WorkShop 2015:
Using OpenSSL to boost TLS performance with Apache Tomcat

Agenda

- **Introduction.**
- **Overview of Problem.**
- **Tomcat-native and Netty.**
- **Work to do.**
- **Q & A.**

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Who I am

- **Red Hat employee**

    www.redhat.com

- **Tomcat committer**

    tomcat.apache.org

- **In Neuchatel Office**

Tomcat and Netty

TOMCAT

NIO2

JSSE

NETTY

NETTY-TCNATIVE ◁ fork TC-NATIVE
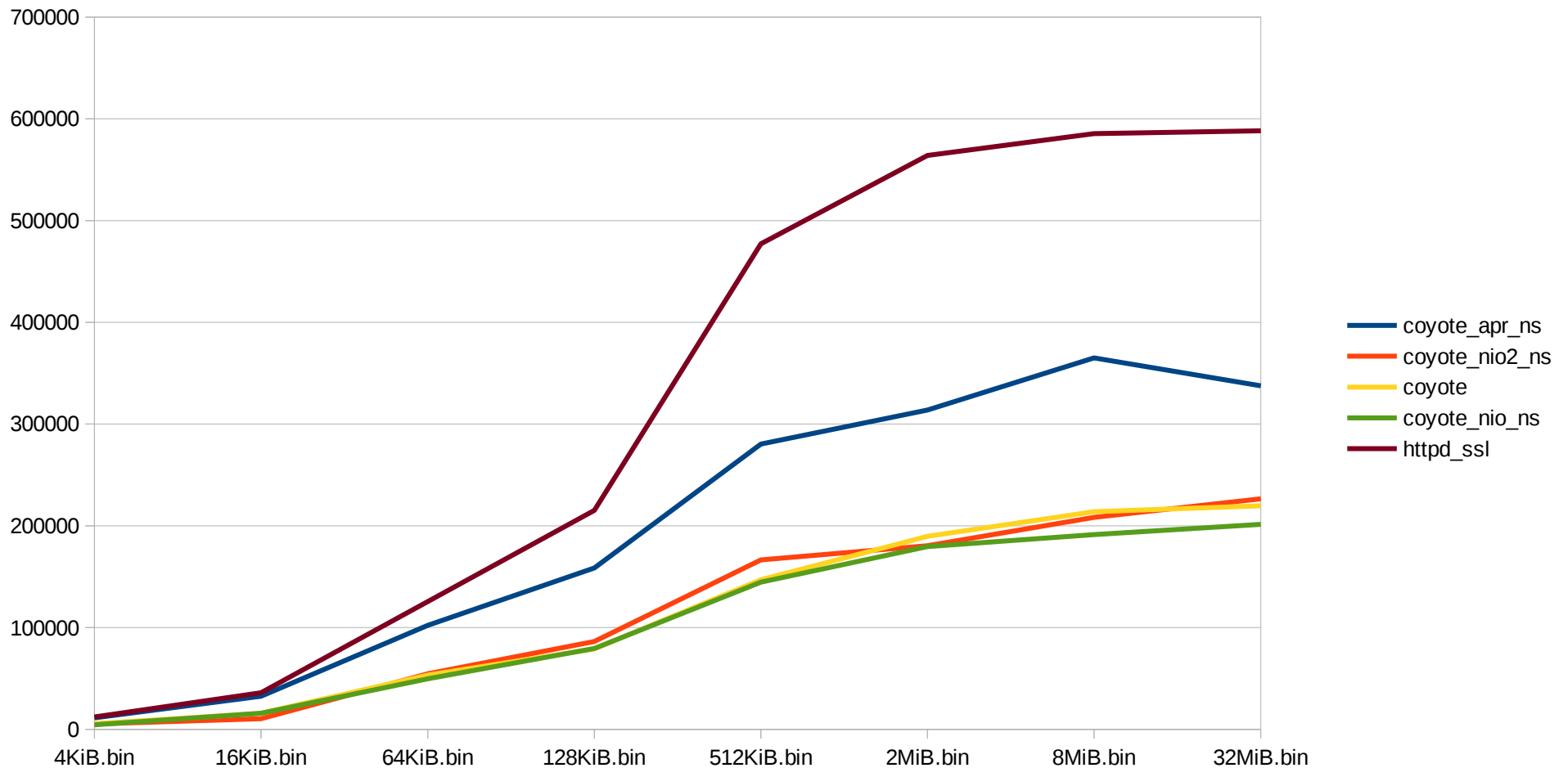
OPENSSL

TOMCAT

APR

OPENSSL

