: 256+ bytes (excl. AMQP headers)
 - Avg : **180,000** msg/sec
 - Max: **220,000** msg/sec

Courtesy of Robert J. Greig, JP Morgan Chase & Co.

Advantages: Stability

- API design
 - Running toward 1.0 fast
- Implementation
 - We've been doing this since 2004

Who Uses MINA?

- The Apache Directory Project

- LDAPv3
- Kerberos
- DNS
- ChangePW
- DHCP
- NTP

- XFire + AsyncWeb

SOAP over HTTP

- AMQP

Advanced Message Queuing Protocol

- QuickFIX/J

Financial Information eXchange

- RED5 Server

Macromedia Flash Media RTMP

Who Uses MINA?

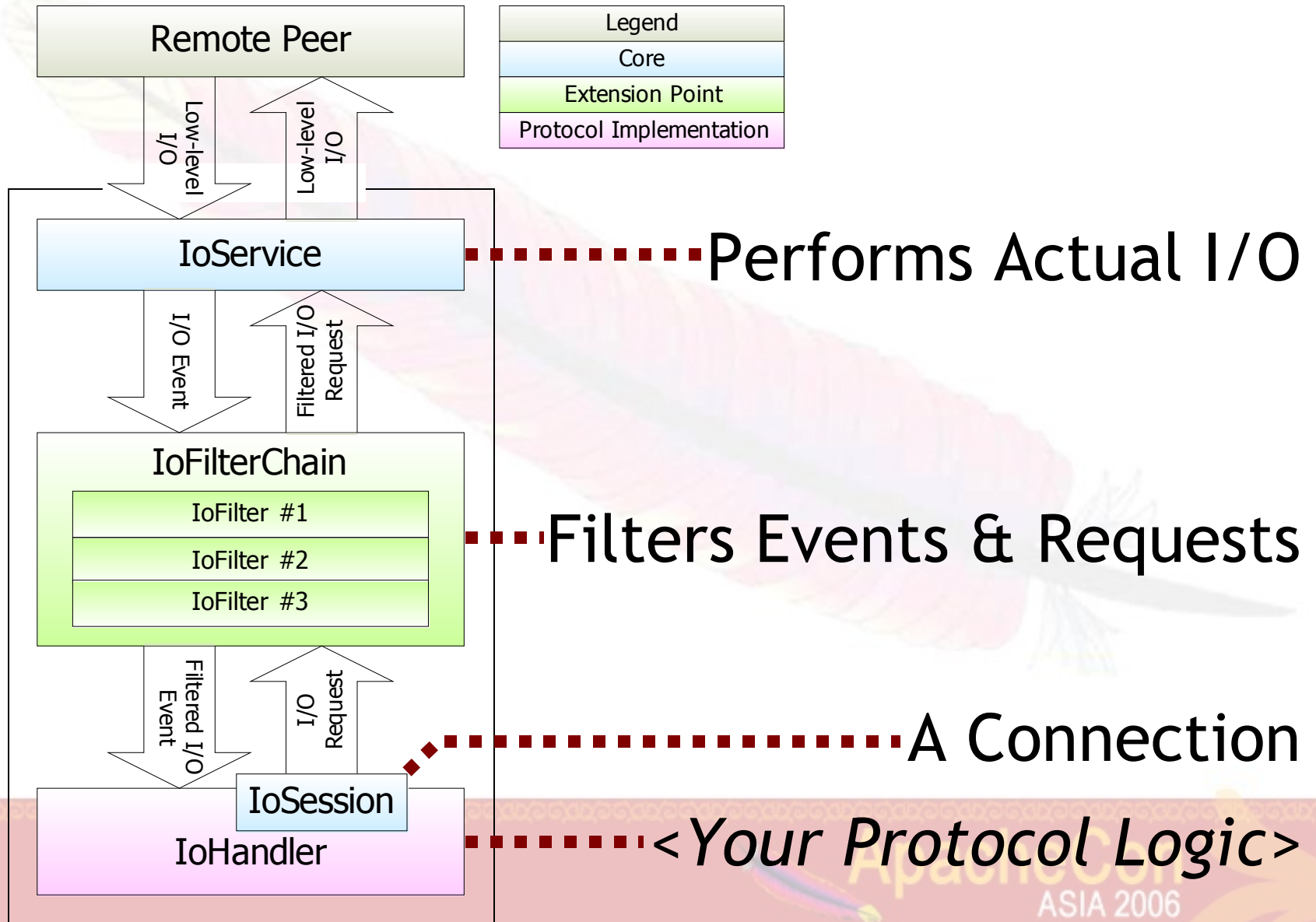
- **ObjectRADIUS** RADIUS
- **FreeCast** P2P media streaming
- **JStyx** A NFS-like file sharing protocol
- **Proprietary projects**
 - XMPP (Jabber · GTalk) implementation
 - SMS · MMS Gateways
 - And many more!



