OSEHRA

Open Source Strategy and Open Collaboration for CNN Tools

Peter Li
Director of Engineering
OSEHRA
Vienna, VA

May

OSEHRA

- **Non-Profit Promoting Open Source Strategy**
- **Established by Veterans Affairs**
- **Membership Organization**
  - 30 Organizations and 550 Individuals
- **ANSI Standard Development Organization**
  - Open Source Software Usability Standard
- **GOV Funding and Membership Revenue**

Open Source and Free Software

When we call software "free," we mean that it respects the users' essential freedoms:

the freedom to run it, to study and change it,

and to redistribute copies with or without changes.

This is a matter of freedom, not price, so think of "free speech," not "free beer."

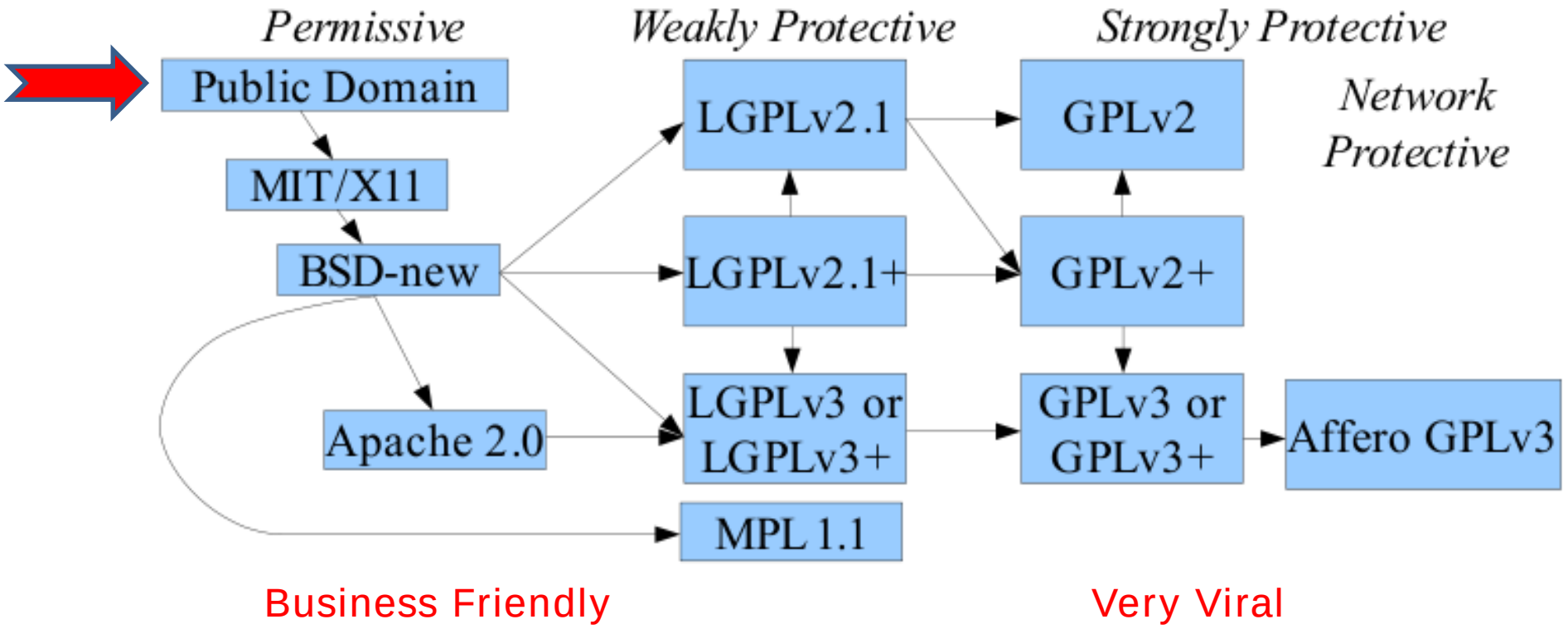
Open Source Software

- ***source code is made available under a license in which the copyright holder provides (depending upon the specific license) various rights to study, change, and distribute the software.***

