Open Source and The Digital Service at the Centers for Medicare & Medicaid Services (CMS.gov)

events.linuxfoundation.org/lf-member-summit || November, 2022

github.com/decause-gov/decks/blob/main/lfms-2022.pdf

THE LINUX FOUNDATION MEMBER SUMMIT

UNITED STATES DIGITAL CORPS

CIVIC DIGITAL FELLOWSHIP

creative commons

PUBLIC DOMAIN

The Digital Service at CMS (DSAC)

1. **Digital Service at CMS**
2. What is Open Source
3. Open Source at CMS today
4. The future of Open Source at CMS
5. How to get involved

DIGITAL SERVICE AT CMS

Who we are

We work with dedicated civil servants at the Centers for Medicare and Medicaid Services:

Remy DeCausemaker
Open Source Lead,
Digital Service at CMS

What we do

We work to transform the U.S. healthcare system by:

Improving the design of healthcare experiences

Delivering value to the government, healthcare providers, and patients

Modernizing systems

Participating in policy development

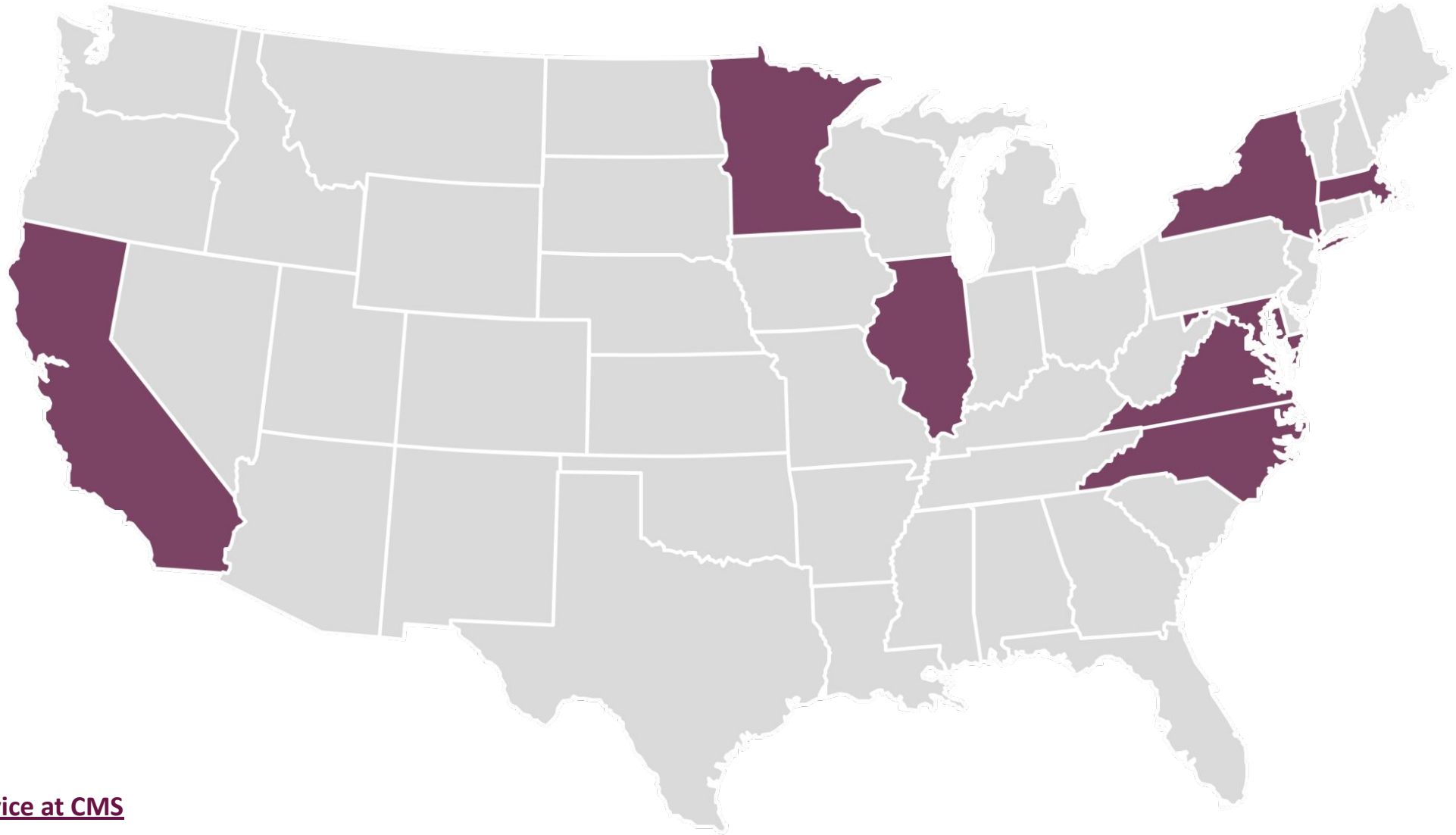
DIGITAL SERVICE AT CMS

How we work

