COMCAST | TECH RESEARCH + DEVELOPMENT GRANTS

Comcast Technology Research & Development Fund

2013 Annual Report

Summary of the Fund's First Operating Year

EXECUTIVE SUMMARY

2013 was the inaugural year for the Comcast Technology Research and Development Fund (Tech R&D Fund).

As a leading innovator in Internet, video, and communications services, Comcast has a long history of investing in programs that support both technical research and open source development. We launched the Tech R&D Fund to increase our commitment to leadership in innovation. .

In today's competitive marketplace, no company can thrive without making significant investments in the future. In addition, many of the future innovations we will deliver to our customers will derive from ideas and research that originate outside of our company. Thus, to continue our support for R&D and to support the best R&D talent wherever it may reside, the Tech R&D Fund is intended to supercharge these third-party research and development efforts.

In 2013, the Tech R&D Fund has provided new resources to leading and emerging researchers to engage in long-term research into technologies and applications that are of mutual interest to Comcast and the research community, as well as provide funding for open source software development.

We are continuing with the Tech R&D Fund in 2014, and are currently accepting grant proposals at http://techfund.comcast.com.

CONSIDERING GRANTS

The process to accept and review grant applications was designed to be quite simple. Applications are made via the Tech R&D Fund's web site[1]. Our grant coordinator then performs an initial review to ensure completeness of the application, to flag applications that are likely out of scope, and to identify whether we will need to assign a subject matter expert (SME) to review and as appropriate engage with the researcher.

We have several categories of grants that we consider: General Research Grants, Targeted Research Grants, and Targeted Open Source Development Grants

GRANTS AWARDED IN 2013

Apache Android Development

Oleg Kalnichevski

Grant Type: Open Source Development

Description: Develop an Android optimized version of an Apache HTTP Client based on the latest official release that: retains full backward API compatibility with the Google internal fork while upgrading implementation classes to the latest release of the official version, provides a full API with the stock version of an Apache HTTP Client, makes selective use of Android specific features that are not available in the context of Java

[1] http://techfund.comcast.com/index.php/apply

Standard Edition, avoids creating a fork of the main code line. Users and developers of the Android platform would benefit from having a better, more feature full implementation of an Apache HTTP Client available for Android. It would also serve to keep the Android platform more open and diverse.

Dissect Cyber

April Lorenzen

Grant Type: Open Source Development

Description: Continue work on a malicious DNS detection tool named Mal4S**.** This tool has been developed and is in course of initial trials. It has been released to an open source repository. It is also being offered to researchers on a number of anti abuse working lists. There is a video online about it at https://vimeo.com/84083759. The tool was presented at a MAAWG meeting in San Francisco, in February 2014.

Bucknell University

Design and Implementation of a Home Load Management System

Grant Type: General Research

Description: Design a home microgrid with smart metering and load management. A home microgrid is a system that manages both load and generation sources in a smart home. As we continue to push the limits of technology further, our power grid is struggling to keep up with the technological advances. We are designing a home microgrid, which is the future of smart grid technology. A microgrid that has a generation source and loads will also need smart metering and load management to be stable. This system will be introduced to help a homeowner identify large drains of power in the home and control these electrical loads to lower energy costs and waste.

Clemson University

Understanding and Optimizing Dynamic Adaptive Streaming Over HTTP (DASH)

Grant Type: General Research

Description: Develop, evaluate, and make available to the community an implementation of DASH that addresses the optimization problem. The project includes a user study using the experimental DASH system allowing us to fine tune the algorithm to maximize user perceived QoE. We also will show how well the adaptation algorithm scales to support higher bit rate video (e.g., 4K). The researchers extended the VLC open source video streaming player to support the latest version of DASH; a prior DASH VLC plugin did not support the latest DASH standard. They will contribute this to the VLC community in early 2014 and have teamed with faculty from Clemson's Human Centered Computing (HCC) Division for the user study part of the project.

Cooperative Association for Internet Data Analysis (CAIDA) – University of California, San Diego Supercomputing Center

Monitoring and Visualizing Internet outages

Grant Type: General Research

Description: We propose to extend our measurement and analysis of Internet outages, focusing on geographical coverage and interactive (near real-time) visualization of such

events. The main goals are to improve the temporal and spatial granularity, as well geographic coverage of measurements, as well as develop new visualization techniques and interactive interfaces.