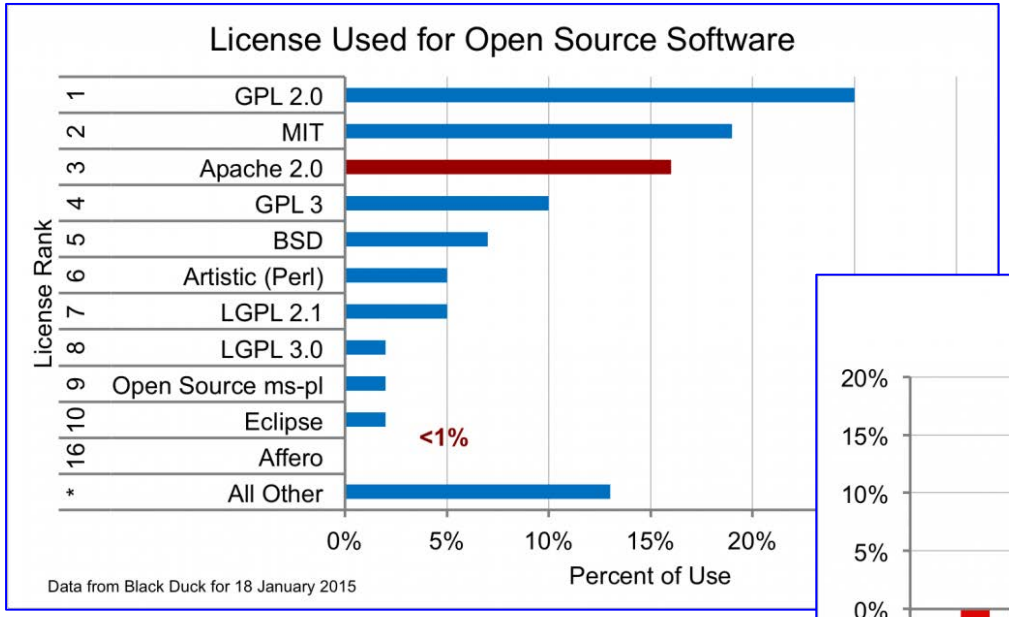
- **Two parts of this definition are particularly important.**

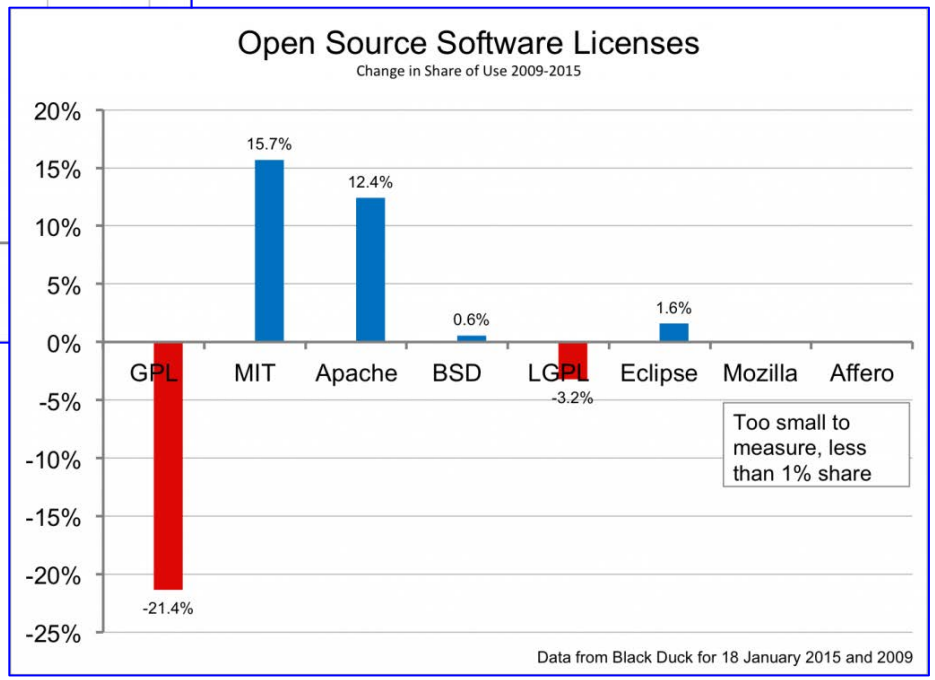
1. **Without a license, software is not open source.**
2. **The copyright holder provides the rights to licensees.**
3. **No license fees.**

