Open Source in Universities

Case Studies from the Coal Face

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OSPO Director
Trinity Research & Enterprise

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Who am I?

- Currently ICT Commercialisation Manager at Trinity College

- BSc in Applied Physics and Electronics, and PhD in Geophysics

- Founder of 3 tech start ups, 2 of which raised 7 figure venture capital rounds and 1 of which Alatto traded for 9 years with sales averaging over €1m per year

- While In Trinity I set up and ran Trinity College's start-up accelerator LaunchBox.

- While Executive Director of Blackstone LaunchPad at Trinity I designed and secured European funding to implement Trinity's Connected Health accelerator "Validator".
- Set up Open Source Programme Office (OSPO)
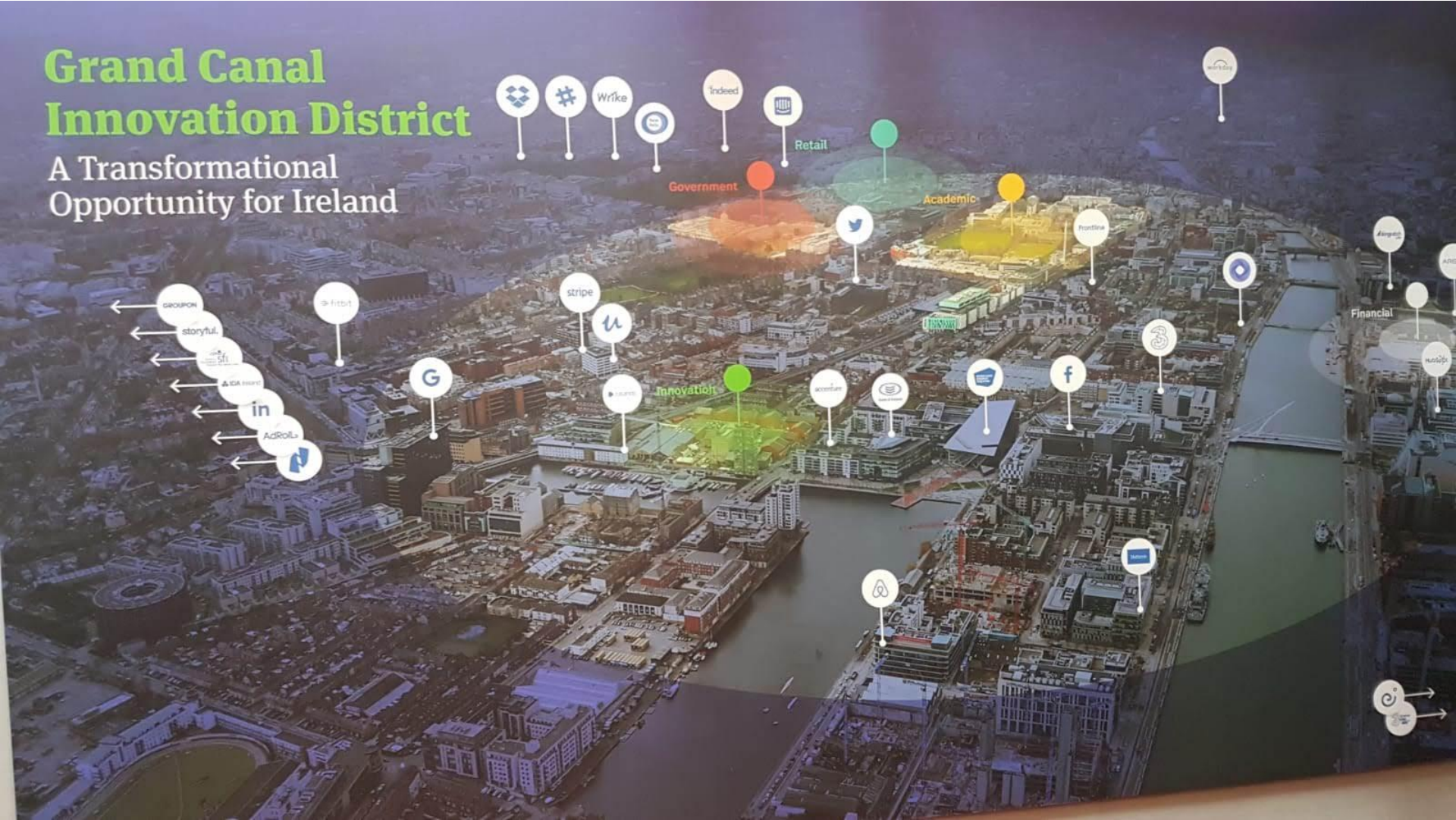
Trinity College Dublin

A research intensive University in the heart of Dublin City

No.1
University in Ireland

QS World University Rankings, THE World University Rankings and the Academic Ranking of World Univeristies (Shanghai)

Physics, Chemistry, Engineering, Social Sciences (General), Immunology, Neurosciences, Nanosciences, Materials Science, Pharmacy and Toxicology, Molecular Biology and Genetics, Biology and Biochemistry, Microbiology, Plant and Animal Science, Clinical Medicine, Agriculture, Psychiatry/Psychology, Environment/Ecology.