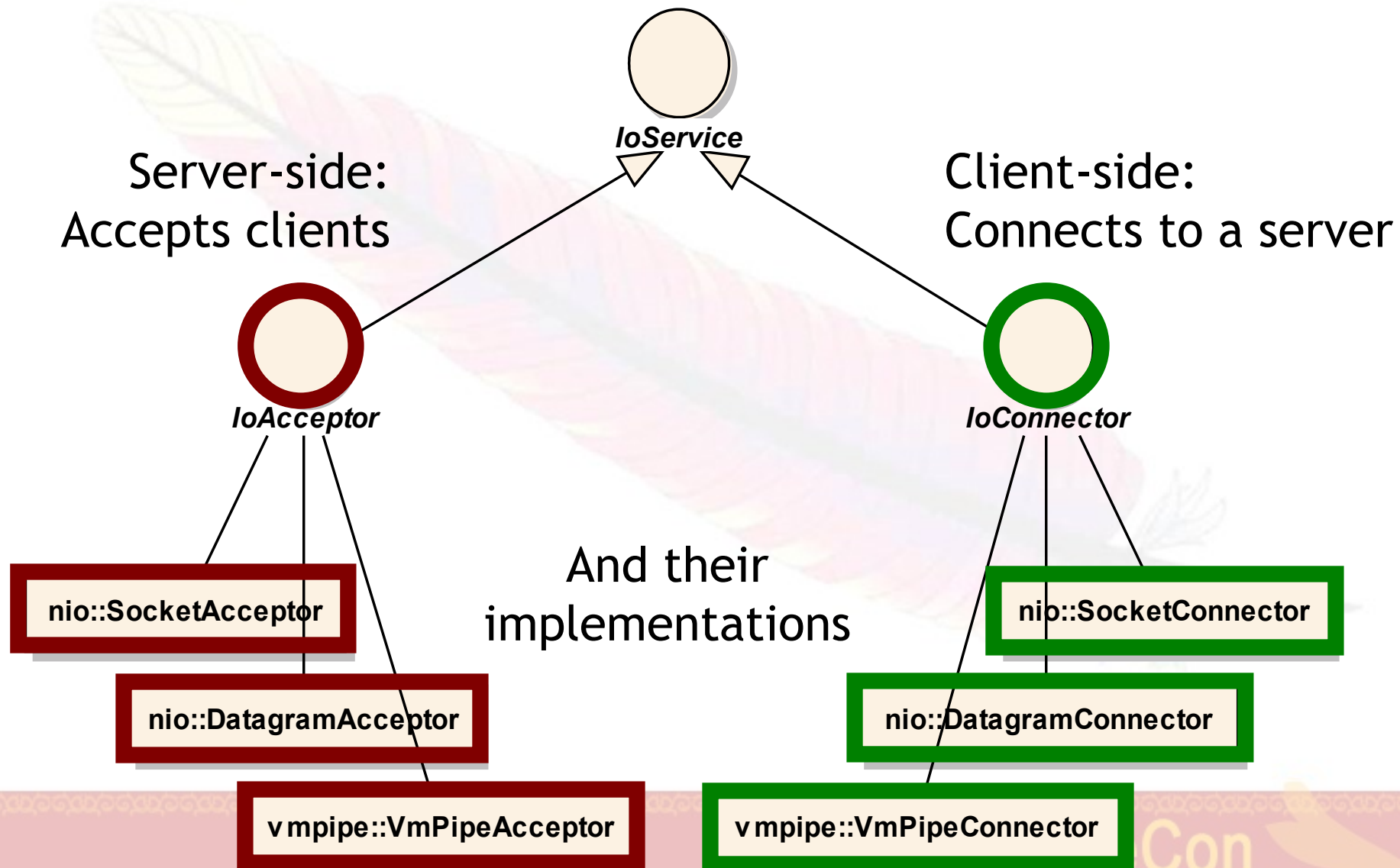
Agenda: In-depth View

- Overview
- **In-depth View**
 - At a Glance
 - Core Constructs
 - In-VM Pipe
- Demonstration
- Future
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At a Glance



IoService



IoFilter

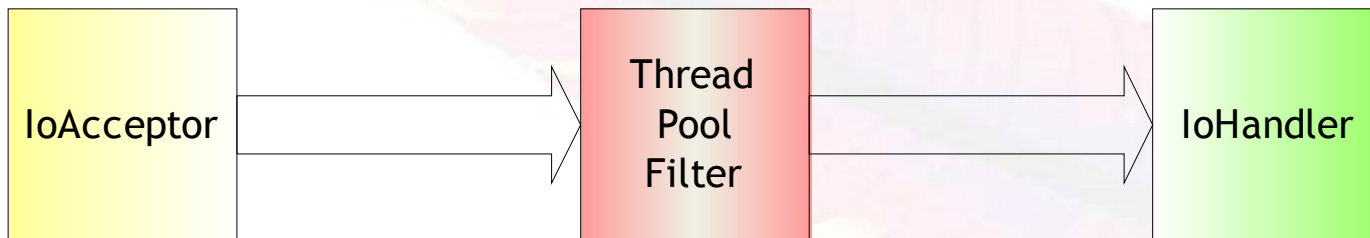
