Open Security Controls Assessment Language
What is OSCAL and Who Needs It?

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National Institute of Standards and Technology
U.S. Department of Commerce

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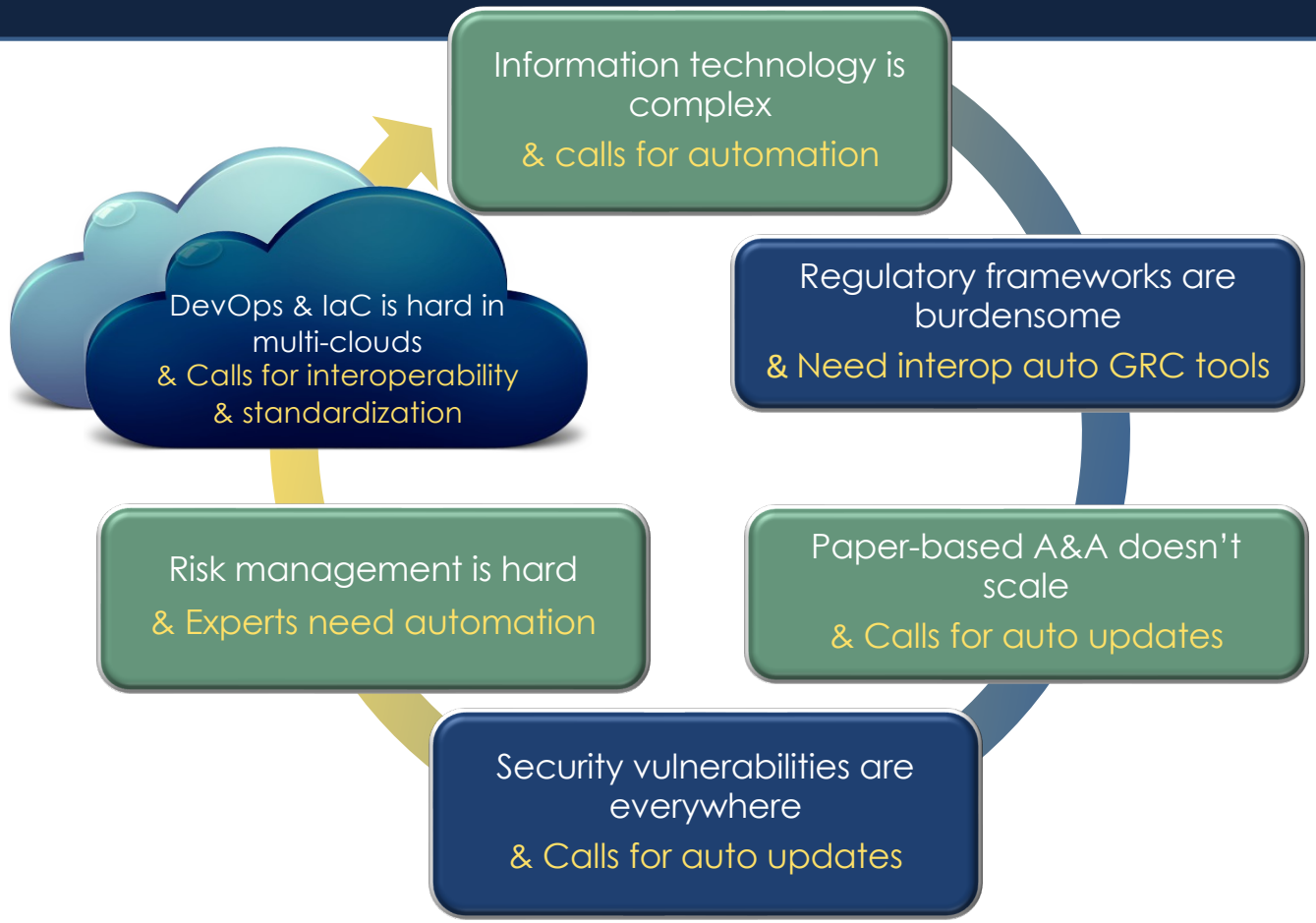
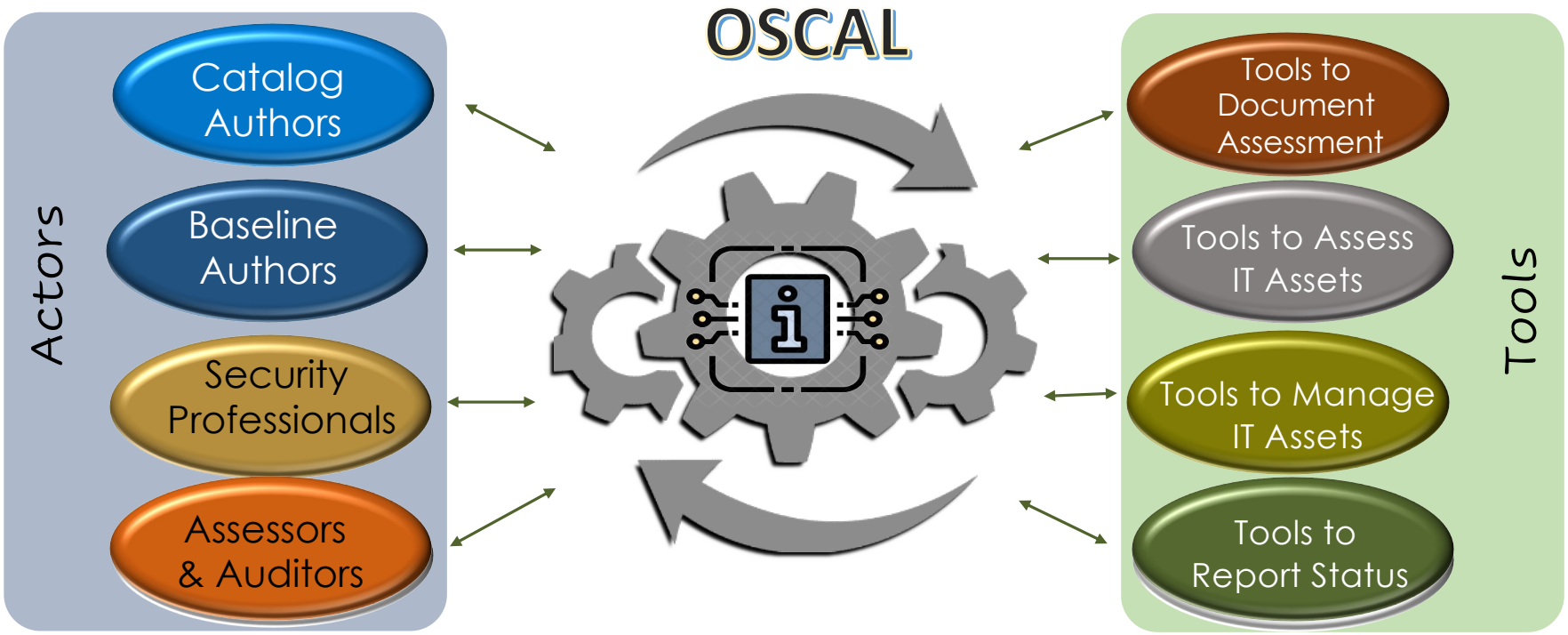
Why are we all here today?



What was needed?