We achieve goals through hiring great talent. We deploy **small, responsive** groups of designers, engineers, and product managers to CMS for a "tour of duty" to work alongside **dedicated civil servants** to solve some of the largest, most complex problems facing our healthcare system.

These **multidisciplinary teams** bring best practices and new approaches to support government **modernization** efforts.

Where we work (remotely!)



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Who we serve

62 M

Medicare Beneficiaries

(As of 11/2021)

88 M

Medicaid Beneficiaries

(As of 4/2022)

31 M

Healthcare.gov Beneficiaries

(As of 6/2021)

https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/CMS-Fast-Facts
https://www.hhs.gov/about/news/2021/06/05/new-hhs-data-show-more-americans-than-ever-have-health-coverage-through-affordable-care-act.html
https://www.medicaid.gov/medicaid/program-information/medicaid-and-chip-enrollment-data/report-highlights/index.html

What is Open Source?

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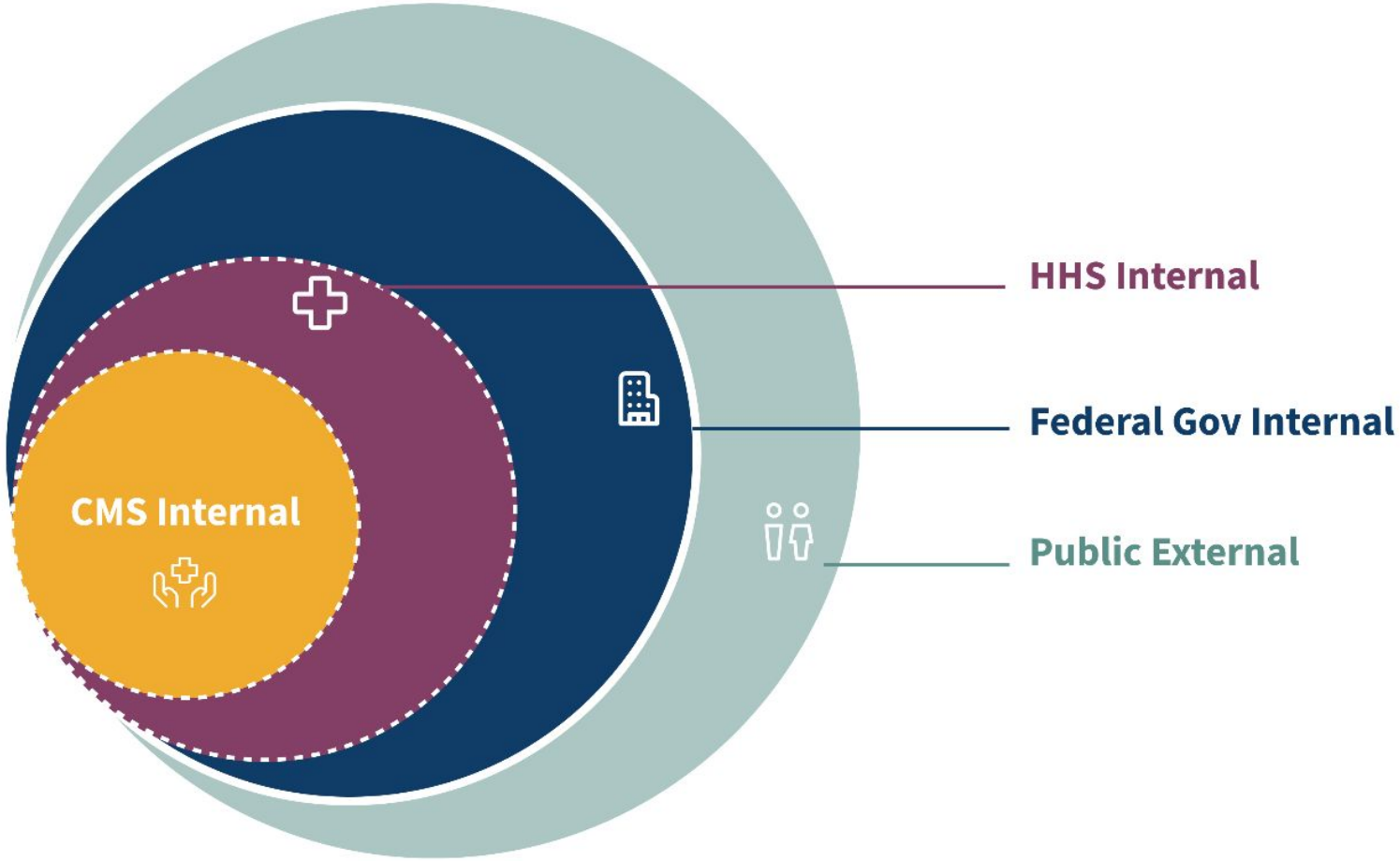
What is Open Source Software?