Top 1%
of research institutions in the World in 17 Essential Science Indicator Fields

Technology Transfer at Trinity, 2017 - 2021

487 industry collaborations

45% with SMEs

209 active licenses*
€6m licence income since 2000*

114 new licences

60% to SMEs

22% underpinning spin-out investment

3 spin-out exits worth €680m total*

INFLAZOME

SilverCloud

IdentiGEN

24 spin-outs
16 High Potential Start-ups

€200m in investment*

103 consultancy engagements

15% with AHSS

€16m for 43 EI Commercialisation Fund projects

29 products and services launched on the market

>350 jobs created by spin-outs*

318 inventions disclosed by Trinity staff

84 patents filed

€80m raised by University Bridge Fund 2

Plus… IP rights, confidentiality, GDPR, data and materials transfer, and state aid

And… active in many professional bodies: AUTM, LES, ITTG, WILA, ASTP

"UNIVERSITIES OWN ACADEMIC RESEARCH PUBLISHING BUT THEY DO NOT OWN SOFTWARE PUBLISHING"

JOHNS HOPKINS UNIVERSITY

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Trinity Research & Innovation

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OPEN SOURCE PROGRAMME OFFICE

Open Source Programme Office(OSPO)

The OSPO is a division of the OCPKE and has been established with the objective of *promoting and supporting the principles of open source, in knowledge transfer and industry engagement* within Trinity College. The office empowers researchers to execute on their open source strategies by providing advice and the tools they need.

Principles

We support the principles of the Free and *Open Source* Software (*FOSS*) model which provides tools and processes with which researchers can create, exchange, share and exploit software and
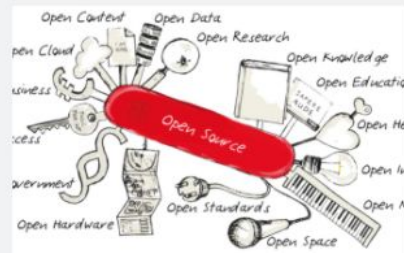

Supports and Tools

We provide advice on suitable Open Source licences to deploy in order to comply with grant conditions. Similarly we issue template agreements for engagement with industry
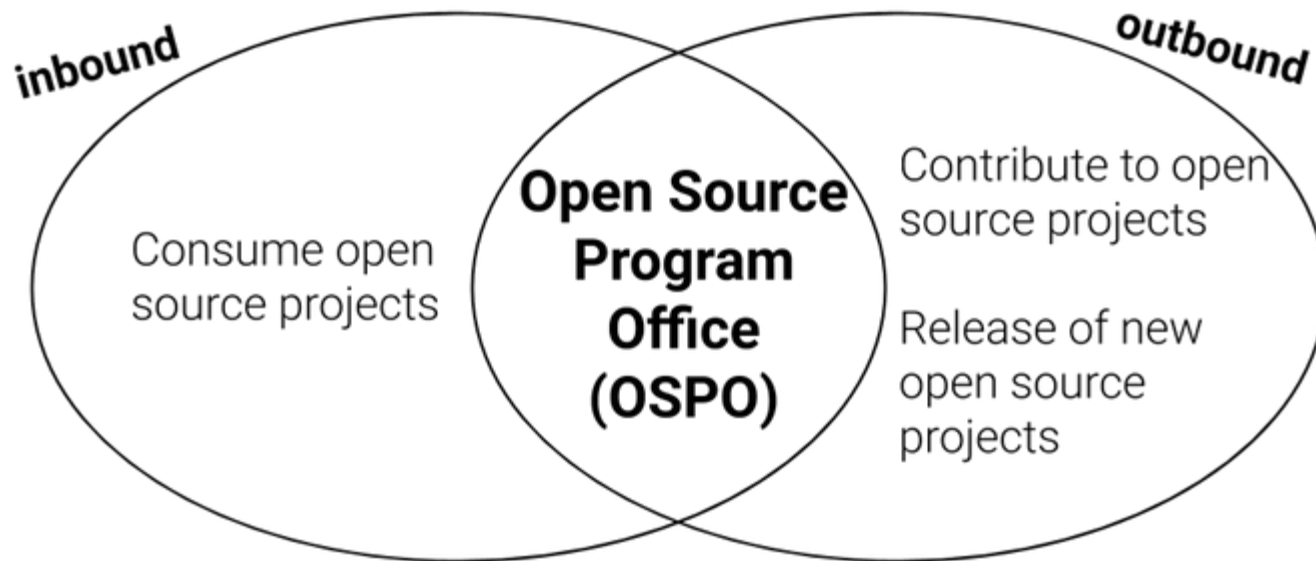