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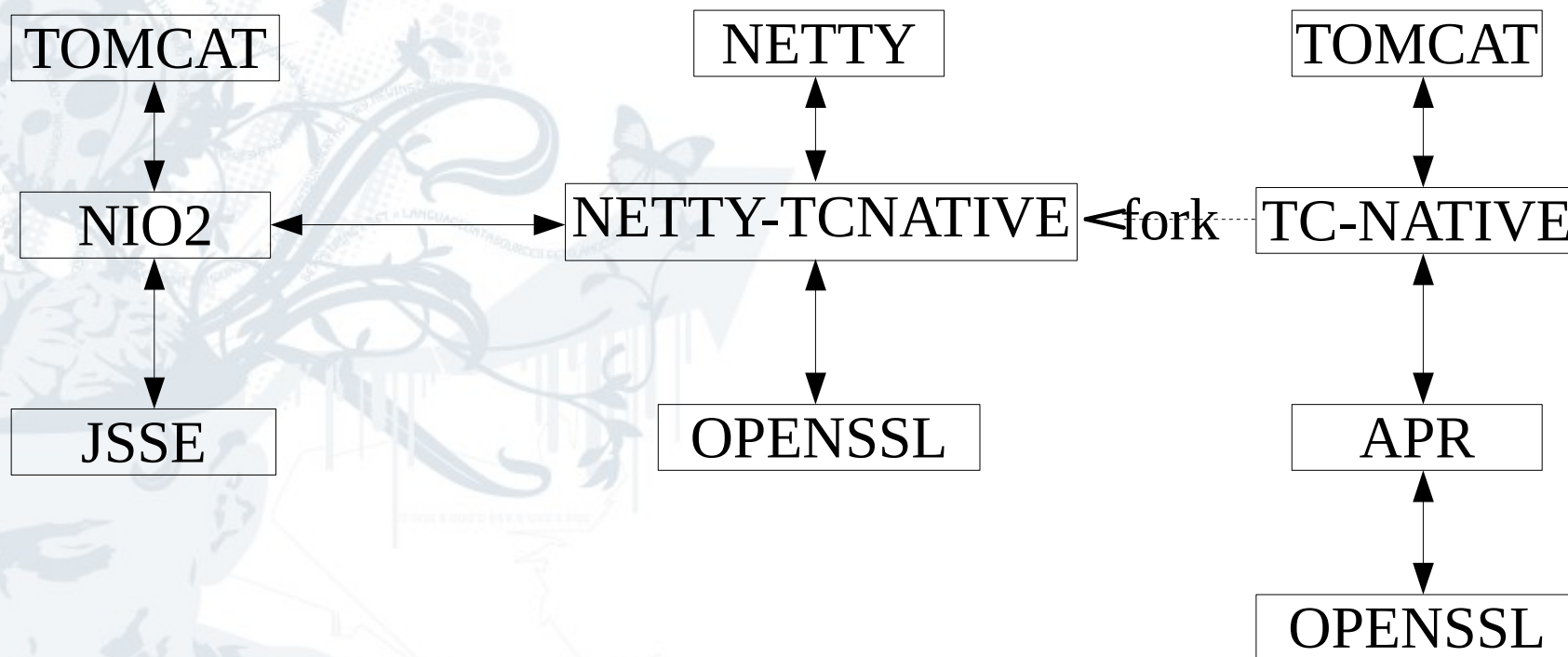
Problems:

- ## Netty:
  - A lot of dependencies
  - A fork of an ASF project
  - Works only in Netty

- ## Tomcat + Native
  - Needs a special connector
  - A lot of C code
  - Works mostly in Tomcat

- ## Tomcat + JSSE:
  - Lower performance

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SSL Connector Throughput (c4)

Legend:
- coyote_apr_ns
- coyote_nio2_ns
- coyote
- coyote_nio_ns
- httpd_ssl

X-axis: 4KiB.bin, 16KiB.bin, 64KiB.bin, 128KiB.bin, 512KiB.bin, 2MiB.bin, 8MiB.bin, 32MiB.bin

