



DIGITAL SERVICE AT CMS

Running The First Federal Open Source Program Office at CMS.gov

GWU OSCON // March 25th, 2025

<https://github.com/DSACMS/decks/blob/main/gwuoscon2025.pdf>
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CMS Open Source Program Office (OSPO)



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What does the Digital Service at CMS 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

How do we do it?

We deploy **small groups** of designers, engineers, and product managers on a "tour of duty" to work alongside **dedicated civil servants**.

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



Who we serve: The American People

66 M

Medicare Beneficiaries

(2023)

94 M

Medicaid Beneficiaries

(2023)

16 M

Healthcare.gov

(2023)

<https://data.cms.gov/fact-sheet/cms-fast-facts>

<https://www.cms.gov/files/document/health-insurance-exchanges-2023-open-enrollment-report-final.pdf>



Who we serve: Taxpayers

\$ 1.5 T

CMS Budget - 22% of the
federal budget

(FY 2022)

\$ 1.03 T

Total Medicare Payments

(FY 2023)

\$ 846 B

Total Medicaid Payments

(FY 2022)

<https://data.cms.gov/fact-sheet/cms-fast-facts>

<https://www.cms.gov/files/document/2022-medicare-trustees-report.pdf>

<https://www.cms.gov/files/document/cms-financial-report-fiscal-year-2024.pdf>



Who we serve: The Health Care System

6,710

CMS Employees

(FY 2023)

1.5M

Health Care Providers

(2023)

21%

National Health Care
Spending is Medicare

(2022)

<https://data.cms.gov/fact-sheet/cms-fast-facts>

<https://www.cms.gov/oact/tr/2024>

<https://www.cms.gov/files/document/cms-financial-report-fiscal-year-2024.pdf>

7 <https://github.com/DSACMS/decks/blob/main/gwuoscon2025.pdf>



—● We Reduce Costs, Reduce Burden, and Reduce Risks.

We save money.

\$ **77.85** M

Saved in FY 2023 and FY 2024.

We reduce burden.

193,026

Hours of burden reduced for hospitals, providers, beneficiaries, and the public.

We hire tech talent.

50+

New technologists hired into CMS and HHS.

We crush bugs.

18+

Critical vulnerabilities removed from our systems.



Our OSPO Journey.



Open Source Program Office (OSPO) Market Dynamics

96% of all commercial software contains open source software, representing \$8.8T of value if rewritten from scratch.

30% of Fortune 100 companies have implemented an OSPO, with 84% of OSPOs developing or managing GenAI infrastructure.

CMS is the first United States Federal Agency to implement this private-sector styled approach to an Open Source Strategy.

see: linuxfoundation.org/research/ospo-2024

THE 2024 STATE OF OSPOS AND OPEN SOURCE MANAGEMENT

94% of organizations **USE OPEN SOURCE SOFTWARE** in products or services.



77% of **LARGE** organizations **HAVE AN OSPO.**



19% of **SMALL**, and **33%** of **MEDIUM** organizations **HAVE AN OSPO.**



105% GROWTH OF OSPOS IS EXPECTED FOR SMALL ORGANIZATIONS over the next one to two years compared with just 12% for very large organizations.



80% of organizations report that OSPOs have a **MEANINGFUL POSITIVE IMPACT** on their ability to work with open source communities.



#1 OSPO responsibility for small & medium organizations: **DEVELOP AND EXECUTE OPEN SOURCE STRATEGY.**



#1 OSPO responsibility for large organizations: **ESTABLISH AND IMPROVE OSS POLICY AND PROCESSES.**



Top benefits reported from organizations having an OSPO are **BETTER LICENSE COMPLIANCE AND INCREASED TRANSPARENCY** of collaboration.



#1 benefit anticipated from implementing an OSPO by organizations not having one is **MORE AWARENESS OF OSS USE AND DEPENDENCIES.**



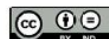
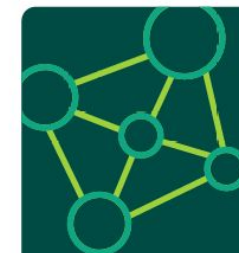
#1 OSPO **CHALLENGE** reported from organizations having an OSPO is **INTERNAL AWARENESS** across teams of the program or initiative.