DNSmasq

Simon Kelley
Grant Type: Open Source Development
Description: DNSmasq is the DNS and DHCP server used in the majority of consumer-grade home gateways (routers). For IPv4, it is mature software with more than 10 years of releases. For the past year, there has been a campaign to extend DNSmasq to allow it to fill the same niche in IPv6-capable systems. This grant is in support of that work. In addition, work will be performed to include DNSSEC validation, with version 2.69 as the first release with DNSSEC.

Effect of Poverty on Internet Usage Study

Dr. John Horrigan, Ph.D.
Grant Type: Targeted Research
Description: Using a survey conducted by Princeton Research of people who have recently adopted Internet access , this study will identify the complex socio-economic factors that drive low-income families who don't adopt broadband Internet to do so, and determine the pathways that lead them to becoming engaged users of the Internet. The research will create a playbook of five strategies to enhance adoption and utilization that can be used by other entities working to address the adoption gap.

Georgia Institute of Technology BISmark Safe Zone

Nick Feamster
Grant Type: General Research
Description: BISmark is an experimental router deployment using small modified home gateways (routers) to place experiments in homes and small businesses to examine aspects of home router and network usage. Amongst the experiments deployed is Safe Zone (SAZO), which is an anti-malware experiment allowing customers and end users to get a more accurate view of infections on their home networks.

Georgia Institute of Technology

DNS Changer
Grant Type: General Research
Description: DNS Changer Study
Status / Outcome: This study has been referenced in a number of further papers including the supporting documentation for US anti-bot code, the "ABCs for ISPs", and shows that notification to customers of bot infection does have an effect on their propensity to clean up infections. This supported presentation of the DNS Changer study at a MAAWG meeting by two Georgia Tech Students.

Jepson Database Failure Mode Test Tool

Kyle Kingsbury

Grant Type: Open Source Development

Description: The author has built a system called Jepsen, which causes network partitions and other failures in distributed systems, and written code which analyzes the safety properties of operations during those failures. This grant provides support for the development of version 2 of Jepsen. It will also encompass analysis of additional databases; likely Datomic, RabbitMQ, Etcd. The system was renamed Knossos and there are a number of additional databases that have been tested.

M3AA Foundation

Messaging, Malware and Mobile Anti-Abuse Foundation

Grant Type: General Research

Description: The M3AA Foundation provides anti-abuse training for emerging economies, especially where significantly more bandwidth has been provisioned as a result of new undersea cable systems and other infrastructure enhancements. So far, several training sessions have been run, training over 150 administrators, regulators and others from emerging economies. This includes work with the Internet Society, the African Telecommunications Union in Nairobi, and the U.S. Telecom Training institute in Washington, D.C.

Georgetown University

Security & Software Engineering Research Center (S2ERC)

Grant Type: General Research

Description: Participate in projects of interest in the security sphere, including investigating security incident data sharing protocols and trying to establish a taxonomy for data sharing.

SIGCOMM

2013 Annual SIGCOMM Conference

Grant Type: General Research

Description: Co-sponsor of SIGCOMM, a leading networking research conference.

Skynav

Closed Captioning & Accessibility Software

Grant Type: Open Source Development

Description: Create and integrate support for W3C TTML (Timed Text Markup Language), in accordance to a selected profile such as SMTPE-TT or SDP-US, into the WebKit and/or Blink open source projects.

Temple University

Government-University-Industry Research Roundtable (GUIRR)

Grant Type: General Research

Description: This organisation is a public / private / academic body addressing potential research issues, Recent workshops have discussed physical infrastructure

investment (e.g. roads, bridges, and airports) and how to get third parties to focus on the need for such infrastructure, as well as on issues related to broadband adoption.

University of California, Los Angeles (UCLA)

Named Data Networking
Grant Type: General Research
Description: This project will develop tools and provide support for the open source community to build innovative content-centric applications on an exciting new research platform: Named Data Networking (NDN). NDN offers a revolutionary shift in the fundamental architecture of the Internet from host-centric to content-centric, while functioning over IP to support experimentation today.

University of Connecticut

Center for Hardware Assurance, Security, and Engineering (CHASE) Research
Grant Type: General Research
Description: Support for CHASE at the University of Connecticut. Work is being done on devising technology to support more secure computing and networking hardware.

Universidad Politecnica de Madrid

DNS Traffic Research
Grant Type: General Research
Description: Seek a better understanding of current DNS traffic patterns observed at large DNS recursive resolvers, typically located at large Internet Service Providers.

Villanova University

IPv6 Research
Grant Type: Targeted Research
Description: Continuing work on IPv6-related projects