

# Internet2 Summer of Code 2005 Report

Stanislav Shalunov <shalunov@internet2.edu>

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## Summer of Code 2005

- Program funded by Google (\$2M)
- Supported students who worked on open-source projects (\$4500/student)
- 400 students were selected
- Each student was required to have a mentoring organization
- 40 mentoring organizations, Internet2 being one of them
- Internet2 got 10 slots in the program

## **What Internet2-mentored students worked on**

- Mostly transport-related things (<http://transport.internet2.edu/>)
- Two projects to build a TSC-based timekeeping library
- Two projects to characterize internal delays
- Three projects to work on the transport tool
- Two projects to work on thrulay
- One project to build a Gaim plug-in
- 8 successes, 2 failures

## **Gaim plug-in**

**Student:** Salony Agrawal

**Mentor:** Ben Teitelbaum

**Synopsis:** Developing a Gaim plug-in for rich presence

**Status:** Failure

## **fb-fr-ccp.sourceforge.net**

**Student:** Ivan Beschastnikh

**Mentor:** Stanislav Shalunov

**Synopsis:** Frame Based, Functionally Reliable, Congestion Controlled Protocol

**Status:** Success, work to continue

**Accomplishments:** ● Protocol specified

- Bulk transport API implemented
- Preliminary implementation (no congestion control)
- Unit tests for the various layers

## **btap-scho.sourceforge.net**

**Student:** Roy Ho

**Mentor:** Stanislav Shalunov

**Synopsis:** Implementing bulk transport API on top of UDT

**Status:** Success

**Accomplishments:**

- Implement bulk transport API on top of UDT
- Several congestion control protocols implemented

# **fasttime.sourceforge.net**

**Student:** Alex Holkner

**Mentor:** Stanislav Shalunov

**Synopsis:** TSC-based timekeeping library

**Status:** Success

**Accomplishments:**

- Read TSC on various architectures
- Daemon that maintains conversion tables
- Clients read TSC and use conversion tables to derive time
- Feedback loop
- Data collected, coefficients tuned

## **btapi-kr.sourceforge.net**

**Student:** Krishna Rajagopalan

**Mentor:** Stanislav Shalunov

**Synopsis:** Implementing bulk transport API on top of UDT

**Status:** Success

**Accomplishments:**

- Implement framing, including datagram support
- Implement bulk transport API on top of UDT

# thrulay-hd.sourceforge.net

**Student:** Huadong Liu

**Mentor:** Jeff Boote

**Synopsis:** Enhancements to thrulay

**Status:** Success

- Accomplishments:**
- Go over pending FIXME comments in thrulay
  - Implement everything in TODO list (TOS setting, MTU reporting, multiple streams, Solaris support, authorization, etc.)
  - Implement an API for testing

## **tsc-xluo.sourceforge.net**

**Student:** Xun Luo

**Mentor:** Jeff Boote

**Synopsis:** TSC-based timekeeping library

**Status:** Success

**Accomplishments:**

- Daemon that maintains conversion tables
- Clients read TSC and use conversion tables to derive time
- Feedback loop
- Windows support

## **thrulay-ng.sf.net**

**Student:** Bernhard Lutzmann

**Mentor:** Jeff Boote

**Synopsis:** Enhancements to thrulay

**Status:** Success

**Accomplishments:**

- Go over pending FIXME comments in thrulay
- Implement everything in TODO list (TOS setting, MTU reporting, multiple streams, Solaris support, authorization, etc.)

## **heterovoip.sourceforge.net**

**Student:** Cesar Marcondes

**Mentor:** Stanislav Shalunov

**Synopsis:** Delay noise characterization

**Status:** Success

**Accomplishments:** • Build testbed

- Instrument Linux and FreeBSD kernel for internal delay break-down (IP and UDP queues are separate)
- Conduct experiments with varying conditions
- Collect and start analyzing data

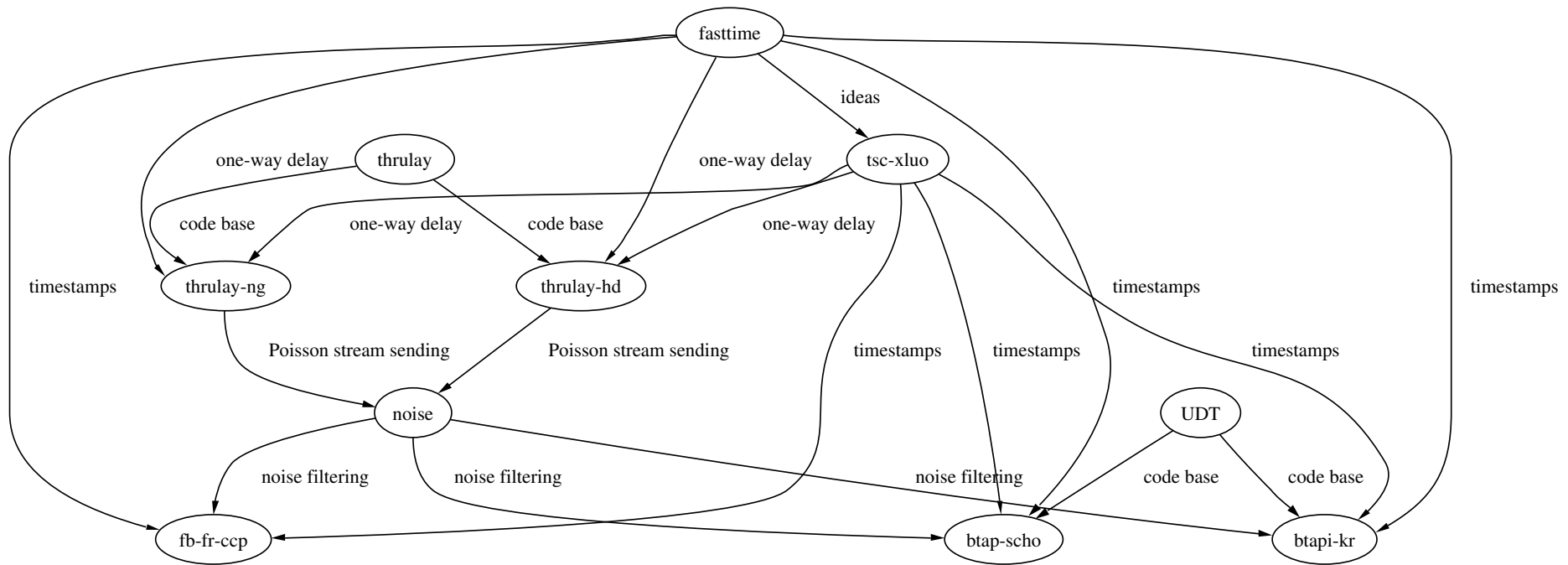
**Student:** Le Xuan Thao

**Mentor:** Stanislav Shalunov

**Synopsis:** Delay noise characterization

**Status:** Failure

# Project dependency graph



## Next steps

- Release next version of thrulay based on thrulay-ng
- Merge thrulay API from thrulay-hd into the main branch
- Decide how to proceed with TSC timekeeping projects
- Work on making noise characterization into a paper
- Implement congestion control in fb-fr-ccp
- Better modularize future development of fb-fr-ccp
- Submit articles to Dr Dobb's Journal