A (Cyber) Machine-readable Esperanto that enables actors, tools and organizations to exchange information via automation:

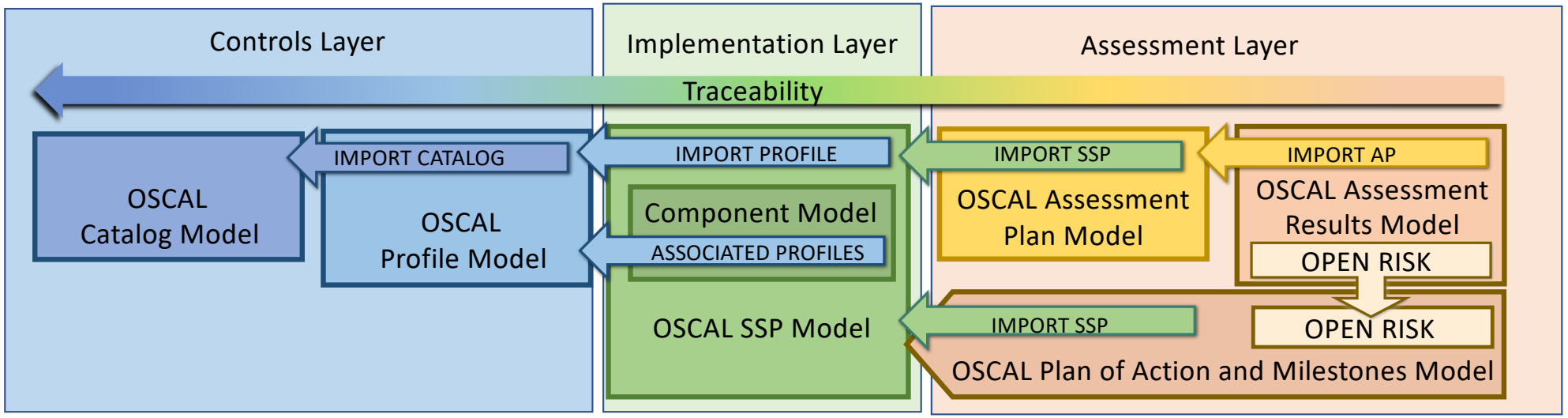


OSCAL sets the foundation for automation and interoperability

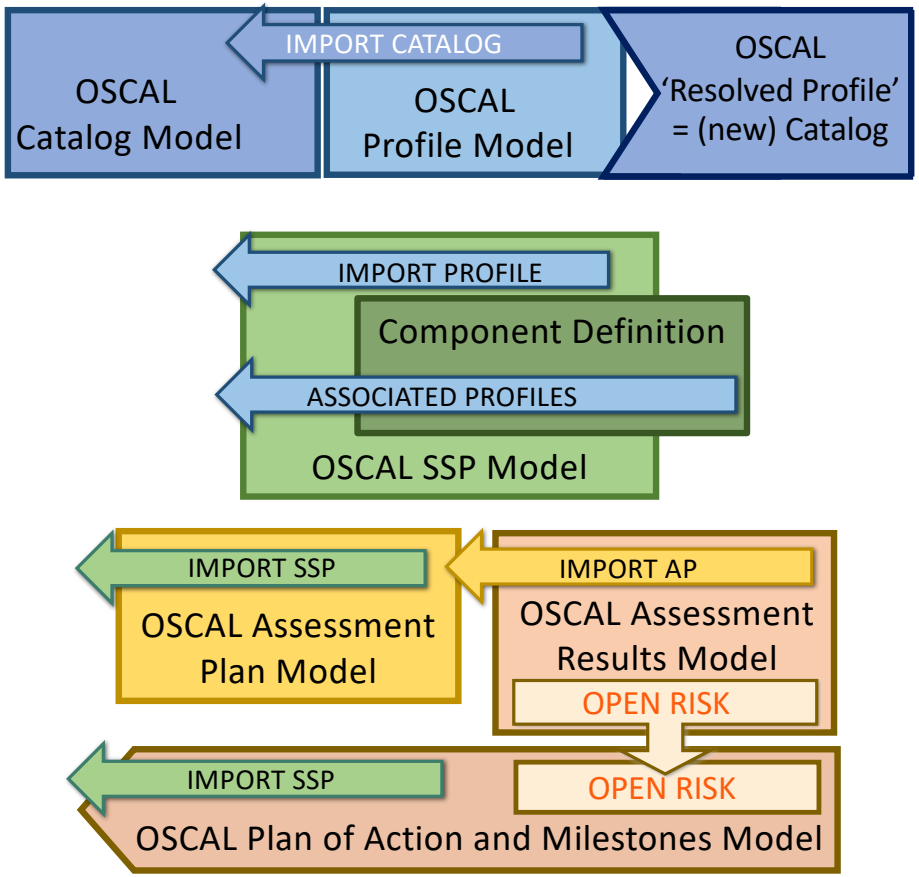
What is OSCAL?

OSCAL is the result of NIST and FedRAMP collaboration

- **OSCAL provides** a common/single machine-readable *language*, expressed in XML, JSON and YAML for:
  - multiple compliance and risk management frameworks (e.g. SP 800-53, ISO/IEC 27001&2, COBIT 5)
  - software and service providers to express implementation guidance against security controls (Component definition)
  - sharing how security controls are implemented (System Security Plans [SSPs])
  - sharing security assessment plans (System Assessment Plans [SAPs])
  - sharing security assessment results/reports (System Assessment Results [SARs])
- **OSCAL enables** automated traceability from selection of security controls through implementation and assessment



How is OSCAL different?

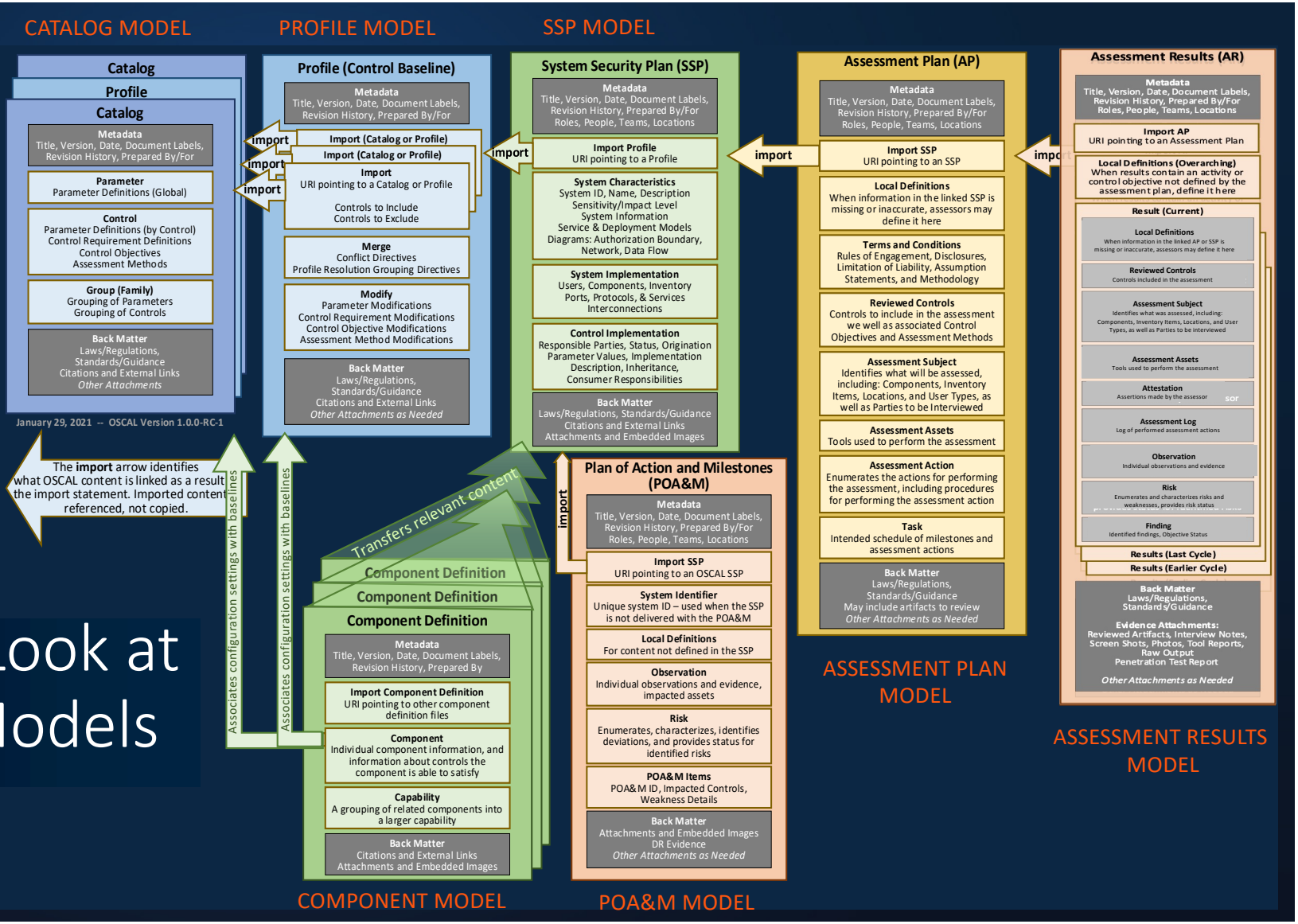


- No information needs duplication
- Custom granularity (controls can be decomposed into statements)
- Unique identifiers for parameters and statements