Contacts

The office is the responsibility of Aoife Tierney and John Whelan within the OCPKE and can be contacted by mailing : ospo@tcd.ie

MISSION OF TCD OSPO

Inbound

CONSUME OPEN SOURCE PROJECTS

OSPO

CONTRIBUTE AND RELEASE OPEN SOURCE

Outbound
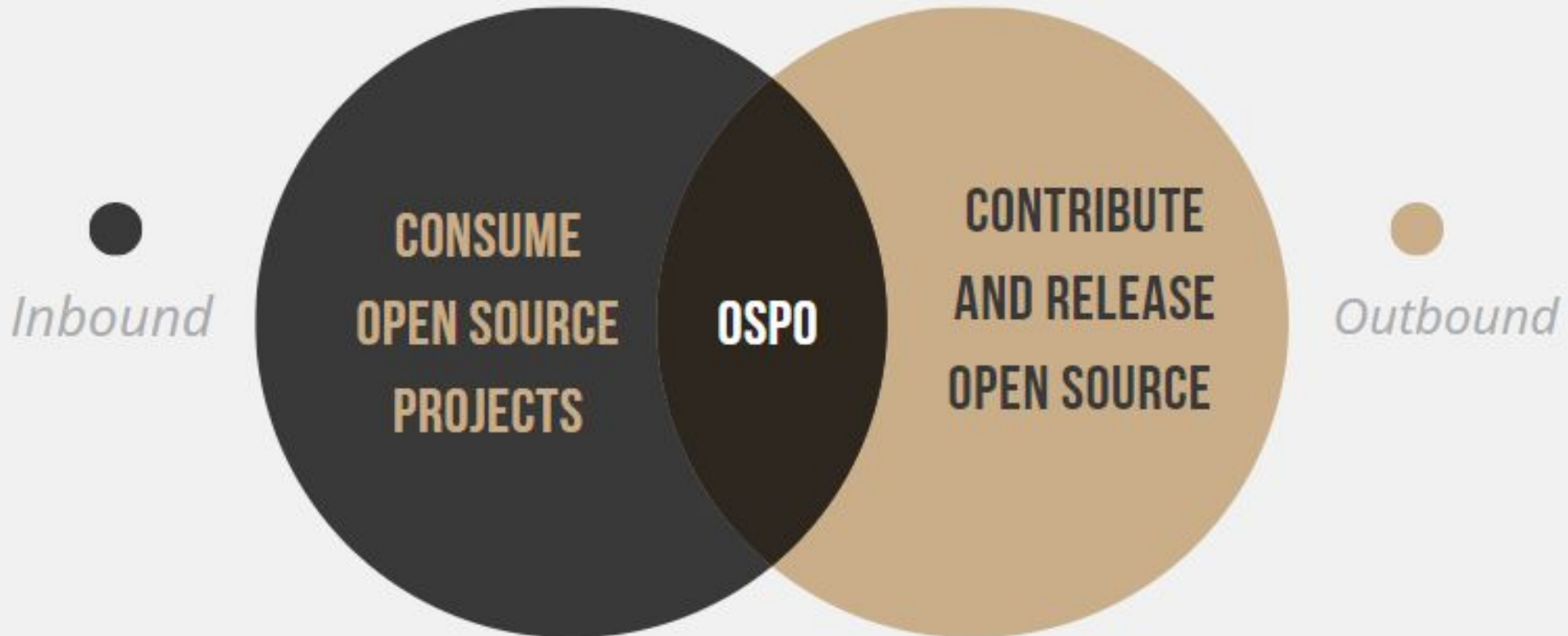
Mission Open Source Program Office (OSPO)

To maximize the Trinity's return on investment in research and reduce the risks of consuming, contributing to, and releasing open source software.

inbound

outbound

Consume open source projects

Open Source Program Office (OSPO)

Contribute to open source projects

Release of new open source projects

2003:

Image Synthesis Group

SPHERE-TREES

Sphere-Tree Construction Toolkit

Overview

Interruptible collision detection aims to provide real-time simulations with constant high frame-rates. This is achieved using a proxy object to represent the objects. This proxy object is then used to perform level-of-detail collision handling in a time-critical fashion. The most common proxy representation is a sphere-tree, which represents the objects as a hierarchy of spheres. Our sphere-tree construction toolkit implements a number of algorithms for the construction of sphere-trees. These algorithms include our new algorithms, which are detailed in various publications .

