

seL4 Center of Excellence (CoE) Management & Transition

**First Annual seL4 Summit
Dulles Airport Hilton, Virginia
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Presentation Outline



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- Who we are
 - Griffiss Institute
 - Cyber Research Institute (CRI)
- seL4 Center of Excellence (COE)
- Governance & Sustainability
- Way Forward

Griffiss Institute



- An independent 501(c)(3) entity
- Established in 2002 with NY State funding to bring together AFRL/RI, Industry and Academia to facilitate and grow the technology base of the region

Today, making major impacts in **technology transfer, training & education,** and **economic development** in the Mohawk Valley Region

Griffiss Institute (GI)



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WHAT WE DO:



PARTNERSHIP INTERMEDIARY WITH AFRL/RI

- Technology Transfer
- Specialized Training & Education
- Educational Outreach (STEM)
- Innovation Concepts
- Commercialization Academy

VISITING FACULTY PROGRAM

STUDENT INTERN PROGRAM

NYS CERTIFIED BUSINESS INCUBATOR

- Collaborative Laboratory Workspace
- 10 – 100 GB Research Network
- Facilities Rental

CENTER FOR TRAINING & EDUCATION

- Custom Courses
- Pearson VUE Testing Center
- Conferences, Seminars & Workshops



Cyber Research Institute (CRI)

Promoting Federally-Funded Research for Public Benefit

Charter: 501(c)(3) Nonprofit

Mission:

- **Promote common goals of public and private investment in cyber security and related information- and data-intensive systems**
- **Provide multi-disciplinary scientific research for government and industry (cyber-security, C4ISR and related topics), for public benefit**
- **Provide trusted consulting and subject-matter expertise for public and private R&D programs**



Vision: seL4 Center of Excellence



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- Training & Certification
 - On-line training, on-site training, and seL4 *certification(s)*
- Development Center
 - Maintain U.S. based seL4 kernel and application source code (e.g., U.S. and DoD Private components)
 - Enforce disciplined development
 - Provide guidance for community coding practices
- Innovation Center
 - Focal point for bringing new ideas to the seL4 community
 - Invite experts and stakeholders
 - Create a roadmap for future projects
- Outreach Program
 - Bolster the academic and R&D community exposure and support
 - Advocate adoption of seL4 framework

What constitutes success?



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Candidate CoE Success Measures

- Contributors
- Developers trained and certified
- Users and downloads
- New applications / components
- Code stability and bug reports
- Projects impacted
- Papers published
- Others?

We need input from the stakeholder community.