OSS License Compatibility

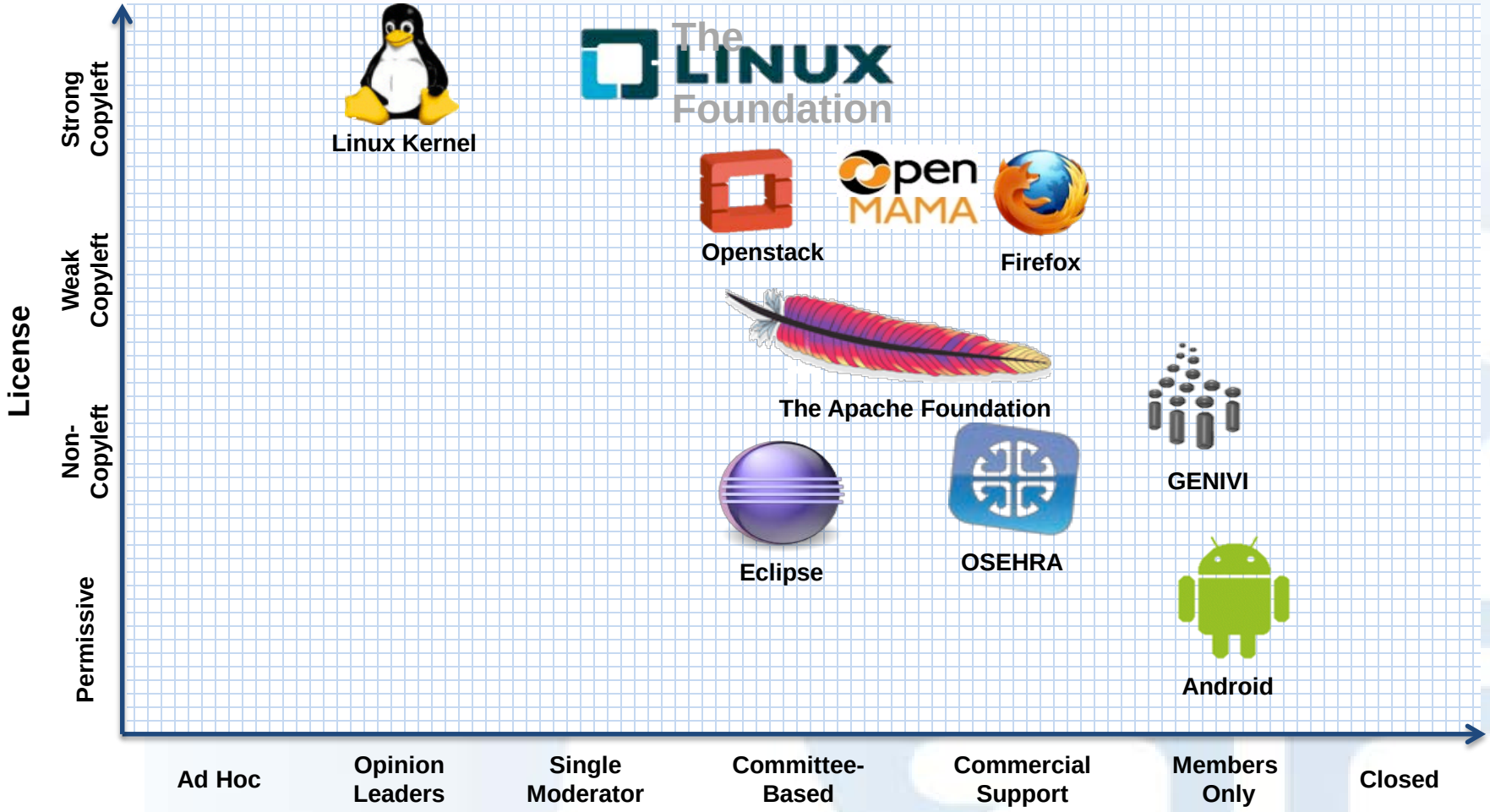


Trends in OS License





Many Open Source Business Models



WHO DECIDES?