- Vendors can document their products
- Systems' security implementation can be decomposed

- Capture assessment Plans and Activities with custom cadence, & only for selected components
- POA&M conveys open risks aligned with the SSP capabilities and controls

A Closer Look at OSCAL Models



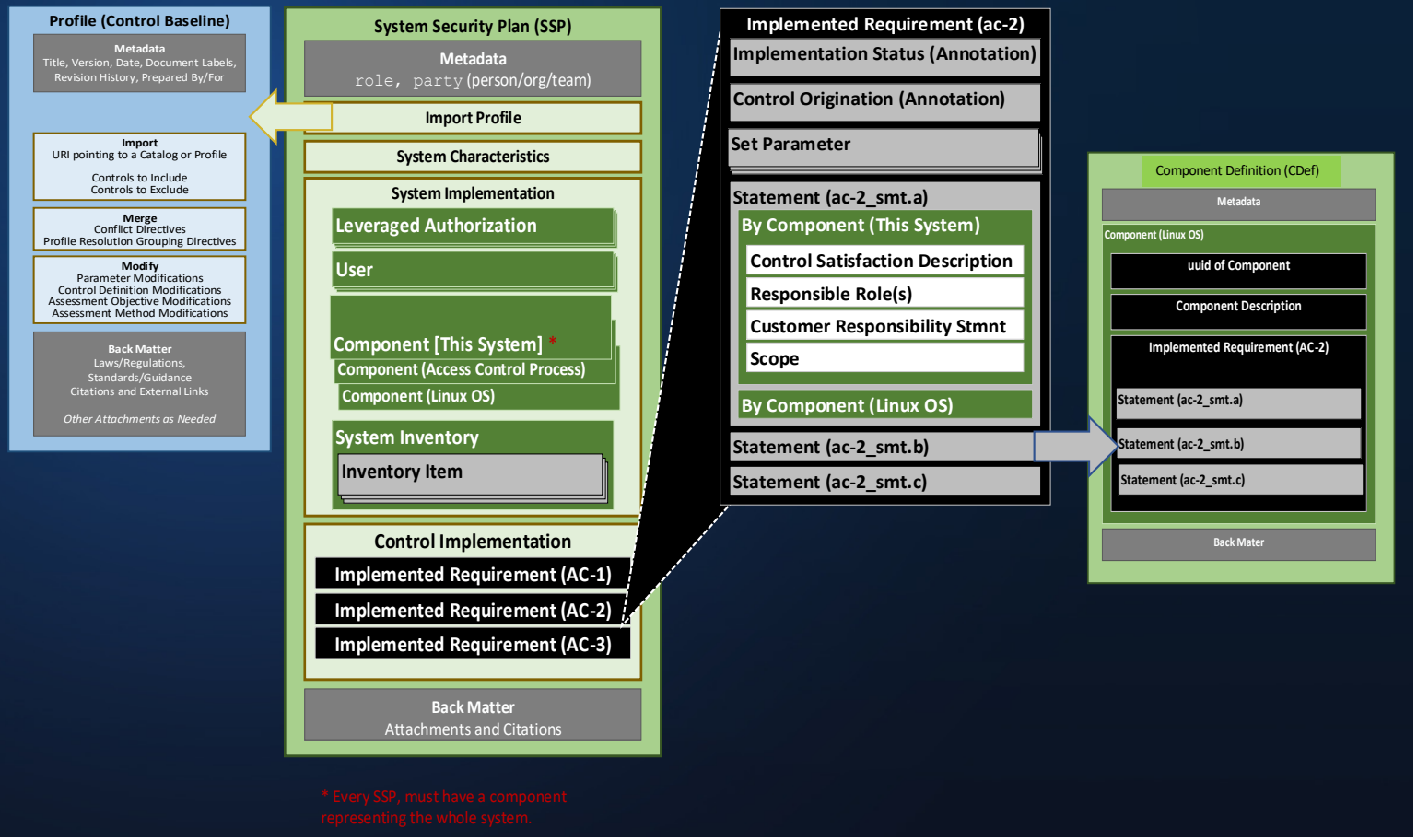
Anatomy of the OSCAL Implementation Layer

NIST

Where the Innovation Truly Starts:
The OSCAL Implementation Layer

OSCAL SSP:

- Imports a Profile identifying the controls
- Each control response is broken down to the individual components involved.
- Enables a more robust response to controls
- Example: The access control implementation that satisfies *AC-2, part a* is described separately for:
  - This System
  - The Access Control Procedure
  - A shared Application



OSCAL Support for Continuously Authorizing Systems to Operate

Authorization to Use Common Control Authorization

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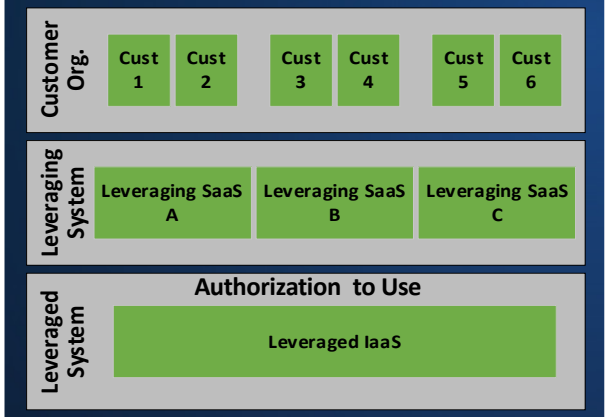
Common Control Authorization & **Authorization to Use**

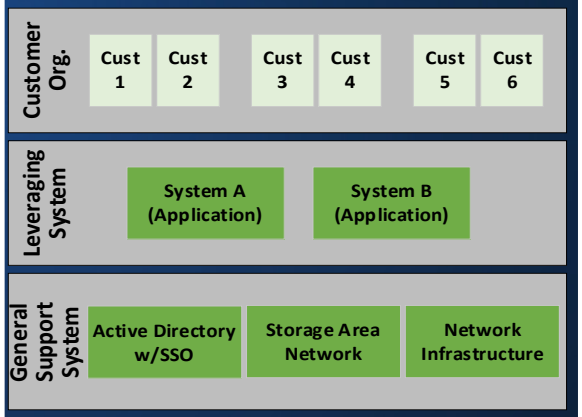
Yes



Cloud (SaaS on IaaS)

Cloud: Several SaaS systems running on a separately authorized IaaS.

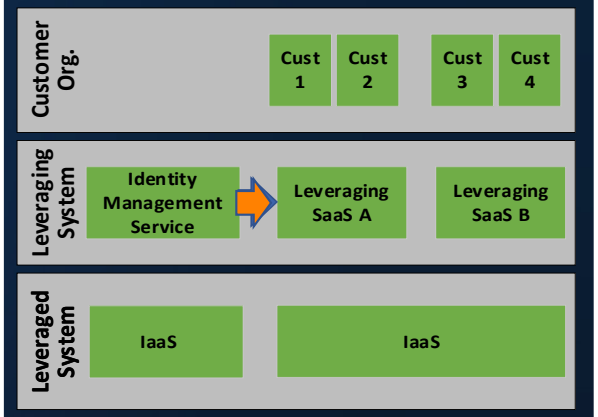
Yes



Data Center (System on GSS)

Data Center: Several systems relying on a separately authorized storage array or other general support system (GSS)