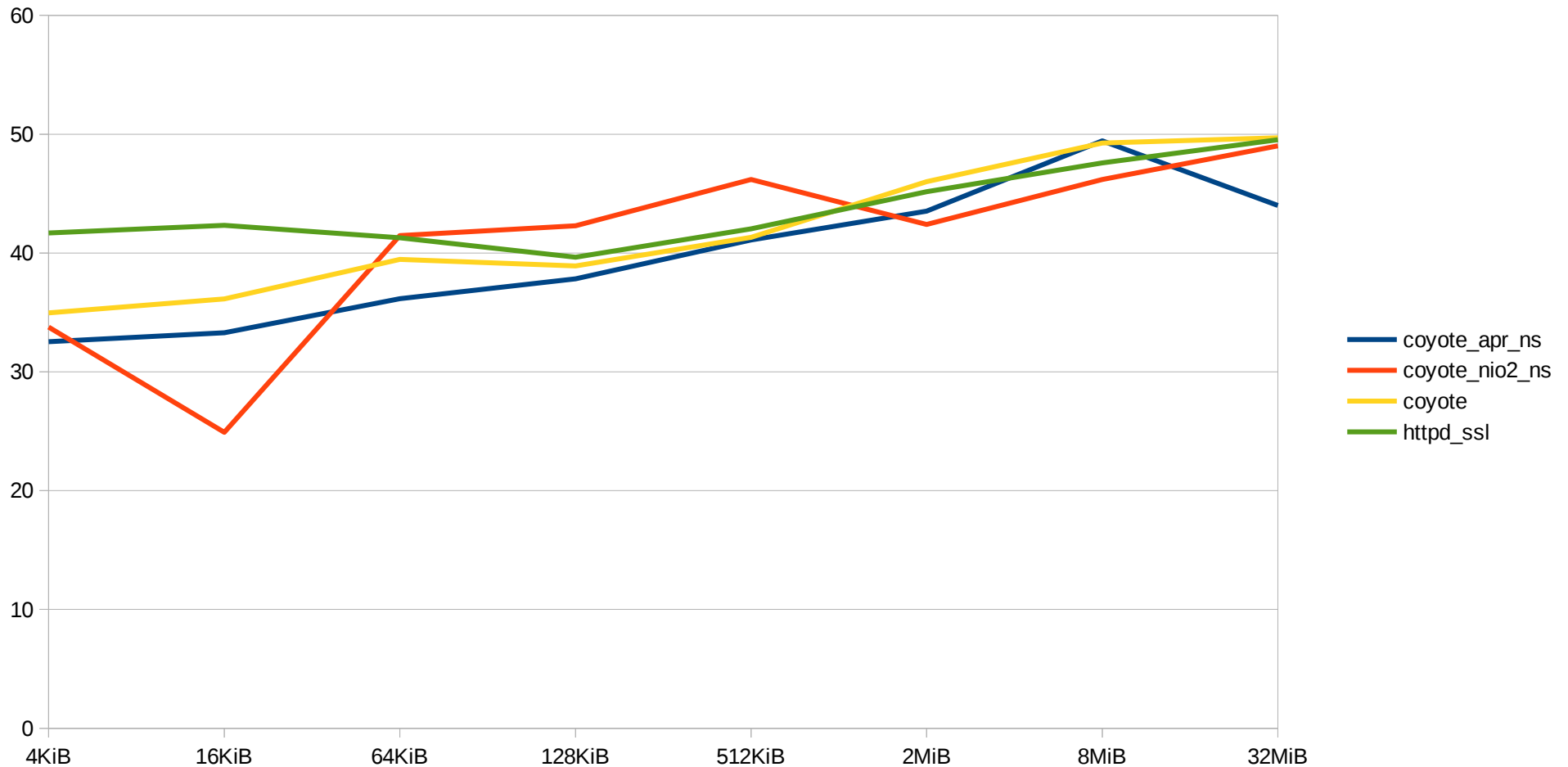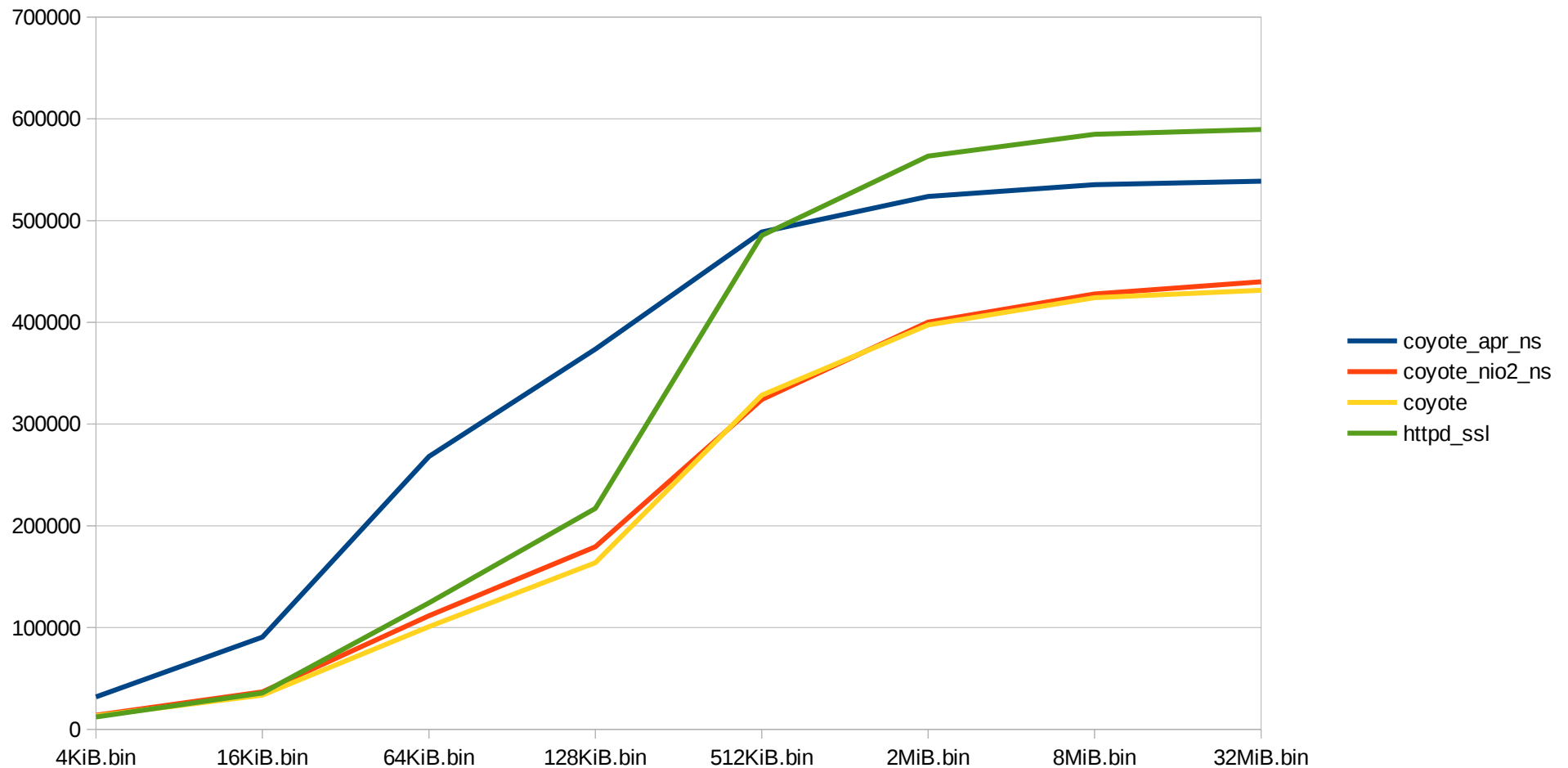Y-axis: 0 to 700000