- Courtesy of MARK RADCLIFF

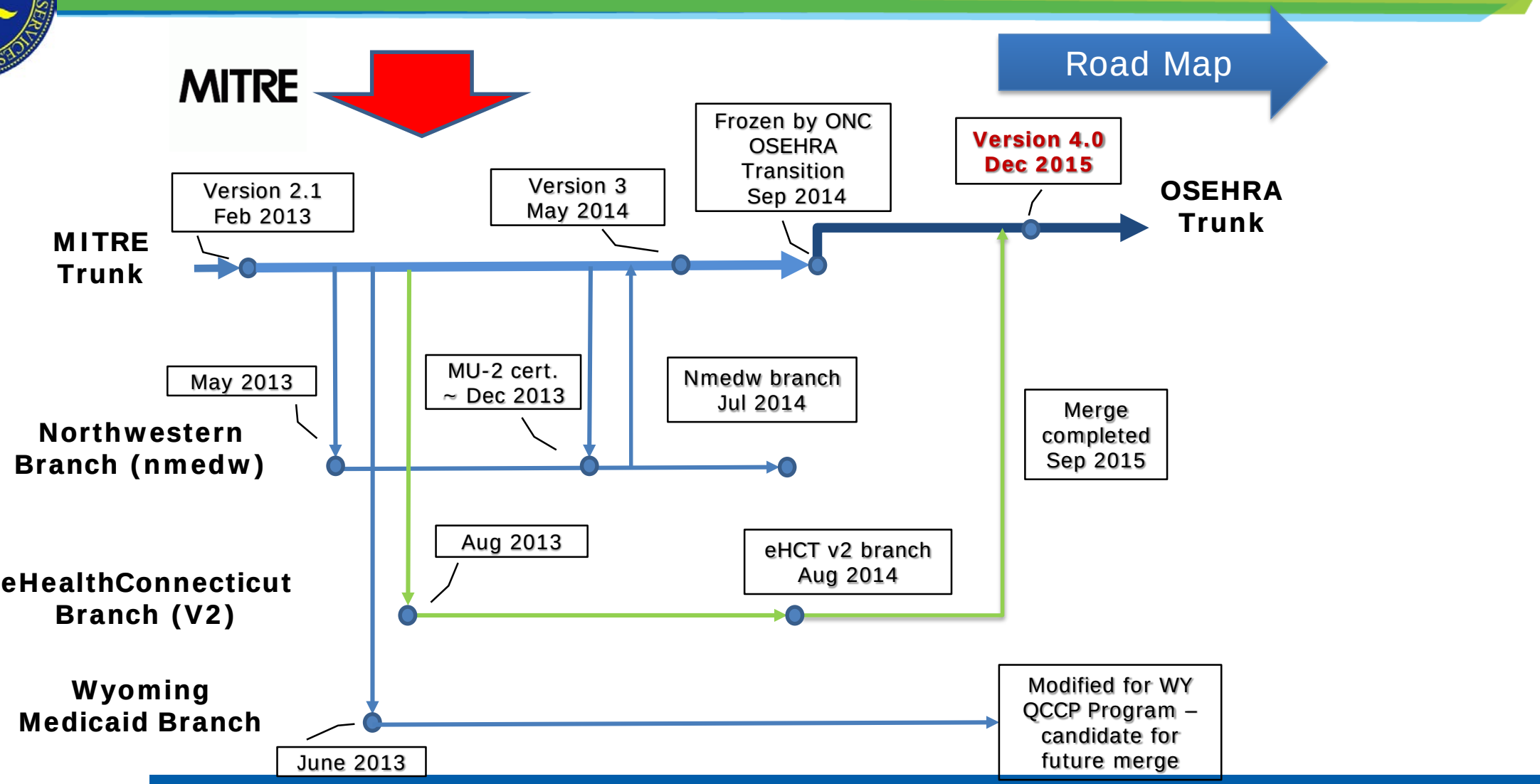
OS Ecosystem

Software
And
Product
Management

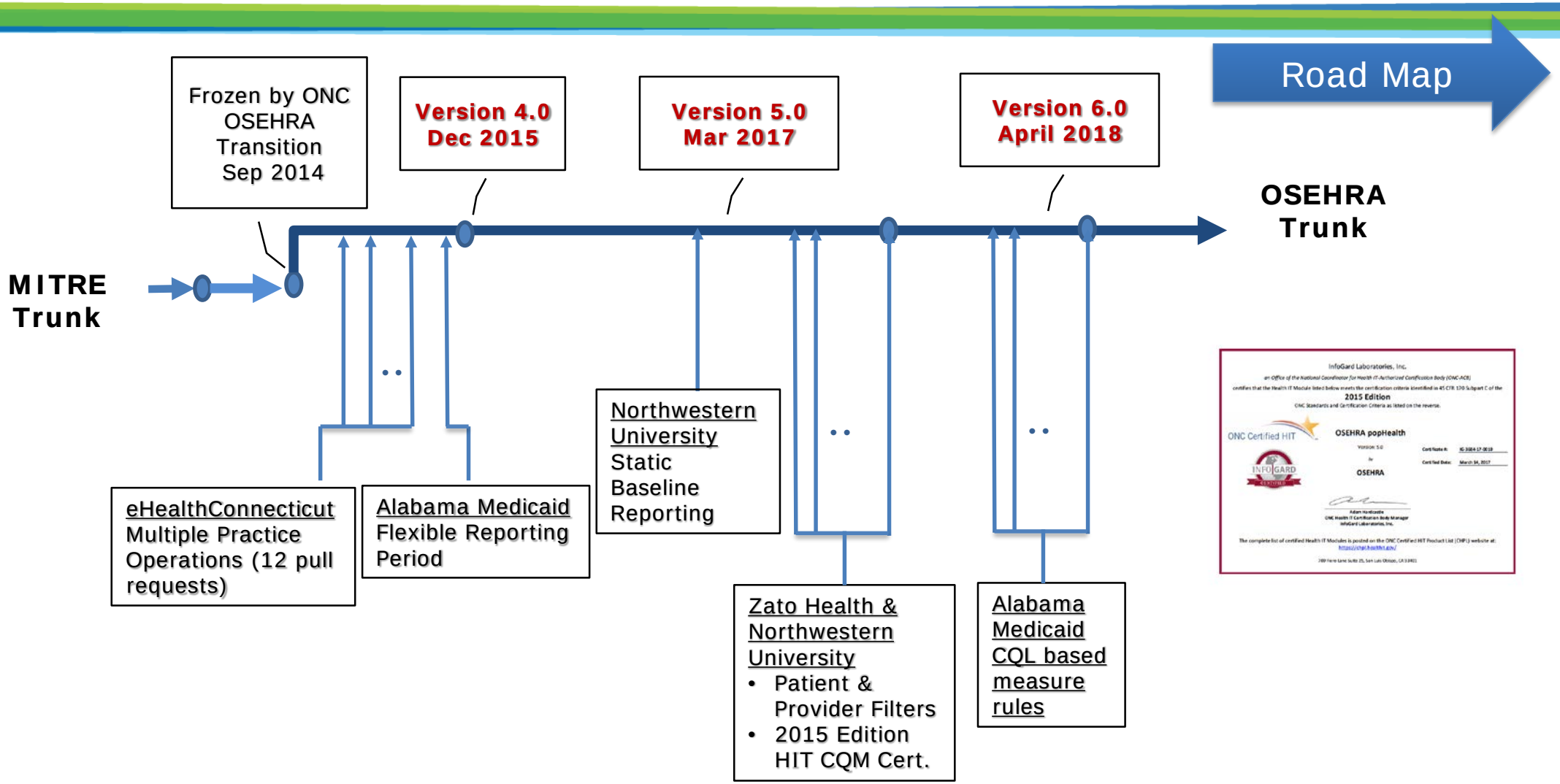
Rules of Engagement
Business Model

Community Development and Management

Community based Product Management Drives Code Convergence



Community based Product Management (Key Open Source Developments)



Open Source and CNN

- TensorFlow.
- Keras. ...
- Scikit-learn. ...
- Microsoft Cognitive Toolkit. ...
- Theano. ...
- Caffe. ...
- Torch. ...
- Accord.NET.
- X
- X

Very large number
of
Open Source Codes

Popular OS CNN Packages

S/W	Creator	License	Platform	Initial Release	Written In..	Net's	
Caffe	Berkeley Vision	BSD	Apache Spark	2013	C++	Rec Net Conv Net	
Karas	Francois Chollet	MIT	Linux, macOS Windows	2015	Python	Rec Net Conv Net	
PyTorch	(Facebook)	BSD	Linux, macOS Windows	2016	Python, C, C++, CUDA	Rec Net Conv Net	
TensorFlow	Google Brain	Apache 2.0	Linux, macOS Windows	2015	Python, C++, CUDA	Rec Net Conv Net	
Torch	Ronan et.cal	BSD	Linux, macOS Windows	2002	C, LUA	Rec Net Conv Net	