Open source means source code that anyone can **inspect**, **modify**, **enhance**, and **share.**

Open Source is a Community of Communities



CMS INTERNAL: https://github.cms.gov (CMS Employee Access Only)

HHS INTERNAL: Agency Employee Access Only

Federal Gov INTERNAL: Federal Employee Access Only

Public EXTERNAL: code.gov, github.com (Public Access)

DIGITAL SERVICE AT CMS

Benefits of Open Source Software (OSS) within the CMS Environment [1]

> *"OSS provides many advantages, as demonstrated in the commercial industry and the government sector. If used thoughtfully,* ***OSS offers the potential for cost reduction, timelier delivery, and improvement of the overall capabilities of a system****."*

[1]: https://www.cms.gov/tra/Content/AD_0210%20Open%20Source%20Software%20Overview.htm

Specifically, Open Source Software (OSS) can:

Offer **considerable savings** in software purchasing cost and **greater efficiency** in repurposing and enhancing existing software

Increase the productivity of application development through open standards to help achieve **interoperability across systems**

Minimize vendor lock-in through open standards and **flexibility in the choice** of solutions

Support **open collaboration and innovation** with the open source **development community** through **free exchange of ideas and results** with the wider community

Enable transparency of software implementation to **support extension** of software (through supported plug-in mechanisms) while also ensuring robustness of design and implementation

Help **keep the enterprise abreast of technology developments** and **facilitate the early adoption of emerging technology**

Myths of Open Source

Open source is ~~less~~ more secure.

"**Many eyes make any bug shallow**." The more people looking at a project, the faster we'll be able to identify problems and create solutions.

Open source is ~~bad~~ good for for-profit businesses.

By **lowering barriers to entry and costs of acquisition**, developers are given access to world-class industry leading tools and infrastructure used at the largest enterprises today.

~~Open Source means all data must be public.~~ Open Source means SOME data CAN be public.

Open source is not a binary, it is a spectrum, and there are layers to the stack. Being intentional about what we cannot share for privacy and security purposes, helps us determine what we can share more effectively.

Open by Default is something we ~~do not~~ already do in Federal Government.

According to **Title 17 U.S. Code § 101 and § 105**, "Copyright protection under this title is not available for any work of the United States Government" meaning, "work prepared by an officer or employee of the United States Government as part of that persons official duties."[1][2]

https://www.law.cornell.edu/uscode/text/17/101
https://www.law.cornell.edu/uscode/text/17/105

What are the *actual* Risks in Open Source?

	Examples
Overdifferentiation • Unnecessarily duplicating work • Unnecessarily dividing your resources	"Not Invented Here" Syndrome
Proliferation • Unnecessarily duplicating communities and projects • Unnecessarily dividing your addressable market	License Proliferation, Conference Proliferation, Event Proliferation
Fragmentation • Unnecessarily dividing your community of contributors	Hostile Forks, Internal Forks

Open source at CMS today

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How do we ‘do’ Open Source at CMS?