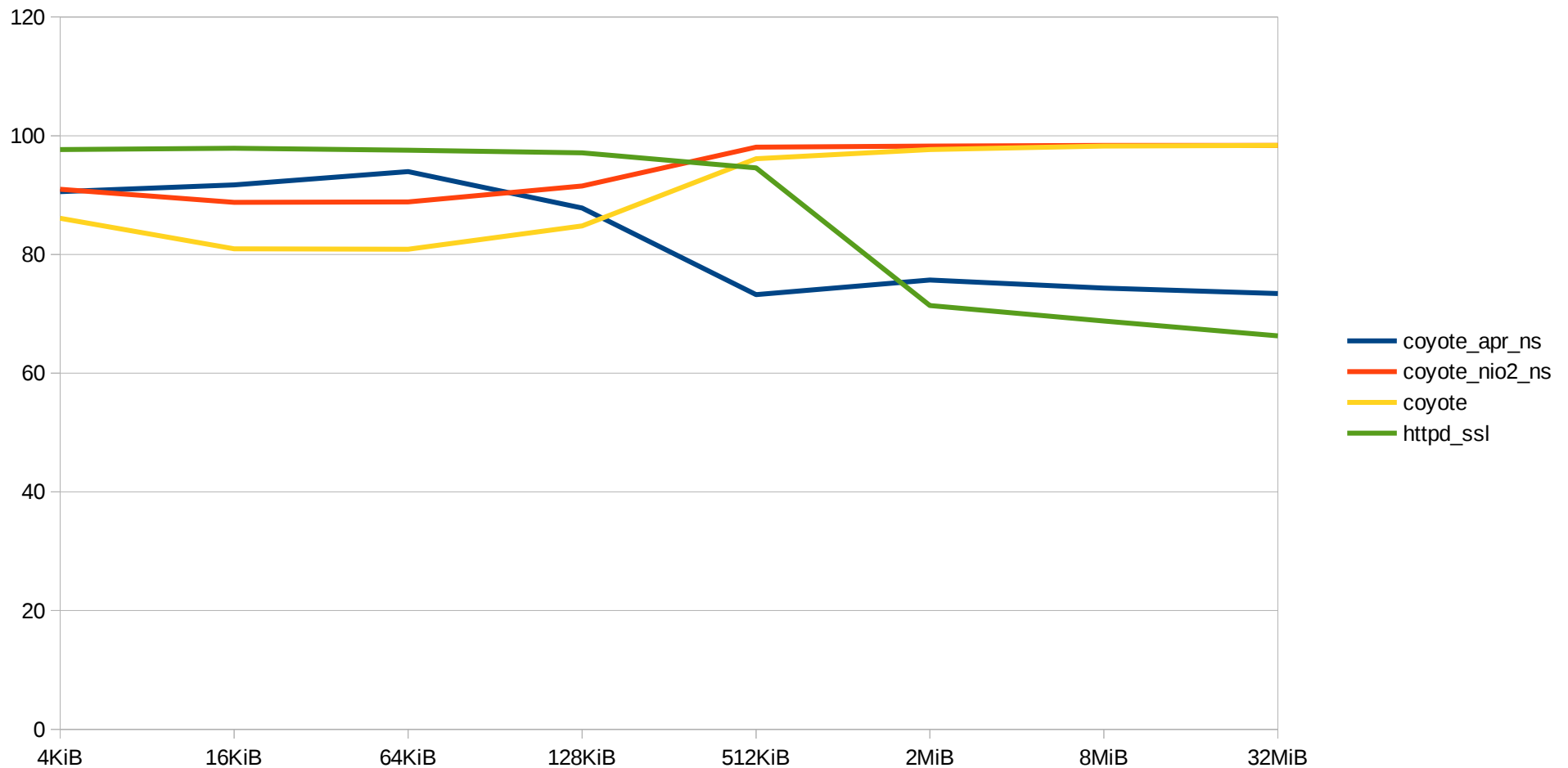# SSL Connector CPU Use (c4)