91% of OSPOs are involved in **MANAGING SECURITY ISSUES**



84% of OSPOs are involved in **DEVELOPING OR MANAGING GenAI INFRASTRUCTURE.**



What is an Open Source Program Office? (OSPO)

*An open source program office (OSPO) serves as the center of competency for an organization's open source operations and structure. It is responsible for defining and implementing **strategies**, **programs**, and **policies** to guide these efforts.*

CMS OSPO Functional Statement:

*“Establish and maintain guidance, policies, practices, and talent pipelines that advance equity, **build trust**, and **amplify impact** across CMS, HHS, and Federal Open Source Ecosystem by working and sharing openly.”*



What is expected of an OSPO?



Save us Money



Save us Time



Reduce Duplicate Work



Reduce Duplicate Costs



Reduce Security Risk



Reduce Continuity Risk

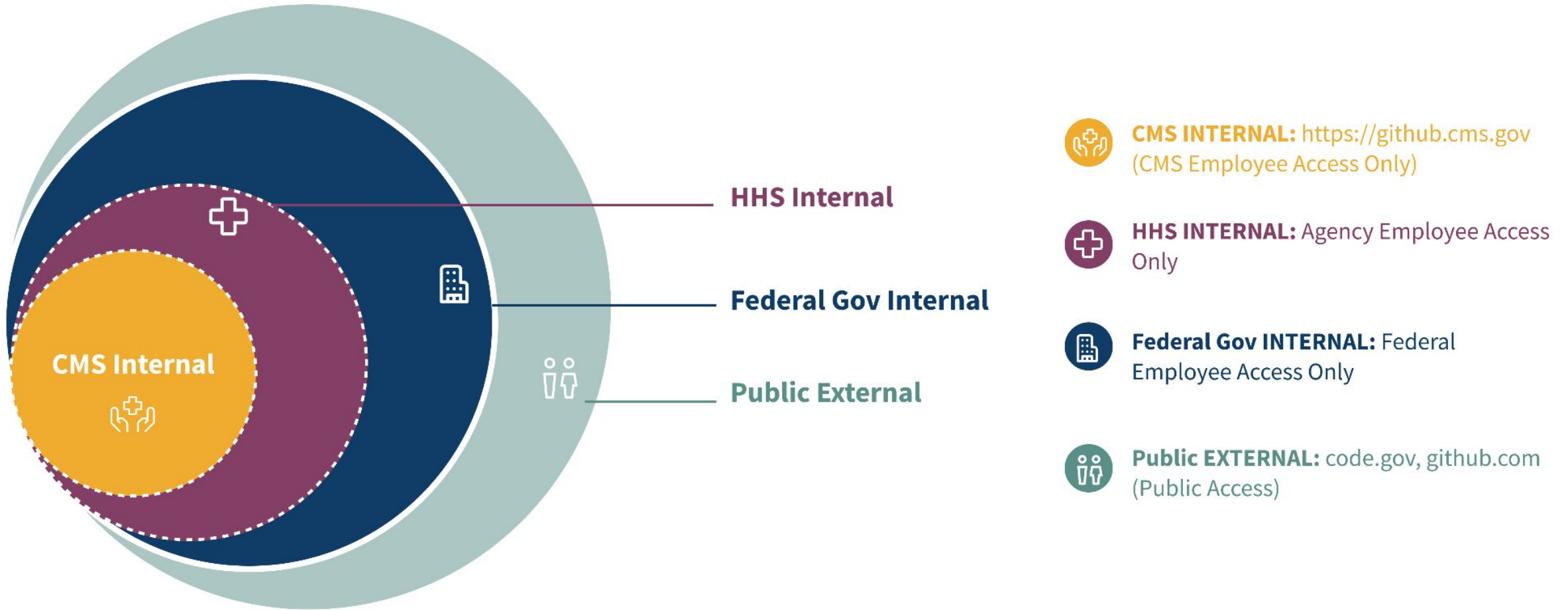


Accountability for Contract Performance



Engine for Talent

Open Source is a Community of Communities



CMS Open Source Footprint

1,000's

open source contributors

(As of 02/2025)

10,000's

source code repositories

(As of 02/2025)

1,000,000's

Lines of Code

(As of 02/2025)