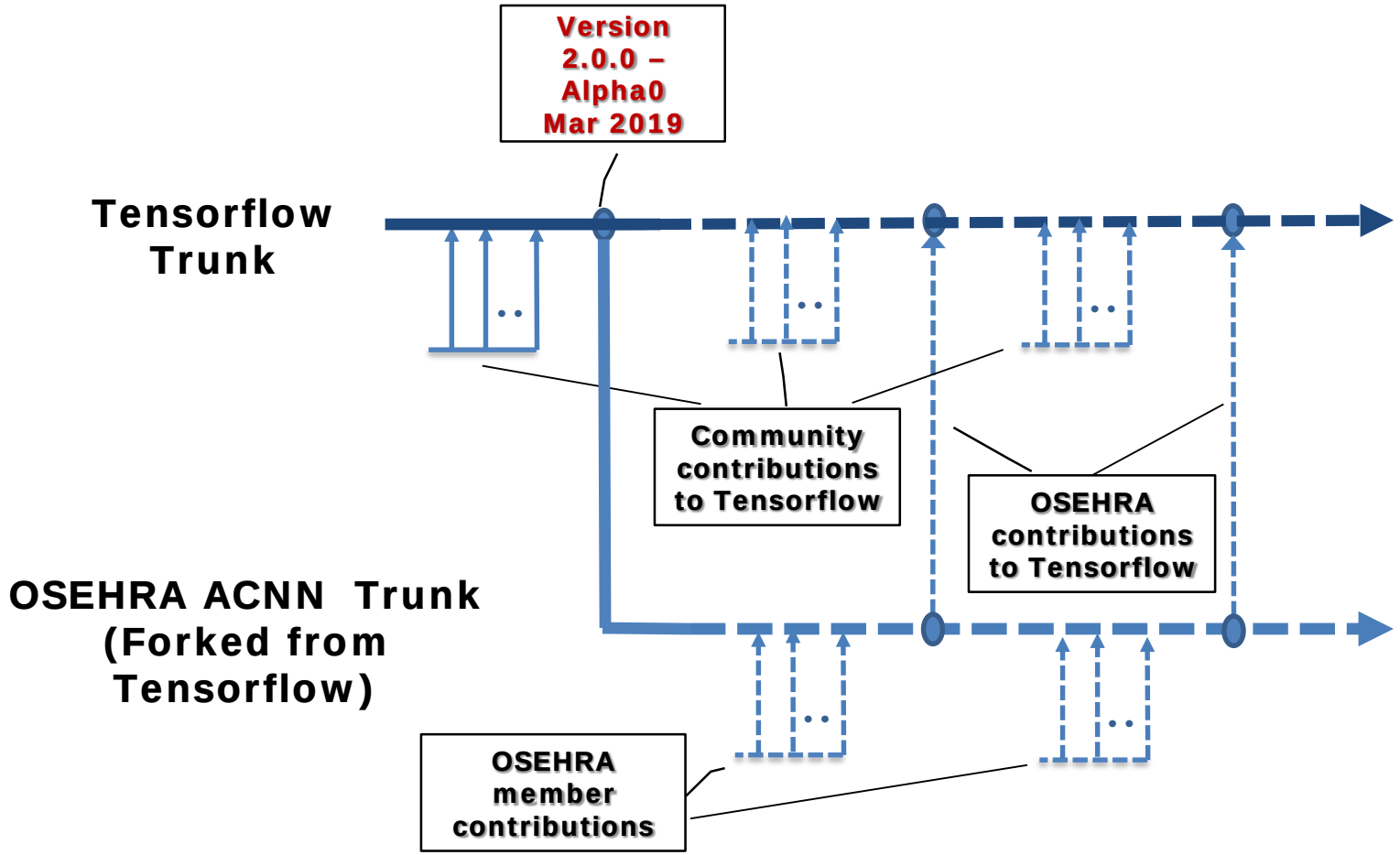
Comparing

Tensor Flow	Keras	PyTorch	Caffe2
✓ Fast compile time ✓ Has many convenient methods built into it ✓ Researching new types of machine learning models ✓ Building a large-scale system to support many users ✓ If processing and memory efficiency is more important than time saved while coding	✓ A high level framework for building neural networks with only a few lines of code ✓ Keras is a frontend layer using TensorFlow backend ✓ It depends on a backend library ✓ Education and experimentation ✓ Prototyping ✓ Production systems that do not highly specialized requirements	✓ Deep learning framework for fast, flexible experimentation ✓ More tightly integrated with Python than TensorFlow ✓ Can use Python libraries, debugger ✓ Imperative execution ➢ Write code, run immediately ➢ No separate build and run process	✓ A new lightweight, modular and scalable deep learning framework ✓ Focus on performance and efficiency, and also mobile ✓ Special relationship with PyTorch

Comparing Permissive Licenses

License	Code Use, Modification & Distribution	User Obligations	Patent License Grant	Linking code to other licenses	Trademark Grants
Apache 2.0	Permissive. Must notify users of code modifications.	Can't remove copyright, patent, trademark and attribution notices	Yes: Explicitly defined	Permissive	Not allowed
MIT	Permissive	Future licensed software must contains a copy of license and copyright notice	Not explicitly defined	Permissive	Not mentioned. Advance permission required
BSD	Permissive	BSD 3-clause: avoid appearance that product is endorsed by the original developers	Not explicitly defined*	Permissive	Not mentioned

Community based Product Management for Advanced CNN Tools (Planned)



Open Source Collaboration Suggestions

- **Available resources should be complementary, i.e., sum of all resources is greater than an individual can muster.**
- **Establish governance such as a contribution guideline that include license agreement, coding style, unit test coverages, and API compatibility**
- **Use automation such as Continuous Integration (CI) platform for code review process.**

Open Source Collaboration Suggestions (cont)

- **Secure stakeholder commitment to provide resources to build new and maintain existing capabilities.**
- **A mix of stakeholders – business for funding, academia for mentors, and government for stable development resources; and last an OSEHRA-like organization to facilitate stakeholder collaboration.**

Essence of Open Source Operations

- Collaboration
- Leveraging Each Other's Expertise
- Output is Software
- For An Efficient Collaboration
- Attribution
- Licensing
- Free Like A Puppy
-

OSEHRA

Thank you.

lip@osehra.org
www.osehra.org