Policies

How we inbound and outbound open source code and content

Projects

Open Source Projects we have released publicly

Programs

How we onboard new contributors into projects, internships, and jobs

Who We Serve

100's

source code repositories

(As of 08/2022)

1000's

open source contributors

(As of 08/2022)

1,000,000's

lines of code

(As of 08/2022)

https://github.com/orgs/CMSgov/insights?period=year

OSS Timeline: 20+ Years of Federal Open Source Policy

1999-2001: Important Publications

- Open Source Code and the Security of Federal Systems
- Developing Open Source Software To Advance High End Computing
- Making the Business Case for Open Source Software

2000: The National Security Agency (NSA) releases Security-Enhanced Linux

2003: The Department of Defense (DoD) CIO, John Stenbit, releases the first agency wide guidance on OSS

2009: President Obama appoints the First CIO and CTO of the U.S.
2009: The Department of Defense releases a memo titled "Clarifying Guidance Regarding Open Source Software (OSS)"

2011: The White House publishes "The Open Government Partnership: National Action Plan for the United States"

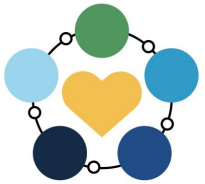
2014: The White House announces New Open Government Initiatives as part of the Second Open Government National Action Plan.

2014: Consumer Financial Protection Bureau Open Source Policy

2019: GSA.gov Open Source Policy

2020: 18F Open Source Policy

Ecosystem of APIs at CMS



Beneficiary
Claims
Data API

OSS-powered APIs at CMS

March 2018

CMS launches Blue Button 2.0 to add developer-friendly, standards-based API to the existing text and PDF downloads

April 2019

CMS releases final rule that allows Prescription Drug Plan sponsors to request Parts A and B claims data

April 2020

CMS launches Claims Data to Part D Sponsors API (AB2D)

Dec 2021

CMS releases Interoperability and Prior Authorization Proposed Rule

2018 | 2019 | 2019 | 2019 | 2020 | 2020 | 2020 | 2021

Feb 2019

CMS releases Interoperability and Patient Access Proposed Rule and launches the Beneficiary Claims Data API (BCDA) pilot

July 2019

CMS launches the Data at the Point of Care (DPC) API pilot

May 2020

CMS finalizes Interoperability and Patient Access Rule

July 2021

BB2.0, BCDA, and AB2D update to FHIR r4 Standard

Transforming Healthcare

Medicare recipients

Providers

Accountable care organizations

Insurance plans

The Big Picture

CMS Open Source Inbound Policies

Common Criteria for OSS Evaluation

Existing Products

- **Approved COTS:** Are there CMS-approved COTS products that can serve the same purpose as the OSS?

Maturity

- **Market Share:** What is the OSS's market/industry rate of adoption?
- **Credibility:** What is the position of OSS's structured bodies and organizations?
- **Documentation/Books:** Are instruction manuals comprehensive and readily available?
- **Community:** Is there an active online community behind OSS? Are there any comercial conflicts? What is the composition of the community?
- **Source Code Quality:** Does the open source project routinely use source code inspection tools to assess quality and security of the source code? Is the code well documented? Does an independent body review the code?
- **Rate of Change:** What is the rate of change of the OSS? This includes the rate of code change and the rate of new releases.
- **Bug and Vulnerability Tracking:** Is there a bug/vulnerability reporting and resolution system? How quickly are patches issued to resolve them?

Costs and Risks

- **Integration:** How well will the OSS integrate within CMS's environment? Is customization of the OSS required?
- **Talent Pool:** Does CMS have the right resources to support Development, Operations, and Maintenance for the OSS?
- **Prohibitions:** Are there CMS or federal security policies that prohibit the use of the OSS? Does the OSS product allow implementation of CMS or federal security requirements?
- **Professional Services Availability:** Is there third-party vendor support to install, configure, customize, integrate, operate, and maintain the OSS?
- **Cost Comparison:** What is the cost of using and maintaining the OSS compared to a COTS solution?