<https://dsacms.github.io/metrics>



OSPO Early/Mid Career Talent Pipeline 2022-2024: 15 employees across 6 programs

3 Local HS Interns - **CodeInTheSchools.org & UrbanAlliance.org** - 5/10 weeks, Aug-Oct

*“5-10 week summer experiences for **Baltimore City residents** between the **ages of 14 and 21**.”*

6 Undergrad Fellows - **CodingItForward.com** - 10 weeks, July-Aug

*“10-week cohort based summer fellowship for **early-career technologists** in local, state, and **federal government** offices across the United States.”*

4 Recent Grad Fellows - **DigitalCorps.gsa.gov** - 2 years, September

***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**.*

1 Graduate Fellow - **PMF.gov*** - 6 weeks, September

***2 year full-time paid fellowship**, “Federal Government's premier leadership development program for advanced degree holders across all academic disciplines.”*

1 Participant - **CMS Intra-Agency Rotational Program** - 3 months, January-April

***3 month rotational program**, “Enriching development opportunity offering employees the chance to grow within CMS, expand their professional competencies and build networks”*

*: PMF.gov was terminated by executive action on Feb. 19th 2025: <https://www.whitehouse.gov/presidential-actions/2025/02/commencing-the-reduction-of-the-federal-bureaucracy/>

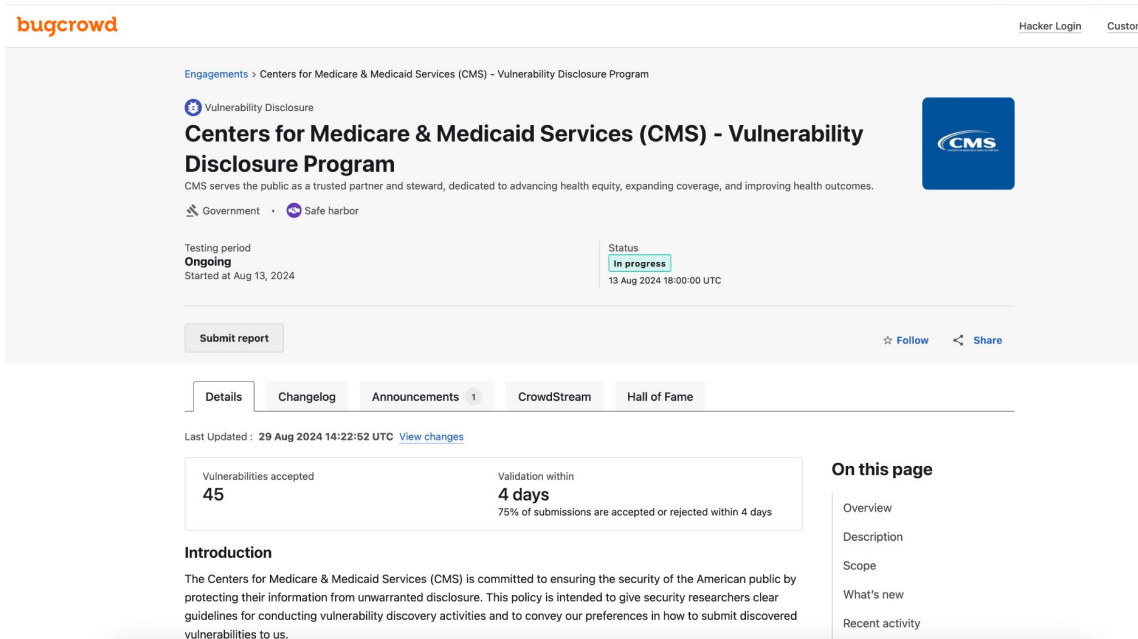


Case Study: CMS Bug Bounty Program



In 2024/2025 we launched CMS' first bug bounty.

This program pays hackers in the wild to test our systems.



We spent \$175,000 to alleviate \$180 million in vulnerabilities* in 4 months.

We partnered with our CISO (Keith Busby) and the Cybersecurity Infrastructure Security Agency (CISA) to crush bugs:

- 200 vulnerabilities submitted
- 18 (and counting) critical vulnerabilities identified and cleared.

*: Each vulnerability if exploited is estimated to cost \$10 million in damages. The cost of the Change Health ransomware attack is estimated at \$2.87 billion.