No



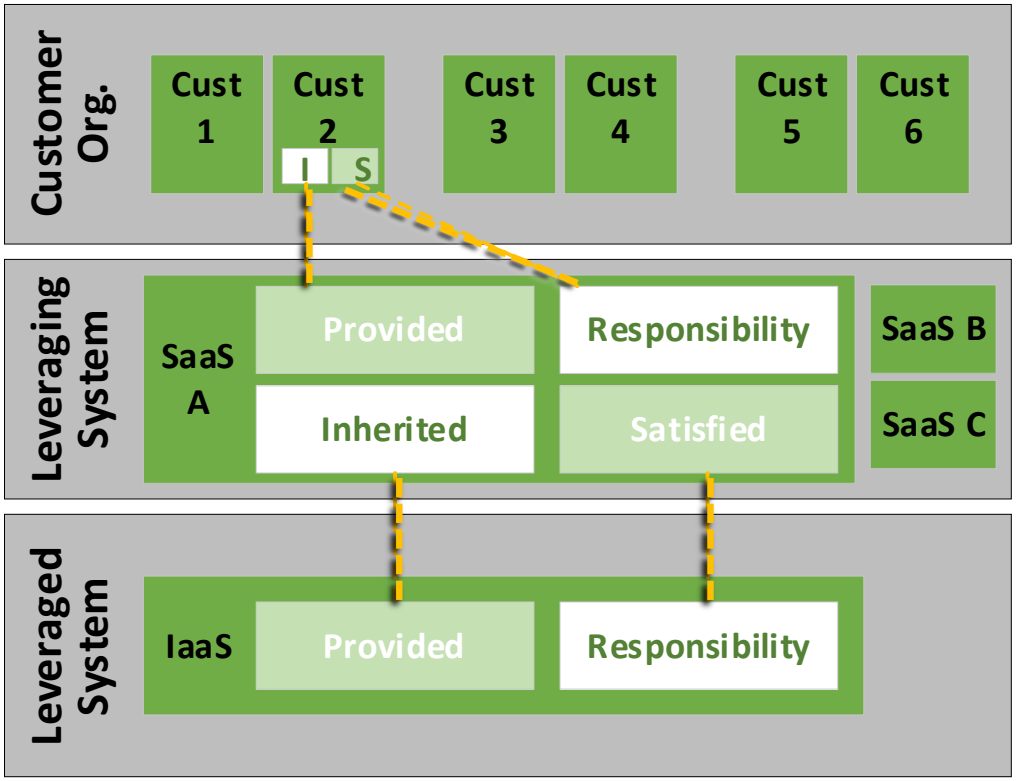
External Service or Interconnection

Interconnections or External Services are not leveraged authorizations

- Even if they have an authorization
- SaaS A handles the Identity Management Service as a system component

OSCAL supports this, just not as a L.A.

OSCAL supports leveraged ATOs of complex stacked systems



Leveraging System:

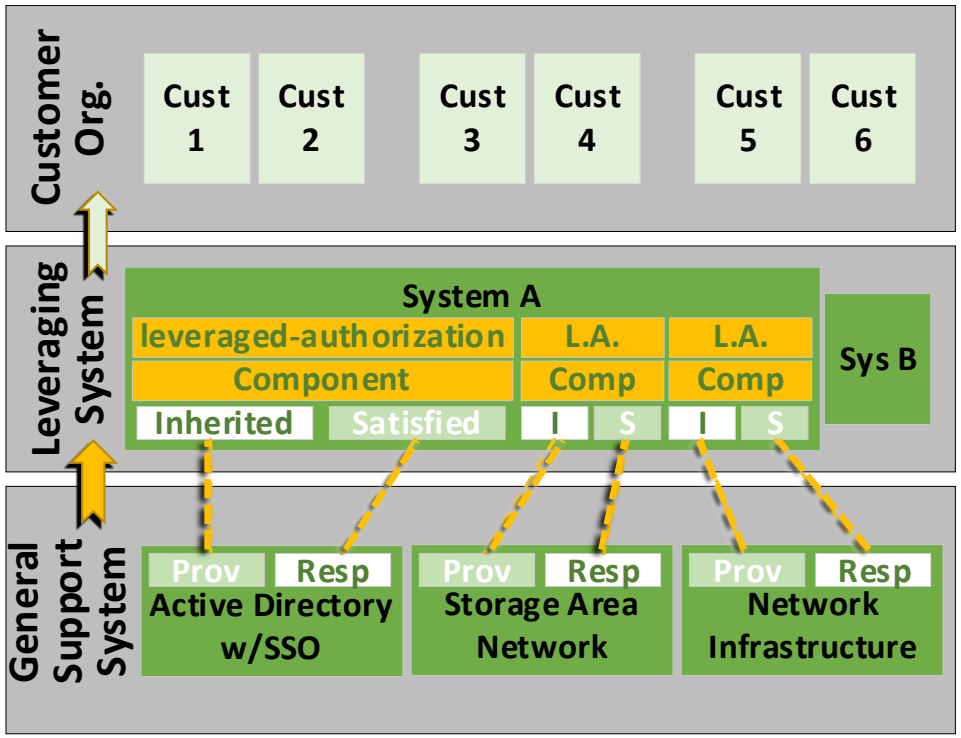
The leveraging system's SSP should:

- identify what is inherited from a leveraged system
- identify any addressed responsibilities (as identified by the leveraged system)

In addition to:

- identifying what **may be** inherited by the leverag**ing** system's customers
- any responsibilities the leverag**ing** system's customers must address to fully satisfy a control

When a Leveraging System has more than one Leveraged System



The same syntax is used

- It is simply replicated for each leveraged system

The Leveraging System's SSP:

- Has a separate "leveraged-authorization" assembly for each leveraged system.
- Has a separate "component" representing each leveraged system.
- Has a separate "component" representing the leveraged system components associated with inherited capabilities.

Anatomy of the OSCAL Assessment Layer

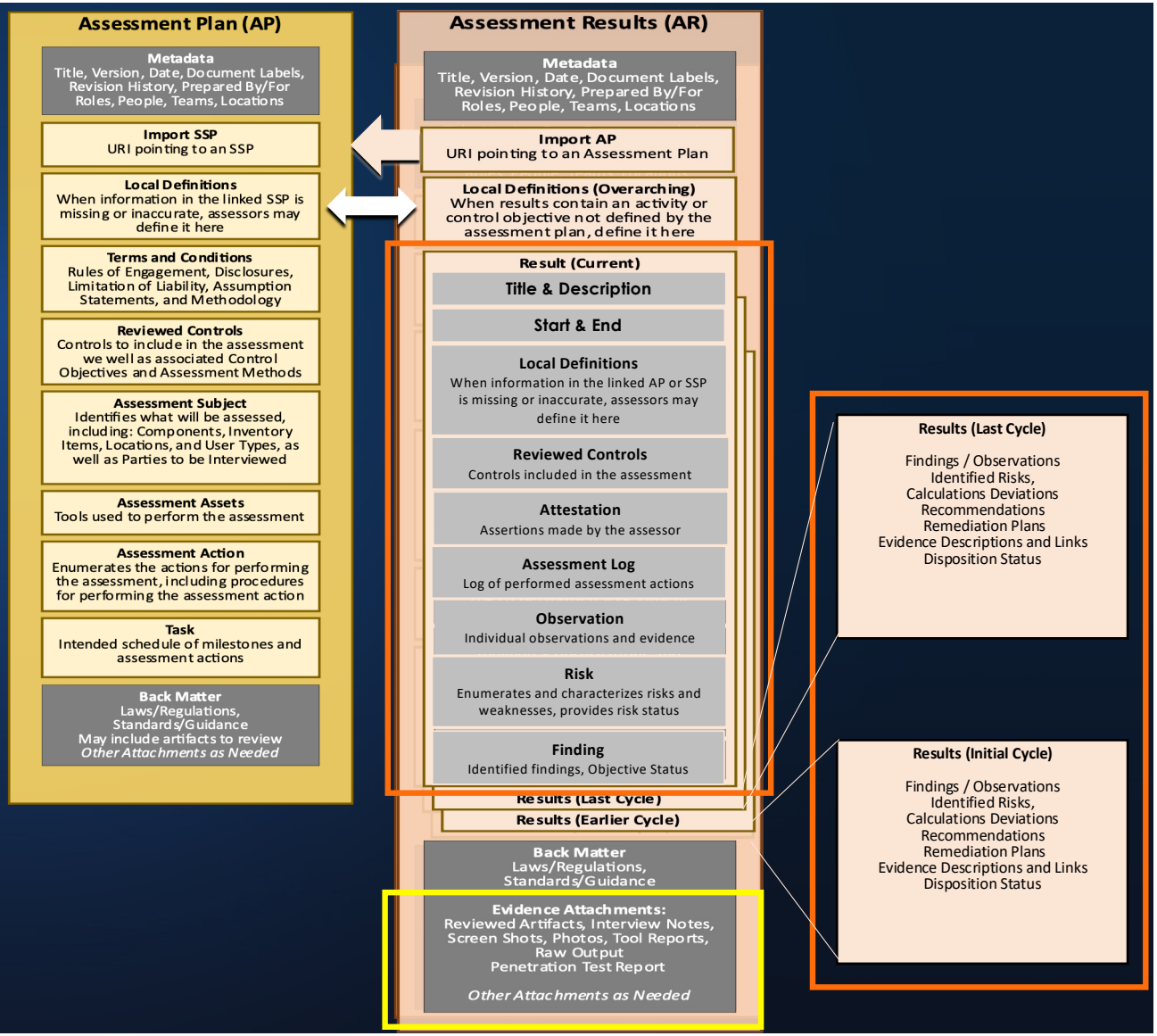
NIST

Assessment Plan (AP) & Assessment Results (AR)