Licensing

- **Licensing Model:** Does the copyright license associated with the OSS have restrictions limiting the redistribution of software code or restrictions on merging with proprietary code that are unreasonable for CMS?

CMS Open Source Recommended Outbound Policies

RP-OSS-1

Provide Ample Documentation with CMS-Release OSS Code

For a CMS-managed repository, the project team should include ample documentation with the software code for increased adoption and modification by the community. The documentation should provide the information on the project's mission, philosophy, goal, design, decision-making process and product roadmap. It should also provide instructions on how to submit issues, feature requests and how to contribute towards fixes or enhancements.

RP-OSS-2

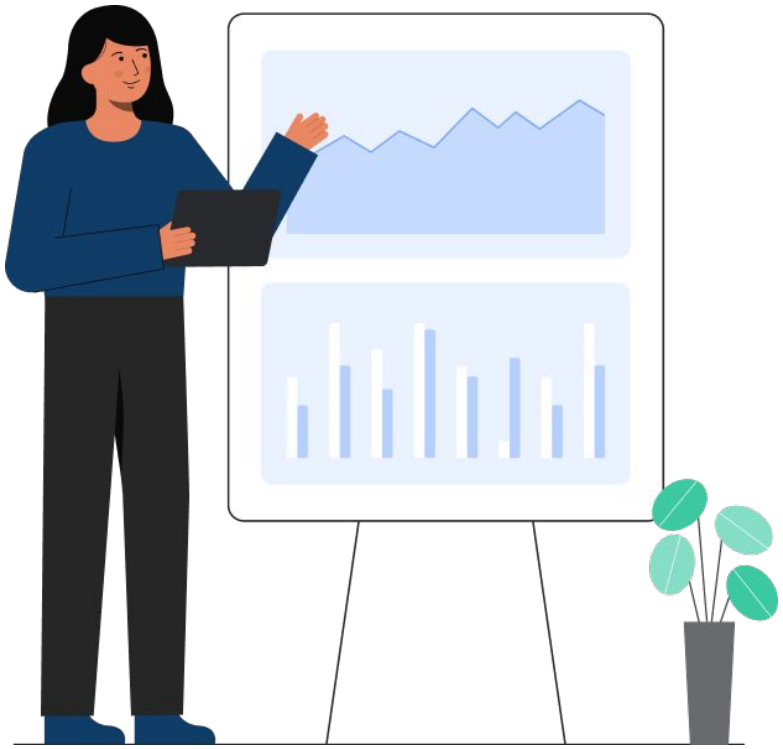
Implement the Tools to Support the Community Around a CMS-Released OSS Project

Implement some or all of the following tools to support the community around an open source project:

- Mailing lists
- Message forums
- Version control
- Wiki
- Tracking mechanisms, such as Kanban boards

GitHub now includes a Kanban board for planning each project, thereby allowing development teams to create a development roadmap. Project teams should use Github Kanban or another Kanban tool, such as Trello to publicly display development

CMS Open Source Recommended Practices



Industry Best Practices

Follow or adopt a **decentralized goverance** model.

Define the team constituents, their decision-making authority **and their roles** to support the project in the open source community.

Define and **staff the roles** for active user engagement, product roadmap development, and for accepting new contributions via pull-requests.

Identify and **promote active contributors to committer status** based on the quality and quantity of code contributions and involvement in day-to-day discussions.