- An event & request interceptor
 - Reusable
 - Hot-deployable
- SSL · TLS
- Thread pool
- Performance profiler
- Lightweight firewall
- Logger
- Overload detector
- Traffic shaper
- Authorization

ThreadPoolFilter

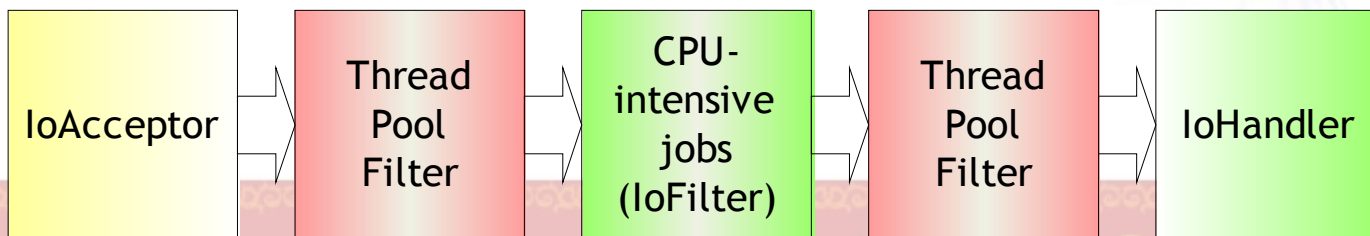
No thread pool: single thread setting for minimal latency