Lessons

- **Competitive Pay:** On par with the private sector on incentives
- **Broad Scope:** Having a broad attack surface attracts a range of hackers
- **Responsiveness:** Responding fast shows the hackers you value their time which in turn motivates them to find more bugs
- **Fixing bugs:** Hackers are motivated by money, but fixing the bugs they identify earns respect, which is priceless within the community
- **Non-restrictive participation:** Don't limit participation to Americans. We included all non-Treasury banned countries.

Case Study: Hospital Price Transparency Tool



Case Study: Hospital Price Transparency Tool

Challenge

Implementation details of a new policy were difficult for users to comply with, resulting in **uncertainty, ambiguity, and non-standard results** being reported.

Recommendation

Build an **Open Source Library and hosted tool** to validate results against the standard and directly help end-users.

Site: [cms.gov.github.io/hpt-tool/](https://cms.gov/github.io/hpt-tool/)

Repo: github.com/CMSgov/hpt-tool

Case Study: Hospital Price Transparency Tool

Hospital Price Transparency Tools

Machine readable file File name wizard

Upload file

Files must follow the voluntary sample format (.json or .csv)

Selected file

Change file

cms-hpt-validator-sample.csv

Having trouble formatting your file name?

[Leverage the file name wizard!](#)

How this tool helps

This validation tool helps identify basic issues in Hospital Price Transparency machine readable files: it checks whether the file matches the [voluntary sample format](#) published by CMS and will identify basic issues and errors for invalid data.

A file that passes these basic validation checks **does not mean that a file is guaranteed to be fully in compliance.**

This tool runs in the web browser, and uploading files here does not share these files with CMS. This validator tool is intended to be used with machine readable files that use the [voluntary sample format](#) published by CMS and will not work for files that do not use this formatting.

Contact

Have you run into an issue or have a question about this tool?

Please reach out to us at

PriceTransparencyHospitalCharges@cms.hhs.gov.

Validation results

Download results as spreadsheet

File name

File name invalid: cms-hpt-validator-sample.csv
Must match format: <ein>_<hospitalname>_standardcharges.[json|csv]. [Click here to use the file name wizard.](#)

Errors

4 errors found in file: cms-hpt-validator-sample.csv

CSV cell	Error description
F4	"billing_class" value "Facility" is not one of the allowed values: "professional", "facility"
G4	"setting" value "ipatient" is not one of the allowed values: "inpatient", "outpatient", "both"
A6	"description" is required
L6	"standard_charge discounted_cash" is required to be a positive number

For further information about resolving these issues, please refer to the document: [8 Steps to a Machine-Readable File](#)

Warnings

2 warnings for file: cms-hpt-validator-sample.csv
These items are not required changes, but addressing them could save time in the future.

CSV cell	Error description
C5	"code 1 type" value "C" is not one of the allowed values: "CPT", "HCPCS", "ICD", "MS-DRG", "R-DRG", "S-DRG", "APS-DRG", "AP-DRG", "APR-DRG", "APC", "NDC", "HIPPS", "LOCAL", "EAPG", "CDT", "RC", "CDM"
C6	"code 1 type" value "C" is not one of the allowed values: "CPT", "HCPCS", "ICD", "MS-DRG", "R-DRG", "S-DRG", "APS-DRG", "AP-DRG", "APR-DRG", "APC", "NDC", "HIPPS", "LOCAL", "EAPG", "CDT", "RC", "CDM"

Format your file name

This tool helps you name your machine readable file in the CMS-specified naming convention as required at 45 CFR §180.50(d)(5).

The output of the wizard automatically updates at the bottom of the form.

EIN

1234567890

Hospital name

Enter the hospital's legal name

GWU|OSCON General

Does your hospital have more than one location with distinct negotiated rates?

☐ Yes

☒ No

File type

☒ CSV

☐ JSON

Copy to clipboard

1234567890_gwu-oscon-general_standardcharges.csv

EIN must be 9 digits in the format XXXXXXXXX

By building on the open source U.S. Web Design System (designsystem.digital.gov), the project gets **Official Government Website look and feel**, as well **baseline 508 compliance** 'out of the box.'

By building a **Statically Generated Website**, we reduced our attack surface and **minimized security risks** and **cloud hosting costs**.

By **hosting the site publicly**, we **reduce the onboarding burden** of installing and running locally.

21 <https://github.com/DSACMS/decks/blob/main/gwuoscon2025.pdf>



Case Study: HPT-validator-tool

Validation results stuck on "File processing..." #8

🔒 Closed michaelhjung opened this issue on Jul 24 · 2 comments



michaeljung commented on Jul 24 • edited

Issue Report

Validation results stuck on "File processing..."