The Future of Open Source at CMS

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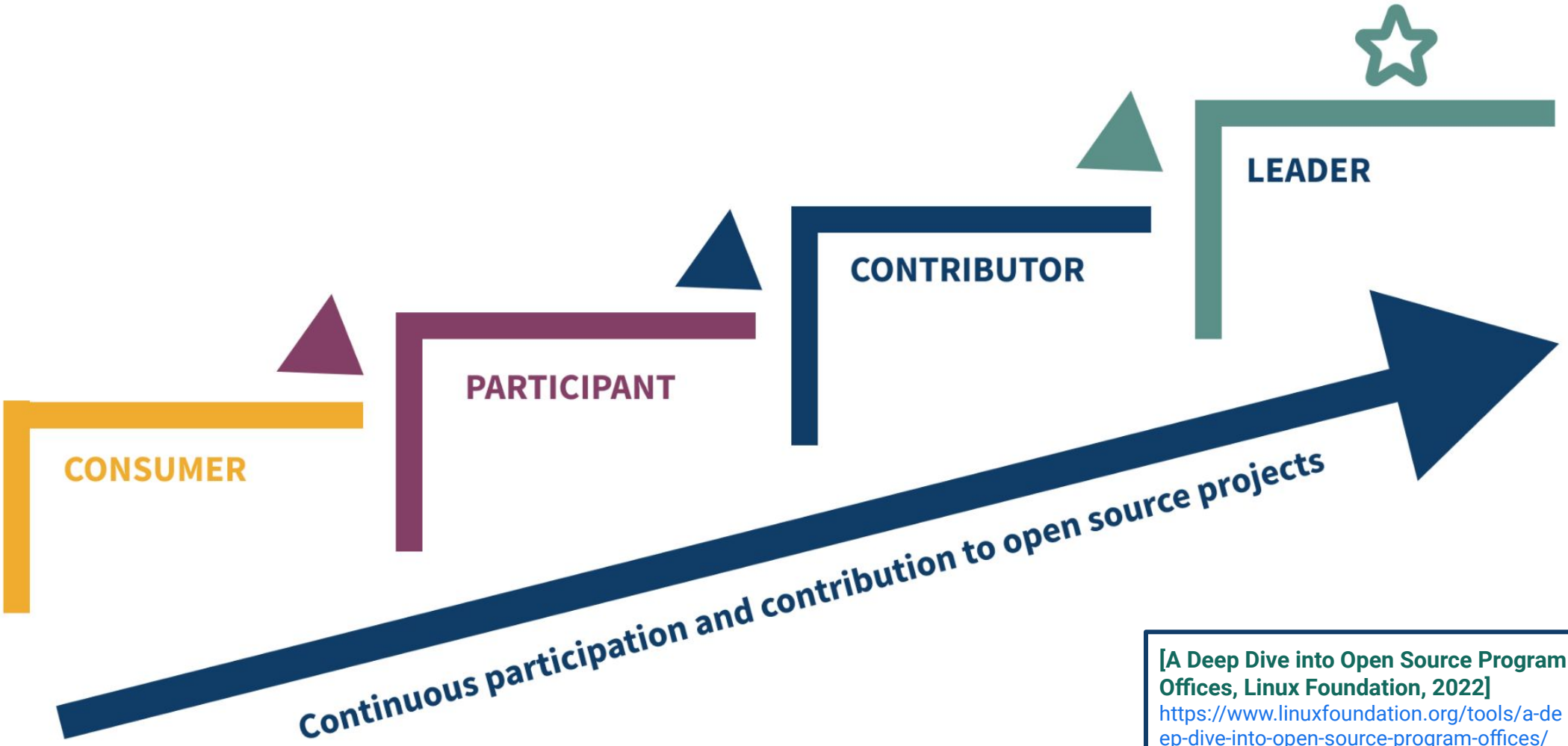
The Four Core Stages of Open Source Strategy



[A Deep Dive into Open Source Program Offices, Linux Foundation, 2022]
https://www.linuxfoundation.org/tools/a-deep-dive-into-open-source-program-offices/