CoE Governance



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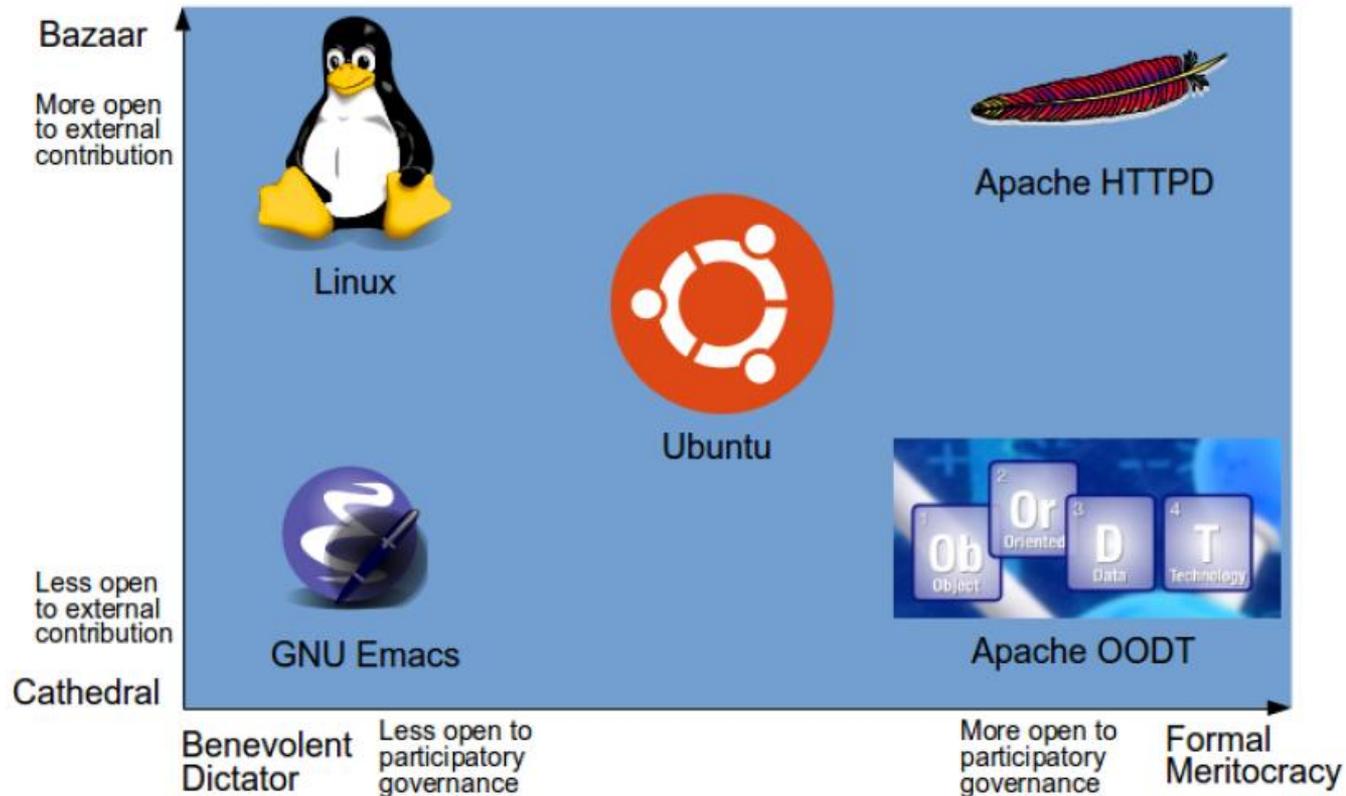
- **Governance**
 - The process by which the project makes decisions regarding strategy, releases, direction, and development priorities
 - A governance model describes the roles that project participants can take on and the process for decision making...
- **Example Open Source Governance Structures**
 - **Benevolent Dictator for Life (DBFL)** – one person has final say on all major project decisions (e.g., Python)
 - **Meritocracy** – active project contributors (those who demonstrate “merit”), are given a formal decision making role, typically by vote (e.g., Apache Foundation)
 - **Liberal contribution** – people who do the most work (current contribution) have the most influence; decision made via consensus seeking rather than pure voting (e.g., Node.js and Rust)

<https://www.linuxfoundation.org/>



Governance & Contribution Models

Governance models vary widely, no single model inherently better than others.



Ref: <http://oss-watch.ac.uk/resources/governancemodels>; last updated 13 Nov 2013.

Roles



What analogies can we draw for the CoE, from the typical roles within an open source project:

- **Leader:** At a minimum, there should be someone responsible for making the final decision about features, releases, and other activities. ...there may be one or more committees responsible for various aspects of a project, like the Core Technical Committee that governs the Node.js project.
- **Maintainers:** Most leaders delegate some of the decisions to people who are responsible for maintaining specific parts of the project, ...
- **Committers:** Some projects also have groups of people who have contributed to the project and are considered reliable and responsible enough to be allowed to commit directly to all or some parts of the project, rather than having to submit to a maintainer for review. Contributions from committers are still subject to review by maintainers or project leaders and may be reverted if there are any concerns about the contribution.
- **Contributors:** Many people contribute to open source projects with code, documentation and other contributions. These contributions are usually subject to a review from an experienced committer and / or maintainer before the contributions are included.
- **Users:** The most important group of people in an open source project is likely to be the ones who actually use the product, since users give the project a purpose and help it grow. These valuable members of the community can provide feedback about features, bug reports and more.

<https://opensource.guide>

Example: Node.js “Foundation Model”



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- Node.js is a JavaScript runtime built on Chrome’s V8 JavaScript engine.
- The largest ecosystem of open source libraries in the world. ...designed to build scalable network applications.
- The Node.js Foundation’s mission is to enable widespread adoption and help accelerate development of Node.js and other related modules
- Today, there are over a dozen working groups, 18 members of the Technical Steering Committee, and more than 2,000 contributors

<https://foundation.nodejs.org/about>

Node.js Foundation Governance



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Governing Board of Directors composed of representatives from corporate members, a representative of the Technical Steering Committee, and representatives elected by the individual membership class.