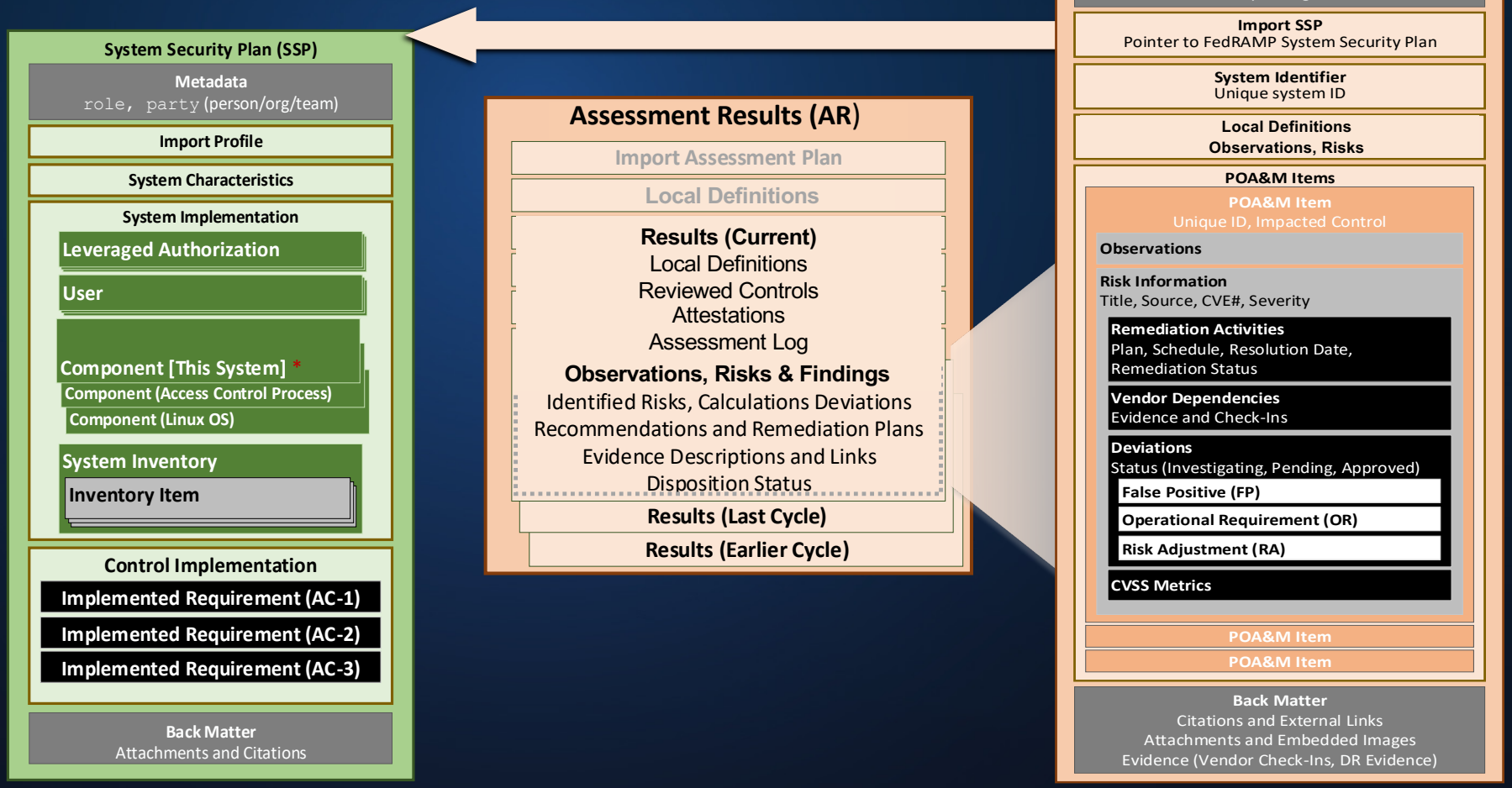
- OVERLAPING SYNTAX
- SIMILAR BUT DISTINCT PURPOSE
- UNIQUE to AR: Results (& Evidence)

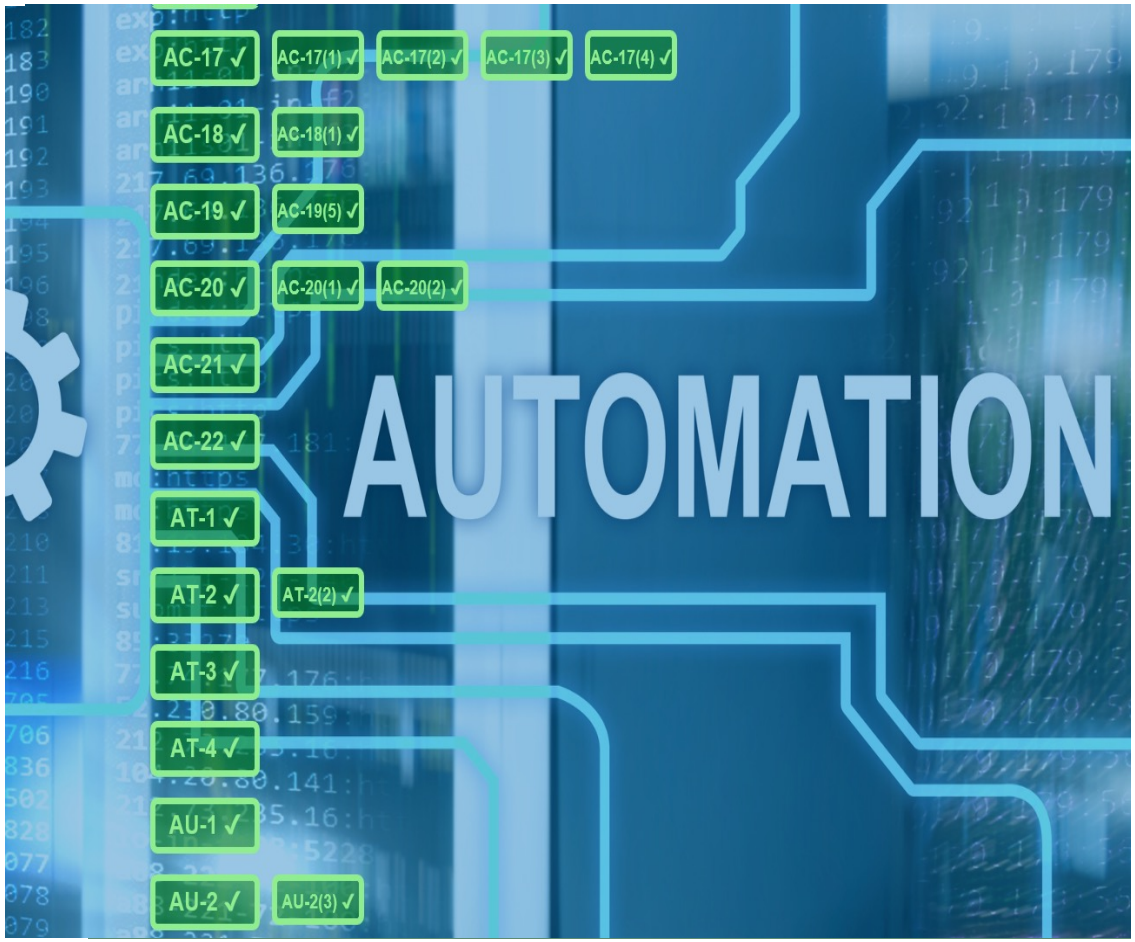
Continuous Assessment Approach

- **Assessment Plan**: What should be tested/inspected, how, and with which cadence is desired
- **Assessment Results**: Time-slice of results