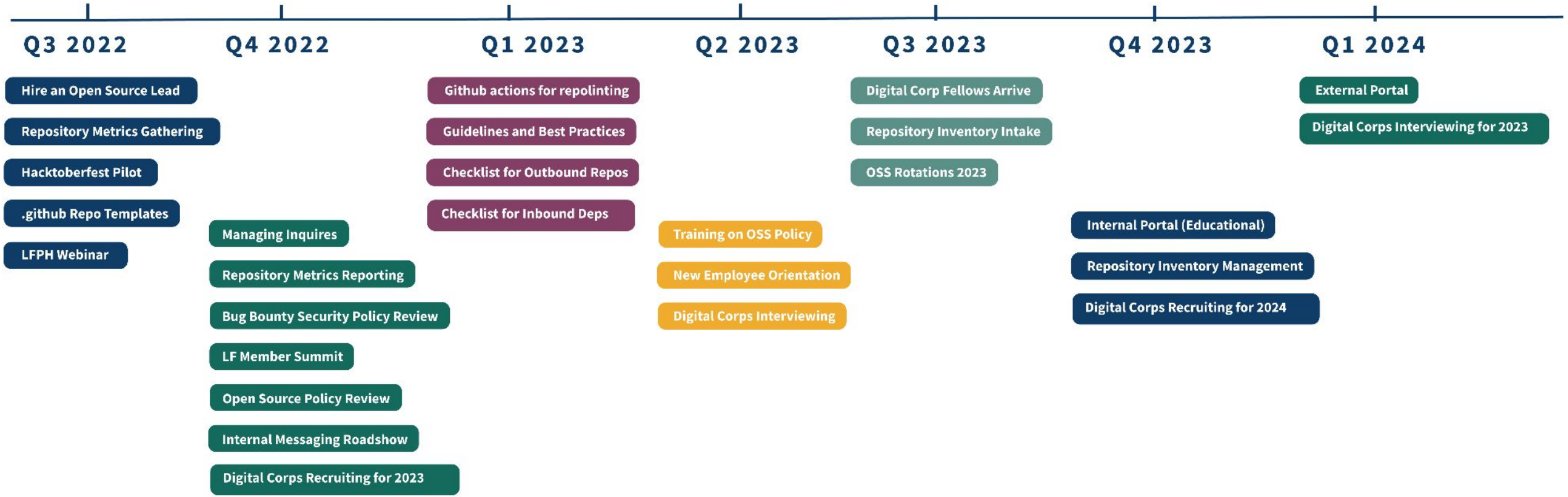
Challenges Open Source Program Offices Face

Open source programs face many challenges including **culture**, **process**, **tools**, **continuity**, and **education**.

How will CMS Open Source Programs address Challenges?

Education	Tools	Policy & Process	Communication	Continuity
Guidance on Agency policy	Source code scanning	Usage & compliance policy (distribution, auditing, notices, usage)	**Internal portal (educational)**	**Succession planning**
Guidelines & best practices	**CommArch analysis**		**External portal (project visibility, recruiting, developer comms)**	**Governance models**
Guidance on open source licenses	**Repository analysis & metrics**	**Upstream contribution policy**		Incident reponse & protocol
New employee orientation	Security vulnerability analysis	**Bug bounty & disclosure Policy**	Data sharing & visualization	Internal communities
Checklist for outbound repos	Software bill of materials (SBOM)	**Code of conduct & incident policy**	**Conferences & public speaking**	External communities
Checklist for inbound deps	**Repository linters & templates**		Mailing lists (internal/External)	**Onboarding documentation**
Checklist for OSS procurement	IP evauation tooling			**Automation of manual workflows**
Coaching and mentorship guide	**SW inventory management**			Hackathons & contributor events
Professional developer training	Project management			

Aspirational Roadmap



DIGITAL SERVICE AT CMS

How to get involved

1. **Digital Service**
2. **Digital Corps**
3. **CodingItForward**
4. **Hacktoberfest**

Join us at the Digital Service!

Digital Service at CMS.gov	**Up to 4 year tour of duty** for established professionals in **Engineering, Product management, Design, and Data science**. GS-13+	https://cms.gov/digital-service-cms
DigitalCorps at GSA.gov	**2 year tour of duty** for **early-career** technologists, eligible to convert to full-time, career positions in the competitive service at their agency. GS-9 to 12, + **50% recruitment Incentive**.	https://digitalcorps.gsa.gov
Civic Digital Fellowship at CodingItForward.com	**Paid 10 week summer internship** program for **currently enrolled** undergrad, grad, bootcamp students **or recent graduates**.	https://www.codingitforward.com

Start by Volunteering and Contributing!

Anyone can make a difference, local, state, or federal!

CODE *for* AMERICA

CodeForAmerica.org

US DIGITAL RESPONSE

USDigitalResponse.org

Thank You

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Questions or Comments?

Open Source Questions?

opensource@cms.hhs.gov

Digital Service Questions?

DigitalService@cms.hhs.gov

github.com/decause-gov/decks/blob/main/lfms-2022.pdf

Answer the Call!

Digital Service at CMS.gov
https://cms.gov/digital-service-cms

DigitalCorps Fellowships
https://digitalcorps.gsa.gov

CodingItForward Summer Internships
https://codingitforward.com

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