Algorithms

The sphere-tree construction framework contains a number of different algorithms. The Octree and Hubbard algorithms implement the existing algorithms upon which we have based our comparisons. Our own algorithms are based around the notion of a *Sphere Reducer*. The sphere reducer algorithms produce a set of spheres to approximate a sub-section of the object's volume. The *Sphere Tree Generator* algorithm controls the construction of the sphere-tree by managing how the object is sub-divided. When a set of spheres is constructed the generator uses the spheres to partition the object into a number of regions, each of which is then approximated using a sphere reducer algorithm. There are also a number of optimisers available in the toolkit. The generator algorithm can apply an optimiser to a set of spheres to improve the approximation prior to their inclusion in the sphere-tree. Many of our algorithms are based on Hubbard's medial axis algorithm. We, however, have extended the notion to allow the medial axis to be approximated in an adaptive manner. Initially the medial axis approximation would contain a relatively small number of spheres, typically 500 to 1000. This is sufficient to construct the top level of the sphere-tree, which would typically contain around 8 spheres. Prior to the approximation of the sub-sections of the object the adaptive medial axis approximation algorithm is used to improve the medial axis around the region being processed. This means that the medial axis will always be detailed

2003: (What Not to do!)

Downloads

You can download a ZIP archive containing ALL the models and sphere-trees that we have featured on this page. The models are supplied as OBJ files and SUR files, which contain pre-computed triangle neighbourhood information for faster loading.

The sphere-tree construction algorithms are also freely available for download. The GUI version is only available for windows platforms but the command line version works on any UNIX-like system, i.e. those capable of compiling supporting programs distributed using autoconf and automake.

Source Code:
Version 1.0 (Feb 2003) DOWNLOAD...

Pre-compiled Binaries (Win32):
Version 1.0 (Feb 2003) DOWNLOAD...

Sample Data: DOWNLOAD...

2003: (What Not to do!)

Downloads

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SOFTWARE DISCLOSURE FORM

Please include with this submission:
- A copy of the software made available via direct transfer of files or through access to a code repository (including source code)
- A copy of any accompanying material, such as a user guide

6. Does the software include any open source or free software?

_✔_ Yes ___ No

(If YES, please identify the software and the license under which it was licensed.

See Appendix B

All code and Materials included in the software that were not developed by the authors must be listed in this disclosure.)

7. Is it anticipated that – subject to TR&I's consent - the software may be distributed through an open source license?

___ Yes _✔_ No

(If YES, please name the preferred license (e.g. BSD or GNU GPL) or describe the desired terms and conditions.)

2010:

2011: OSS discovered in SDF

2013:

```
% Copyright (c) 2013 Trinity College Dublin
%
% License
%   This code is a part of the Voice Analysis Toolkit with the following
%   licence:
%   The software product (and any modifications thereof) is distributed under
%   a dual licence: an open source license for individual, non-commercial
%   purposes, and a commercial license. The opensource licence under which
%   the product is distributed is GNU GPL v2. For individual users, this
%   licence suits their use as these are not distributing proprietary
%   modifications, additions to, or derivatives of the product and don't
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%   licensing of the product. A commercial license permits customers to
%   modify, add or produce derivative products without the obligation of
%   making the subsequent code open source. For more information regarding
%   our commercial licence, please contact john.whelan@tcd.ie
%
```

2015:

Deal-hungry Google snaps up TCD-based virtual reality startup

Trinity College Dublin

2019:

TerminusX

AN OPEN-SOURCE IN-MEMORY DOCUMENT GRAPH DATABASE

Build quickly with the simplicity of JSON documents and turn objects into powerful knowledge graphs to solve complex problems.

Installation Details

Forbes

Zorin OS 15 Celebrates 1.7 Million Downloads As Newest Version Releases

Jason Evangelho Senior Contributor ⓘ

Games

I cover the fascinating worlds of Linux & consumer PC hardware.

A freshly updated version of Zorin OS 15 — a great beginner-friendly Linux distribution based on Ubuntu — releases this week with a handful of important updates and hardware compatibility features.