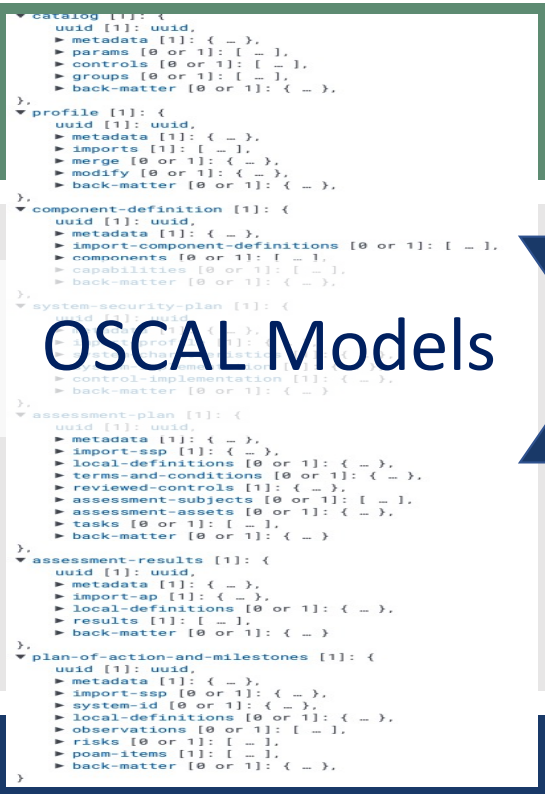
OSCAL POA&M Model





What can you do with the OSCAL models?

OSCAL Models >>> OSCAL Content >>> OSCAL Tools



OSCAL Models

https://github.com/usnistgov/OSCAL

OSCAL Content Generation

OSCAL Content in Action

https://github.com/usnistgov/oscal-content

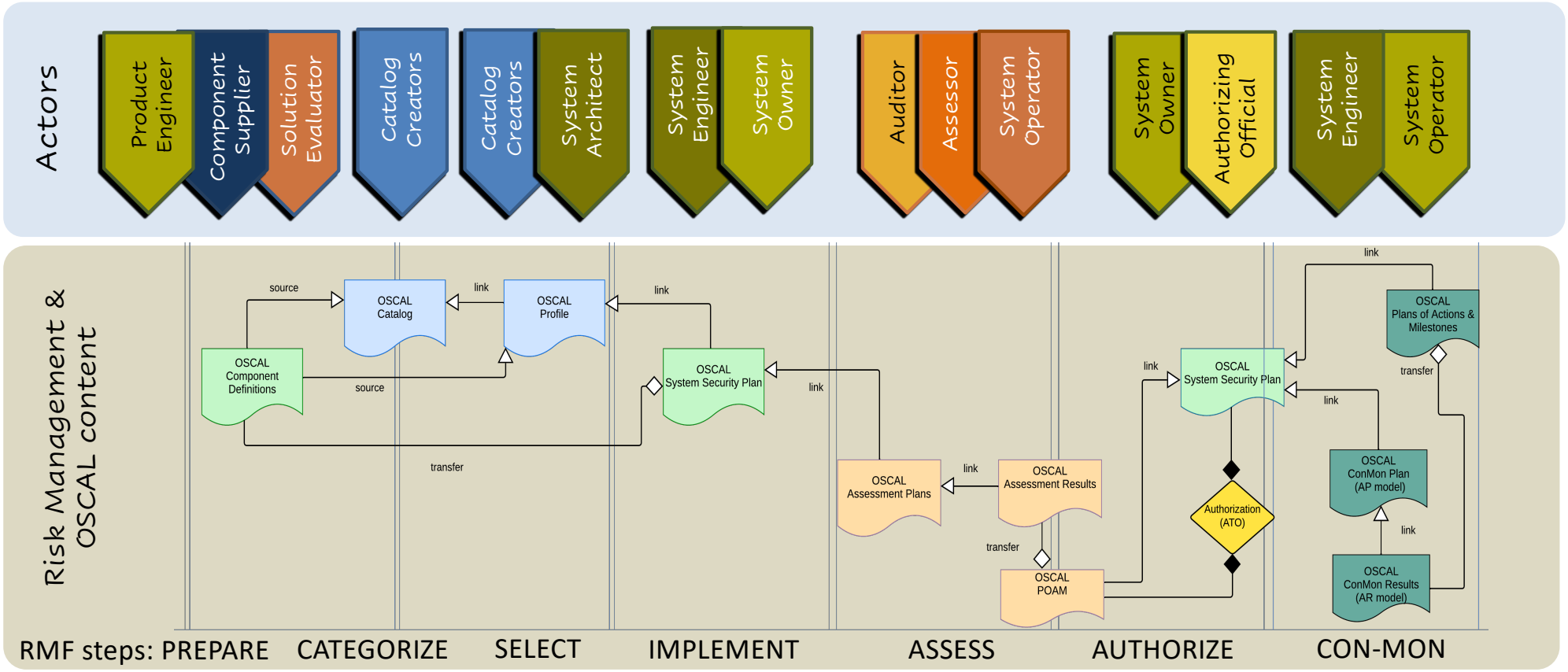
Name	Provider/Developer	Description	Type
Compliance trestle	IBM	A python SDK and command line tool which manipulates OSCAL structures and supports transformation of data into OSCAL.	open source
OSCAL Java Library	NIST OSCAL Project	A Java-based programming API for reading and writing content conformant to the OSCAL XML, JSON, and YAML based models.	open source
OSCAL React Component Library	Easy Dynamics	A library of reusable React components and an example user interface application that provides a direct UI into OSCAL	open source
XSLT Tooling	NIST OSCAL Project		open source
XML Jelly Sandwich	Wendell Piez (NIST)	Interactive XSLT in the browser includes OSCAL demonstrations.	open source
Xacta 360			license
Atlasity: Continuous Compliance Automation	C2 Labs	development of OSCAL v1.0 content for Catalogs, Profiles, System Security Plans and Components. Additional detail can be found in this blog post: Atlasity Delivers Free Tools to Create OSCAL Content.	community edition

OSCAL Editorial Tools

OSCAL GRC Tools

https://github.com/usnistgov/oscal-tools

Who can benefit & How



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Use of Metaschema and Metaschema Constraints in OSCAL

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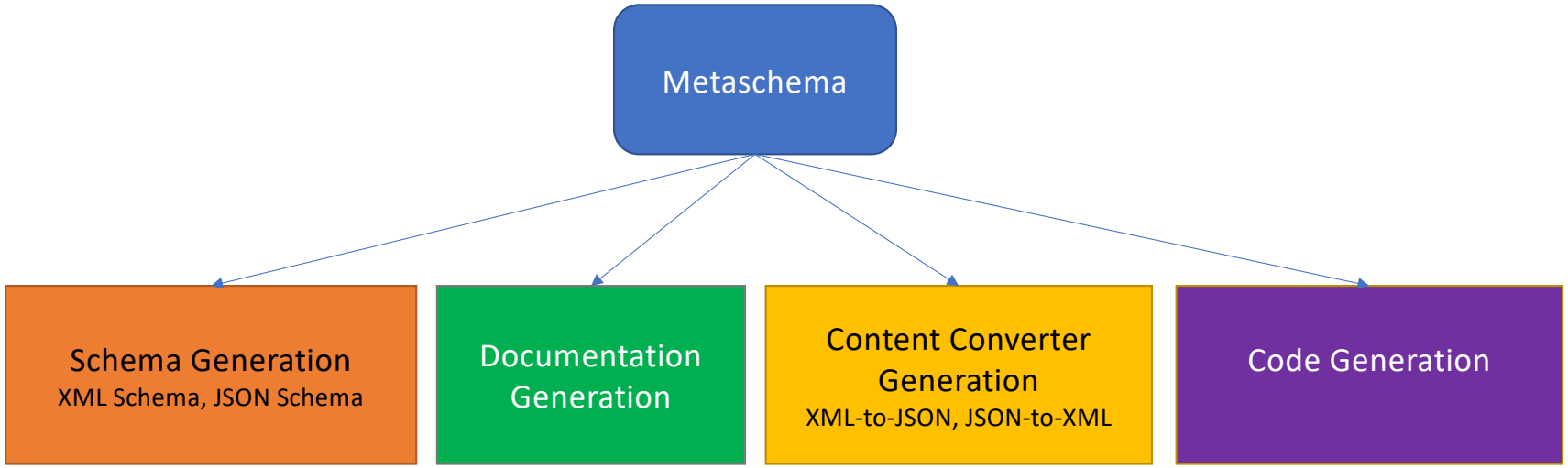
Metaschema provides a format-agnostic foundation for managing data formats and supporting tooling

- OSCAL uses Metaschema to define the logical structure of OSCAL data.
- Metaschema is format agnostic. We can support XML, JSON, and YAML with no extra effort.
- XML and JSON Schema are derived from Metaschema definitions to support well-formedness checking for XML, JSON, and YAML formats.
- Model documentation can be auto-generated.