One thread pool: general setting for high throughput



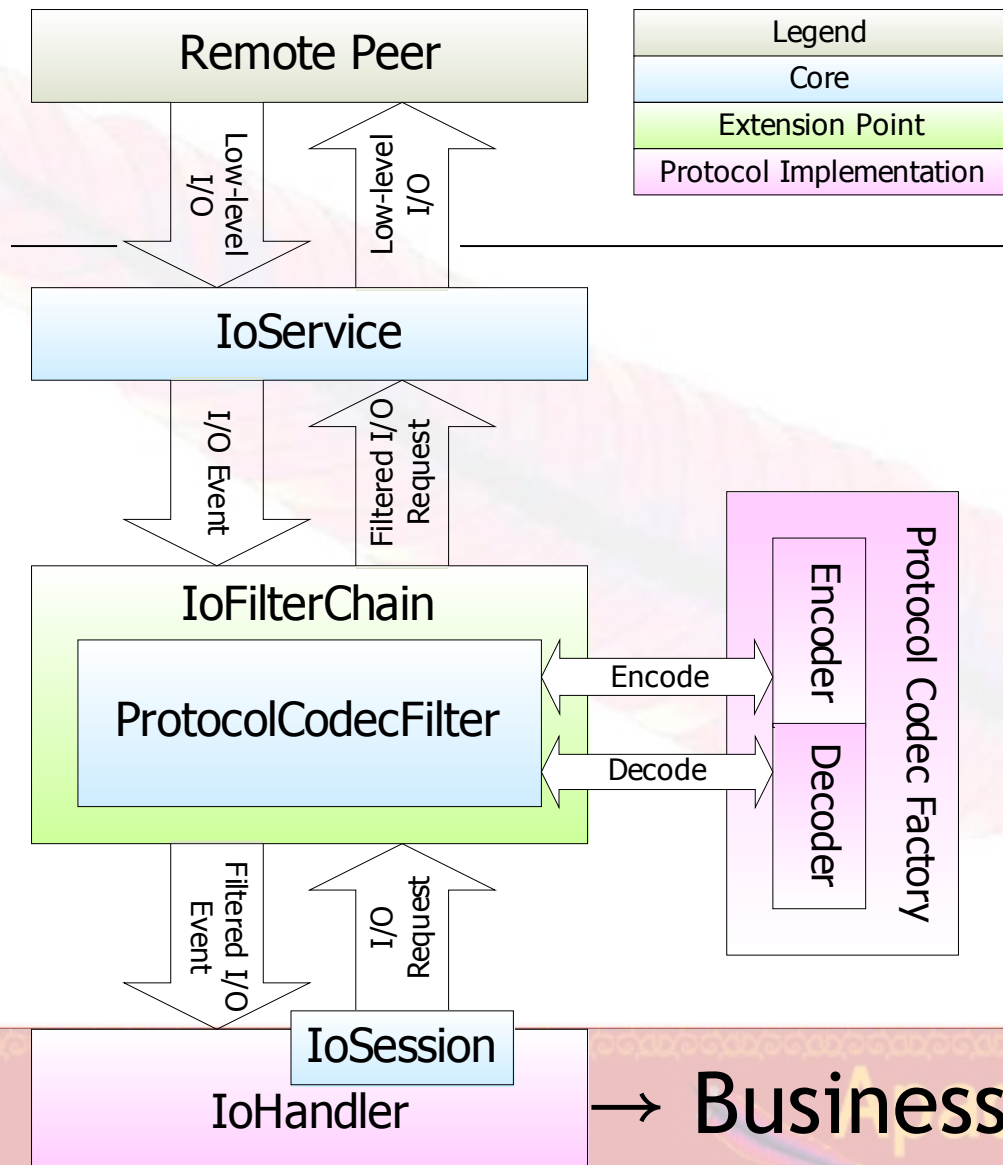
More than one thread pool: special setting for CPU-intensive jobs



ProtocolCodecFilter

- Clear separation and reusability
- Business logic - `IoHandler`
- Protocol codec - `ProtocolCodecFilter`
 - Object serialization
 - Text line