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SSL Connector Throughput (c40)

SSL Connector CPU Use (c40)

Work to do

- **Study the actual code:**
    - **Netty-TCnative**
    - **Tomcat native**
- **Code to write:**
    - **a layer to use the native part of Netty-TCnative directly with Tomcat NIO2 connector or a small test server.**
- **Validation:**
    - **Run performance tests.**
        - **AB (Apache Bench) or improve one.**
    - **Analyze and comments.**

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Goals

- ## Have something like:

  – **org.apache.tomcat.util.net.jsse.JSSEImplementation**

  – **As openssl.OpenSSLImplementation for example**

- ## Called from:

  – **org.apache.tomcat.util.net.SSLImplementation**

- ## Mostly java:

  – **The C code is already available**

  – **extent the SSLContext to use the OpenSslEngine from netty**

  – **And load it from the new openssl.OpenSSLImplementation**

  – **Targeted platform: Linux**

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Useful information

- **Tomcat:**
  - **https://github.com/apache/tomcat**
  - **https://github.com/apache/tomcat-native**
- **Netty:**
  - **https://github.com/netty/netty-tcnative/**
    https://github.com/netty/netty
- **OpenSSL:**
  - **http://openssl.org/**
- **Apache Httpd (for AB):**
  - **http://httpd.apache.org/**
  - **Usually included in Linux distros**

For more info:

- Main sites:
    - Oracle
    - https://github.com/netty
    - http://tomcat.apache.org
    - Links to docs, downloads, forums, dev lists, etc
    - Mail: jclere@redhat.com
- Questions?

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