Metaschema provides a format-agnostic foundation for managing the OSCAL models.

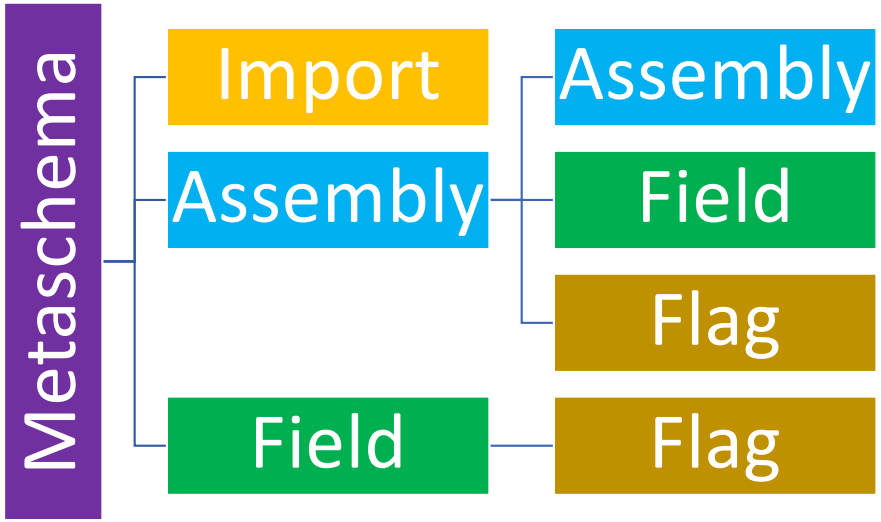
Use of Metaschema provides model agility



A single modeling approach supporting multiple formats and related productions.

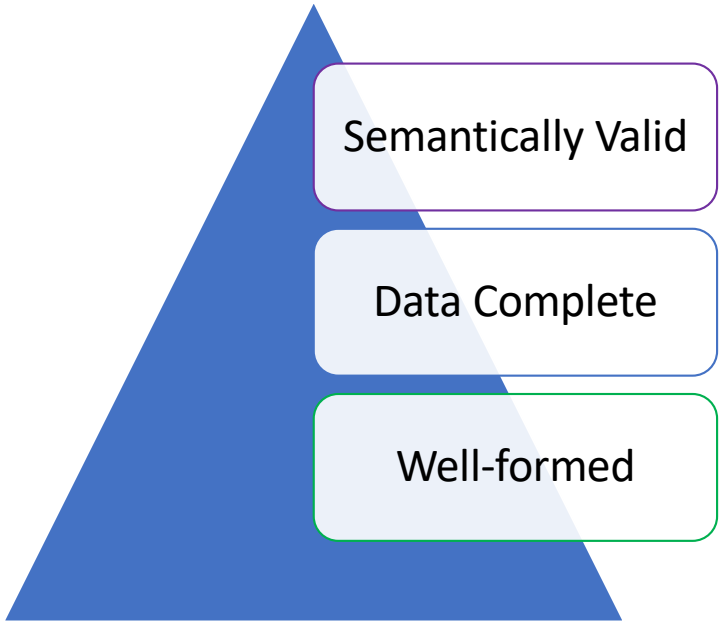
Metaschema structure

- Metaschema is compositional.
- **Imports** allow constructs to be shared between Metaschemas.
- **Assembly:** Represents a data object.
  - Contains child assemblies and fields at various cardinalities
  - May contain flags
- **Field:** Represents a valued data point
  - May contain flags
- **Flag:** Qualifies or supports a data object



The path to richer Semantics in OSCAL

- Metaschema supports format-agnostic constraints.
  - Supports co-constrains (i.e., if X then Y)
  - Richer rules than schema validation alone
- Constraints are written in Metapath, an XPath-like grammar.
- Can measure data completeness for a given use case
- Will allow different dialects to be defined for OSCAL (i.e., FedRAMP)



Open-Source Tools and Libraries

https://pages.nist.gov/OSCAL/tools/#open-source-tools-and-libraries

Name	Provider/Developer	Description	Type
Compliance trestle	IBM	A python SDK and command line tool which manipulates OSCAL structures and supports transformation of data into OSCAL.	open source
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OSCAL React Component Library	Easy Dynamics	A library of reusable React components and an example user interface application that provides a direct UI into OSCAL.	open source
OSCAL REST API	Easy Dynamics	An initial OpenAPI definition of an OSCAL REST API that describes how systems might manipulate catalogs, profiles, components, and SSPs.	open source
XSLT Tooling	NIST OSCAL Project	A variety of Extensible Stylesheet Language (XSL) Transformations (XSLT), Cascading Style Sheets (CSS), and related utilities for authoring, converting, and publishing OSCAL content in various forms.	open source
XML Jelly Sandwich	Wendell Piez (NIST)	Interactive XSLT in the browser includes OSCAL demonstrations.	open source
Xacta 360	Telos	Xacta 360 is a cyber risk management and compliance analytics platform that enables users to create and submit FedRAMP system security plans (SSPs) in OSCAL format. Future OSCAL capabilities are forthcoming as the standard evolves.	license
Atlasity: Continuous Compliance Automation	C2 Labs	Atlasity CE (release 2.0) runs in any environment and supports the development of OSCAL v1.0 content for Catalogs, Profiles, System Security Plans and Components. Additional detail can be found in this blog post: Atlasity Delivers Free Tools to Create OSCAL Content.	community edition
control_freak	Risk Redux	This tool seeks to provide folks with a searchable and easy-to-navigate reference for NIST SP 800-53 Revision 5. It is an open-source application from the Risk Redux project, built using parsed content directly from the OSCAL repositories.	open-source