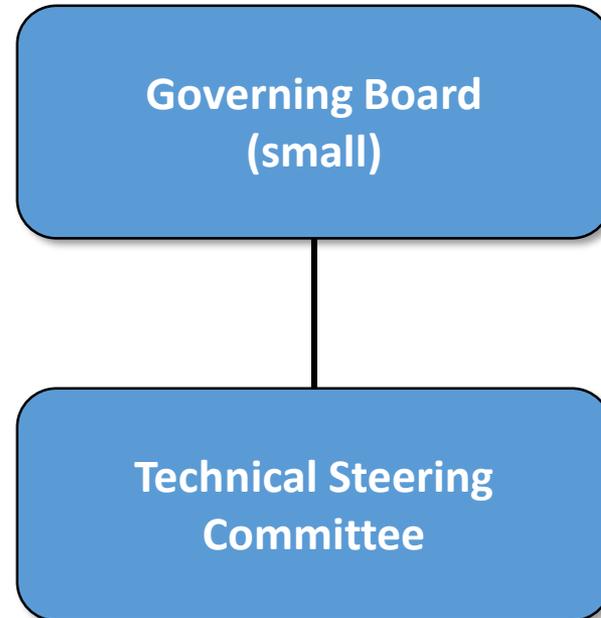
Technical Steering Committee (TSC) is the technical governing body of the Node.js Foundation.

- Managing code and documentation creation and changes for the listed projects and resources
- Setting and maintaining standards covering contributions of code, documentation and other materials
- Managing code and binary releases: types, schedules, frequency, delivery mechanisms
- Making decisions regarding dependencies of the Node.js Core project, including what those dependencies are and how they are bundled with source code and releases
- Creating new repositories and projects under the nodejs GitHub organization as required
- Setting overall technical direction for the Node.js Core project, including high-level goals and low-level specifics regarding features and functionality
- Setting and maintaining appropriate standards for community discourse via the various mediums under TSC control
- Setting and maintaining governance rules for the conduct and make-up of the TSC, Working Groups and other bodies within the TSC's domain

CoE Governance

An Initial Recommendation

- Nonprofit foundation model to start, modeled after Node.js Foundation
- Small Governing Board composed of representatives from Government, Industry, and Academia
- Larger technical steering committee, membership based on level of interest, availability, and expertise
- Evolve structure and procedures as appropriate



Governance model is till a work in progress.

CoE Sustainability



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- Sustainability models
 - Government sponsorship
 - Foundation model
 - Commercial Offering (e.g., Red Hat or Ubuntu model)
- Other candidate sources of Revenue
 - Training fees
 - Conference fees
 - Membership on Boards
 - Value added services

*A wide variety of business strategies can be employed to generate revenue: software support, software services, SaaS, Ad Ware, Consulting, Proprietary software, premium software, dual licensing, ...

“Open source isn’t a business model, it’s a marketing strategy.” Forbes.com, Sep 2018.

*OpenHealthNews, Groen and Maduro, Dec 2012.

Moving Forward



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Over the next twelve months:

- Formalize a CoE governance model, charter, governing documentation, and membership
- Stand up an initial *Development Center* to address the needs of DoD stakeholders (as a minimum)
- Academic outreach
 - AFRL-funded summer faculty researchers
 - Open computing environment and repository of tools
- Explore options for generating revenue: self-sustainment goal

Sponsored Research Opportunity

AFRL 2019 Summer Research Program



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- 8-12 weeks on-site (AFRL/RI - Rome NY)
- Summer Faculty Fellowship Program (SFFP)
 - AFOSR Funded / Application deadline **30 Nov 2018**
- Visiting Faculty Research Program (VFRP)
 - Funded by AFRL/RI / Application deadline **11 Jan 2019**
- AFRL/RI Topics in Cyber Science & Technology
 - **Cyber Defense Research**, Advisor: E. Paul Ratazzi
 - **Formal Methods for Complex Systems**, Advisor: Dilia Rodriguez
- Administered by AFRL/RI **Information Institute**

<https://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/836756/>

Email: rrs.iweb@us.af.mil

Summary



- CoE (as envisioned) is an element of the ecosystem to promote and support wider adoption of seL4 and leverage development across stakeholder communities
- Governance and structure of the CoE is in a formative stage, driven by community interest and constraints
- Questions or recommendations?
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 - <https://www.griffissinstitute.org/>