ProtocolCodecFilter



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**

Agenda: Demonstration

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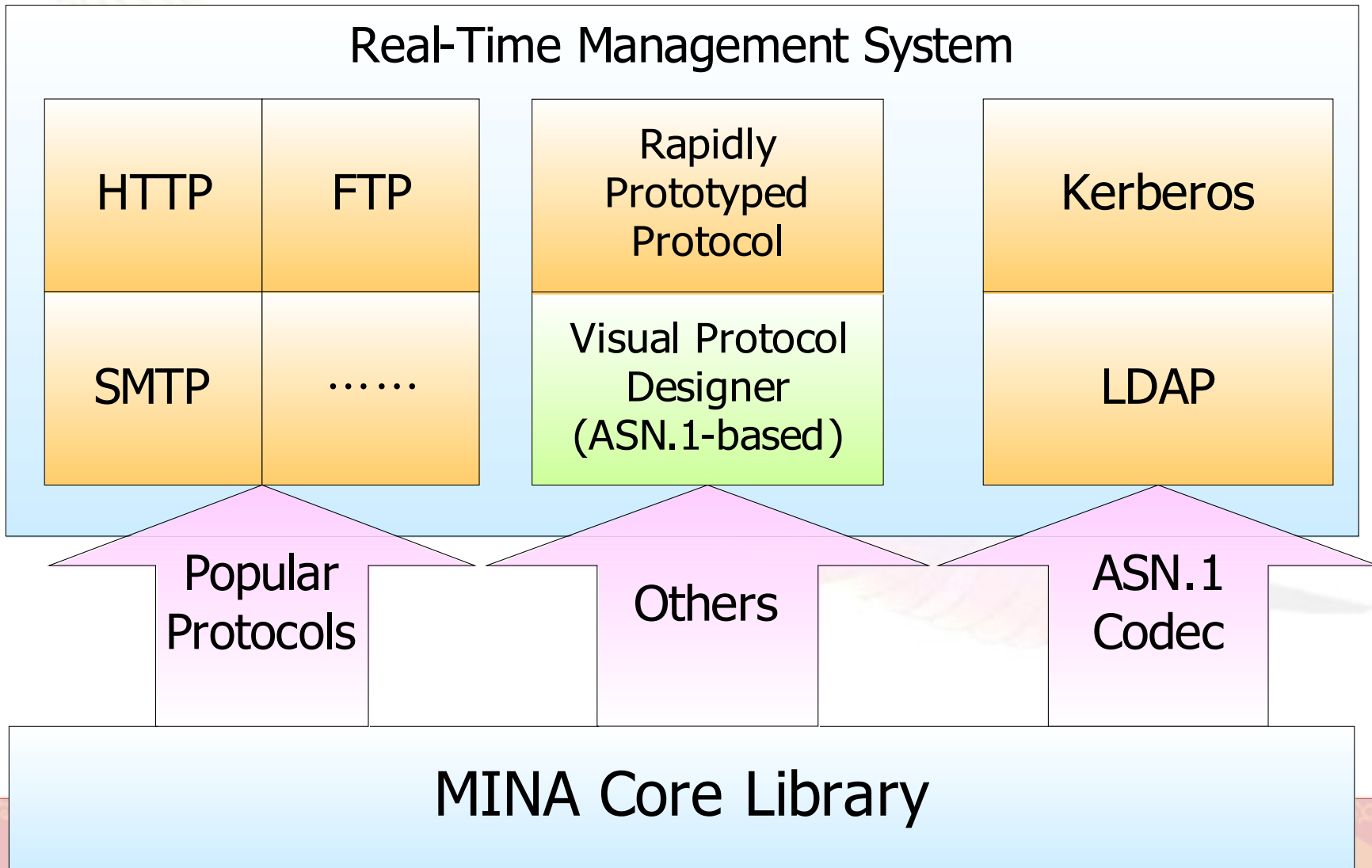
Reverse Echo Server

- Echo server which reverses a line
- Using a built-in text line protocol codec in MINA

Agenda: Future

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- **Future**
 - MINA as a Platform
 - Real-time Management
 - Participation
- Conclusion

MINA as a Platform



Real-Time Management System

- A universal management view
- JMX console and Web browser
- Real time access
 - Server traffic
 - IoFilter Hot-deployment
 - 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?
- Your feedback is our blood!
 - Ask questions
 - Criticize design flaws
 - Report bugs
 - Publish performance test results

Agenda: Conclusion

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Conclusion

- MINA is...
 - A network application framework for...
 - Productivity
 - Performance
 - Stability
- MINA will be...
 - Full-featured dev. & mgmt. platform for network applications

Resources

- Homepage
 - <http://directory.apache.org/subprojects/mina/>
 - More useful examples
- Mailing List
 - mina-dev@directory.apache.org

Thank You!

Q & A