Few of the OSCAL Adopters

2021 presenters

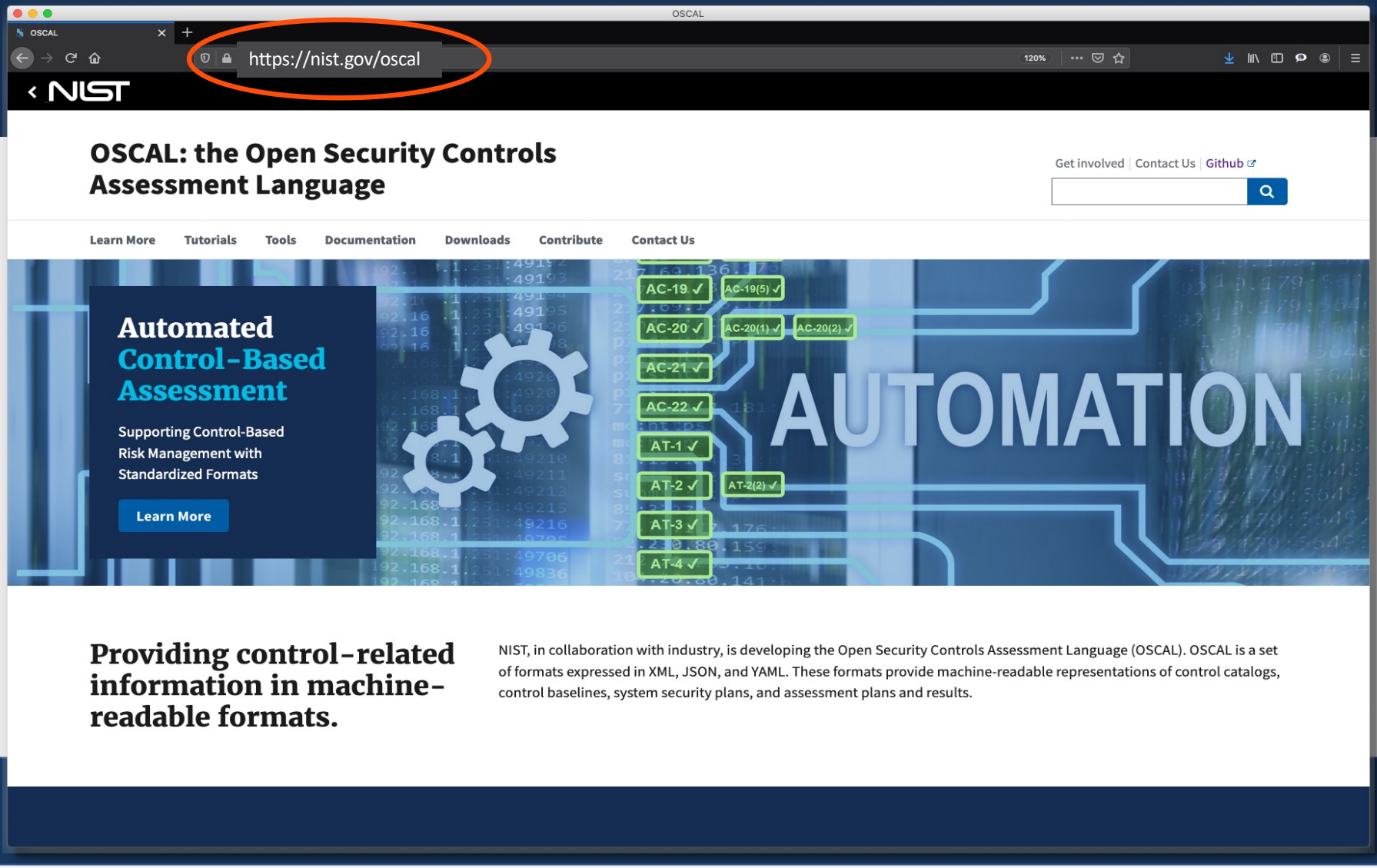
- ❑ FedRAMP
- ❑ Noblis
- ❑ HHS CMS
- ❑ National Renewable Energy Lab
- ❑ GovReady
- ❑ C2 Labs
- ❑ cFocus Software
- ❑ Shujinko
- ❑ Robers Bosch (EU|Germany)
- ❑ Telos
- ❑ KPMG
- ❑ IBM Research

2022 new presenters

- ❑ AWS
- ❑ CSAM
- ❑ Easy Dymanics
- ❑ Volant Associates LLC
- ❑ Secureframe
- ❑ Red Hat
- ❑ Nirmata
- ❑ SunStone Secure

2021-2022 other adopters

- ❑ Booz Allen Hamilton
- ❑ eMASS
- ❑ Microsoft
- ❑ Coalfire
- ❑ Kratos
- ❑ Salesforce
- ❑ Oracle


OSCAL
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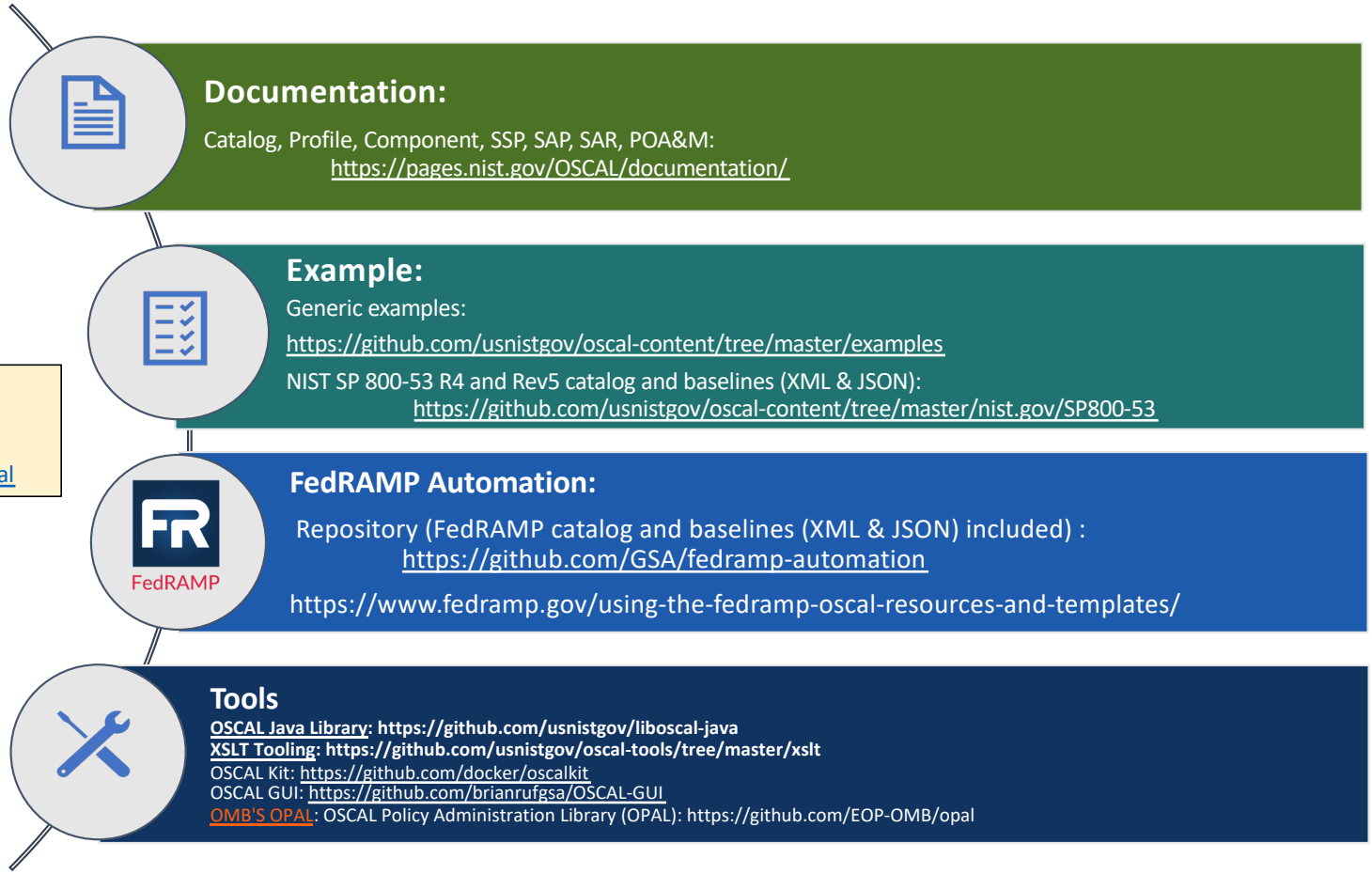
OSCAL: the Open Security Controls Assessment Language
Get involved | Contact Us | Github
Learn More Tutorials Tools Documentation Downloads Contribute Contact Us
Automated Control-Based Assessment
Supporting Control-Based Risk Management with Standardized Formats
Learn More
AC-19 ✓
AC-19(5) ✓
AC-20 ✓
AC-20(1) ✓
AC-20(2) ✓
AC-21 ✓
AC-22 ✓
AT-1 ✓
AT-2 ✓
AT-2(2) ✓
AT-3 ✓
AT-4 ✓
AUTOMATION
Providing control-related information in machine-readable formats.
NIST, in collaboration with industry, is developing the Open Security Controls Assessment Language (OSCAL). OSCAL is a set of formats expressed in XML, JSON, and YAML. These formats provide machine-readable representations of control catalogs, control baselines, system security plans, and assessment plans and results.

Publicly Available Resources

Please visit Community's:
OSCAL Club/awesome-oscal:
https://github.com/oscal-club/awesome-oscal



Questions?

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Chat with us on Gitter: https://gitter.im/usnistgov-OSCAL/Lobby
Collaborate with us on GitHub: https://github.com/usnistgov/OSCAL
Join our COI meetings: https://pages.nist.gov/OSCAL/contribute/#community-meetings

Thank you!