Expected behavior

Validation results section should show results within 1-2 minutes.

Actual behavior

Upon uploading a file, validation results screen gets stuck on "File processing..." No results seen after 10+ minutes. Console shows the following error:

Tracing the error, looks like the issue happens in the `validateJson` function when attempting to map `errorObjectToValidationError`.

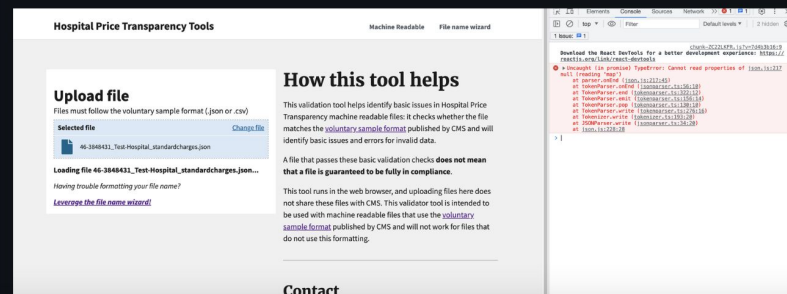
I've attached screenshots of the errors below.

GH doesn't support uploading json file type so here is a link to the test file I used: https://www.dropbox.com/sc/fi/dzpp6ofikki2w62p6q3nj/46-3848431_Test-Hospital_standardcharges.json?rlkey=d03rmg507hb2uuqnqss13gn8h&dl=0

Thanks!

Steps to reproduce the behavior

1. Upload file (see dropbox link above)
2. Open chrome devtools to see error in console



By releasing the project open source on GitHub.com, and using the CMS OSPO repo-scaffolder templates, we reduced the overhead of both submitting issues and merging of pull-requests by establishing clear expectations that adhere to open standards and best practices.



patsier-cms commented on Jul 24

Member ...

@michaeljung thanks for the detailed report! This was an issue on our end not properly handling valid JSON files without errors. This is now working with your sample file so I'm closing this, but feel free to reopen if you're able to reproduce.



1



 patsier-cms closed this as completed on Jul 24



michaeljung commented on Jul 24

Author ...

@patsier-cms thanks so much!!!



CMS' first “end-to-end” OSPO supported project: hpt-tool

- **Solves a real-world agency problem**, and **reduces burden** for Hospitals
 - Open source best practices, policy compliant, and elegantly executed
 - **Cost Avoidance** in both contractor time and cloud-hosting resources
 - **Modular Development** allows Logic code to be **“write once and reuse”**
 - Working in the Open **enables contributions**, not just passive feedback!
-

Conclusion

- This project demonstrates how OSPOs and an OSS Strategy help the agency **deliver software faster**, with existing in-house resources, while **reducing costs and risks** for the agency, and **reducing burden** for our users.
- HPT-tool can **serve as a model** for future open source projects across CMS, HHS, and the Federal Government



Burden Reduction Breakdown: Hospital Price Transparency

DSAC partnered with Center for Medicare to improve the implementation of the Hospital Price Transparency Rule. By automating processes with new tools for providers to use, we **reduced both cost and burden** hours to the **CMS team** working on compliance, **and providers** complying with CMS rules.

Internal to CMS:

- Finding the files - Reduction in **7,089 yearly burden hours**
- Auditing the files - Reduction in **56,784 yearly burden hours**

External for Providers

- Auditing the files: Reduction of **56,784 yearly burden hours**
- Preparing cms.hpt.txt file - Reduction of **7,089 yearly burden hours**
- Uploading cms.hpt.txt file - Reduction of **2,729 - 65,280 yearly burden hours**



Our impact.





193,026 Hours

of estimated time savings as the result of our open source work!

—● And The Journey Continues...

Thank You GWU OSCON!



**DIGITAL
SERVICE
AT CMS**



Questions or Comments?

<https://go.cms.gov/ospo>

Open Source Questions?
opensource@cms.hhs.gov

Digital Service Questions?
DigitalService@cms.hhs.gov

Help Answer The Call!

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

DigitalCorps Fellowships
<https://digitalcorps.gsa.gov>

CodingItForward Summer Internships
<https://codingitforward.com>