OSS Business Models:

OSS in Genomics:

Tool	Owner	Notes:
GATK4 - a collection of command-line tools for analyzing high-throughput sequencing data with a primary focus on variant discovery.	Broad Institute, Inc	GATK4 is released under an open source license. Depending on the specific tool and specific version you are hoping to use, this may be either the "New" BSD license or the Apache-2.0 license. Please refer to the "LICENSE.txt" file of the applicable code repository to confirm which specific license governs the code you are interested in using.
Vcftools: is a program package designed for working with VCF files, such as those generated by the 1000 Genomes Project. The aim of VCFtools is to provide easily accessible methods for working with complex genetic variation data in the form of VCF files. VCFtools consists of two parts, a perl module and a binary executable. The perl module is a general Perl API for manipulating VCF files, whereas the binary executable provides general analysis routines.	The program package is maintained and developed by: • Adam Auton (C++ Module) • Petr Danecek (Perl Module, HTSlib) • Anthony Marcketta (C++ Module) Made available under GPL v3	• Use of the code for commercial purposes: GPL v3 imposes no conditions on the internal use of the software. • Change the code: Users can change or rework the code, but if they distribute these changes/modifications in binary form, they're also required to release these updates in source code form under the GPL v3 license. • Distribute copies or modifications of the code: As long as these modifications are also released under the GPL v3 license, they can be distributed to others. • Place warranty: Distributors of the original code can offer their own warranty on the licensed software. • Like its predecessor, GPL v3 does *not* allow users to sublicense the code. • In other words, you cannot rework, alter, or add to the code, then close those changes off to the public. • The "open source-ness" of the original code follows any update or addition.
Bcftools: BCFtools is a set of utilities that manipulate variant calls in the Variant Call Format (VCF) and its binary counterpart BCF. All commands	Software is available under a choice of one of two licenses. Can chose to be licensed under the terms of the MIT/Expat license or the GPL V3	GPLV3 – As per above The MIT/Expat License Copyright (C) 2012-2023 Genome Research Ltd.

Dual Licence (bcftools):

Software is available under a choice of one of two licenses. Can chose to be licensed under the terms of the MIT/Expat license or the GPL V3 licence.

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Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

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The University of Dublin

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The introduction of Software under Controlled License Terms in the Project requires the prior approval of the General Assembly to implement such introduction into the Consortium Plan.
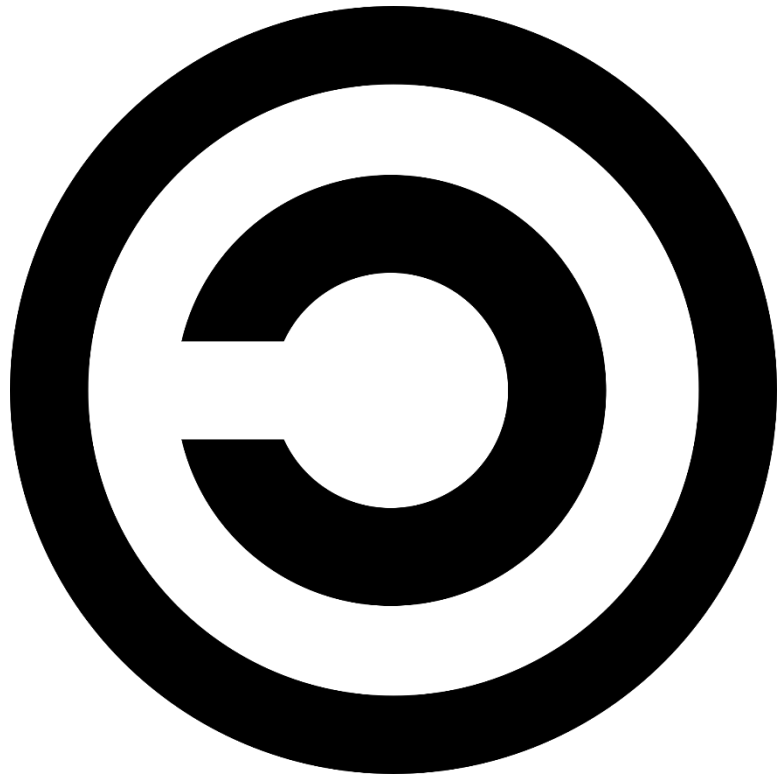
Actions

- Update IP Policy
- Communicate Support for OS to Researchers **and Industry**
- Educate Researchers and other parties
    - EI/SFI/LERU/IDA
- Embrace Open Source Ecosystem in Startups and Industry
- Produce mini-guides and infographics

open source
hardware

REMEMBER FOR BUSINESSES: