Asset Reporting Format (ARF) and Asset Identification

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What is ARF and Asset Identification

- What is Asset Identification
  - NIST Interagency Report (IR) 7693
  - A specification governing the method and format to identify and represent assets
- What is ARF
  - NIST Interagency Report (IR) 7694
  - A specification governing the formatting of reports about assets
  - Defines how tools should report on information about assets

What is an Asset

- Anything that has value to an organization, including, but not limited to, an organization, person, computing device, Information Technology (IT) system, IT network, IT circuit, software (both an installed instance and a physical instance), virtual computing platform (common in cloud and virtualized computing), and related hardware (e.g. locks, cabinets, keyboards, etc.).

Who contributed to ARF and Asset Identification

- National Institute of Standards and Technology (NIST)
- Department of Defense Computer Network Defense Research and Technology Program Management Office (DoD CND R&T PMO)
- MITRE Corporation

Agenda

- Overview of Asset Identification
- Overview of ARF
- Where we're going

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Asset Identification

How do you associate information about an asset with the asset itself?

Asset Identification

Or,

Asset Identification

How do you uniquely identify an asset and represent that identification?

Use Cases

- Reporting
  - E.g. assessments, remediations, events
- Tasking
  - E.g. assessments, remediations
- Contextual Information
  - E.g. owning organization, location, network, etc
- Federation of asset databases
- Correlation of sensed data

What types of assets are we looking at?

- Person
- Organization
- System
- Software
- Database
- Network
- Service
- Data
- Computing Device
- Circuit
- Website
- (3rd parties can extend it)

What do you get?

- Correlation of data across the management domain, including from varying…
  - Sensor types
  - Timeframes
  - Result types
  - Vendors

Are we there yet?

- Automated security specifications use varying mechanisms to identify assets
  - **Incompatible** specifications
  - **Inconsistent** implementations
  - **Incomplete** information

How can we get there?

- Single specification to identify assets
- May be used by specification authors as identification elements
  - OVAL
  - XCCDF
  - OCIL
  - Digital event reporting
  - Remediation

How it works

Assets may be identified using some set of **identifying information**, including both **literal identifiers** and **synthetic identifiers**

Synthetic Identifiers

- Many tools assign identifiers to assets they manage
- Assets may be identified using an **assigned identification element** in the context of a **namespace**
- Ex:
  - Namespace: VendorProduct1
  - Identifier: Asset3544

Literal Identifiers

- Information that is **collectable** or **discoverable** about an asset is also useful for identification
  - Devices: hostname, IPv4 address, Motherboard GUID
  - People: Full name, location, organization
  - Organizations: Name, type

How it works

Assets may be identified using some set of **identifying information**, including both **literal identifiers** and **synthetic identifiers**

Examples

Synthetic IDs:
- Asset1234@MITRE

Synthetic IDs:
- Asset1234@MITRE
- Asset4321@Tool2

Synthetic IDs:
- Asset1234@MITRE
- Asset4321@Tool2

Literal Identifiers:
- IPv4: 1.2.3.4
- Hostname: mm123123

Literal Identifiers:
- IPv4: 1.2.3.4
- Hostname: mm123123

What it means for you: **End Users**

- More complete and accurate information about each asset
  - Better metrics
  - Improved knowledge of security posture
  - Better return on investment

What it means for you: **Vendors**

- Simpler and Cheaper Implementation
  - Single identification element to implement across the various specifications
- Normalized data to support fusion and correlation
    - But no rules on extra features your product can offer
- Single path for feedback on problems
- Built-in extension mechanisms for value-added capabilities

What it means for you: **Specification Authors**

- Focus on core competency
  - Reuse asset identification
- Automatic compatibility of identification with other specifications

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Purpose of ARF

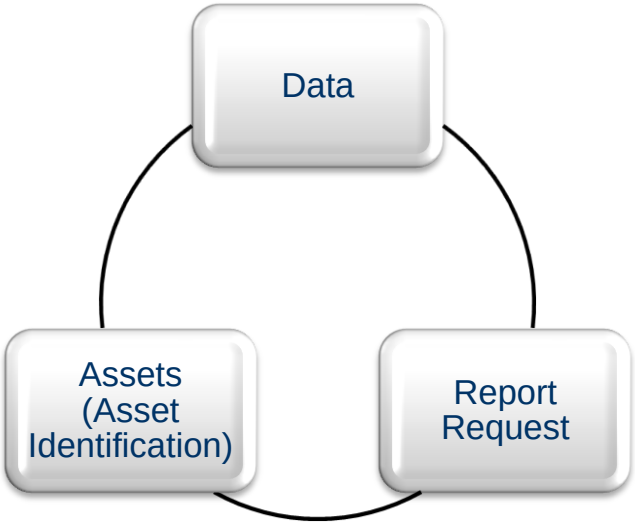
- Define a data model to house data about:
  - Assets
  - Asset identification information
  - Requests for asset information
  - The relationships between the components above
- Define a specification to report about assets in support of numerous use cases in government and industry at various levels of detail

Purpose of ARF (con't)

- Enable asset report correlation
  - Leverage the Asset Identification specification to identify the subjects of reports enabling different reports about the same assets to be correlated across and enterprise

Scope of ARF

- Define the report transport data model
- Define the relationships between asset report components, while leaving the low-level data models to other specifications



High-level Requirements

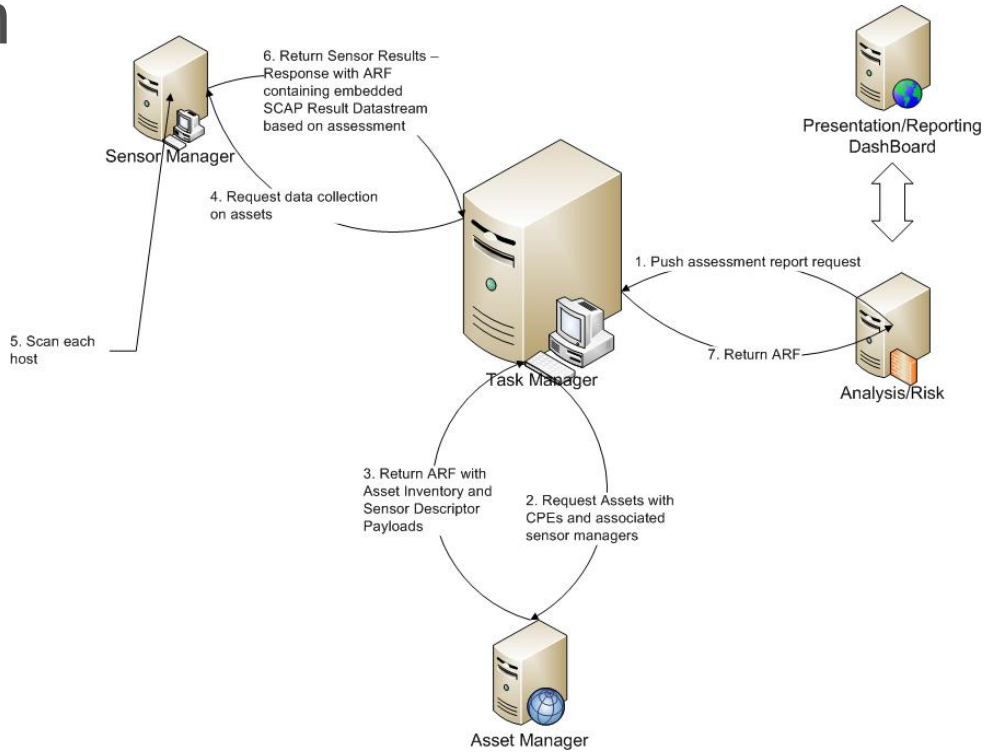
- Must be able to:
  - associate one or more assets with arbitrary payloads
  - define explicit relationships between payloads and assets
  - combine multiple ARF reports into a single ARF report
  - define reusable sets of data
  - reference data external to the ARF report

Use Cases

- Vulnerability Management
- Asset Discovery and Inventory Management
- Compliance Assessment
- Digital Event Analysis

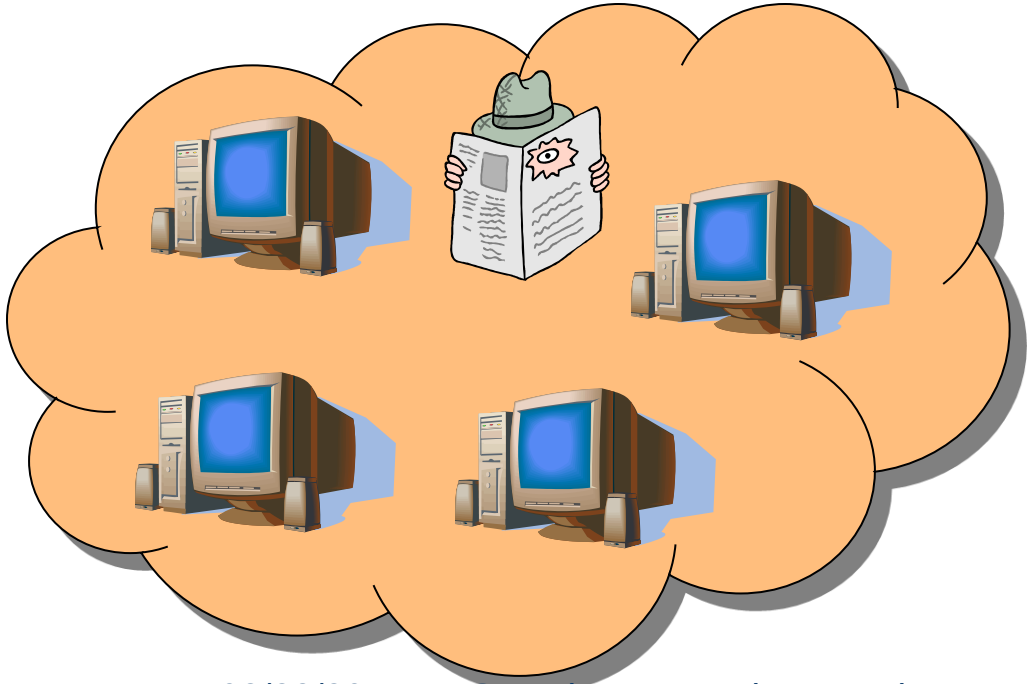
Use case: Vulnerability Management

- Endpoint scan results
- Aggregate reporting of vulnerability / remediation



Use case: Asset Discovery and Inventory Management

- Reporting on newly discovered assets
- Maintaining inventory records of assets
- Communicating about assets between data stores



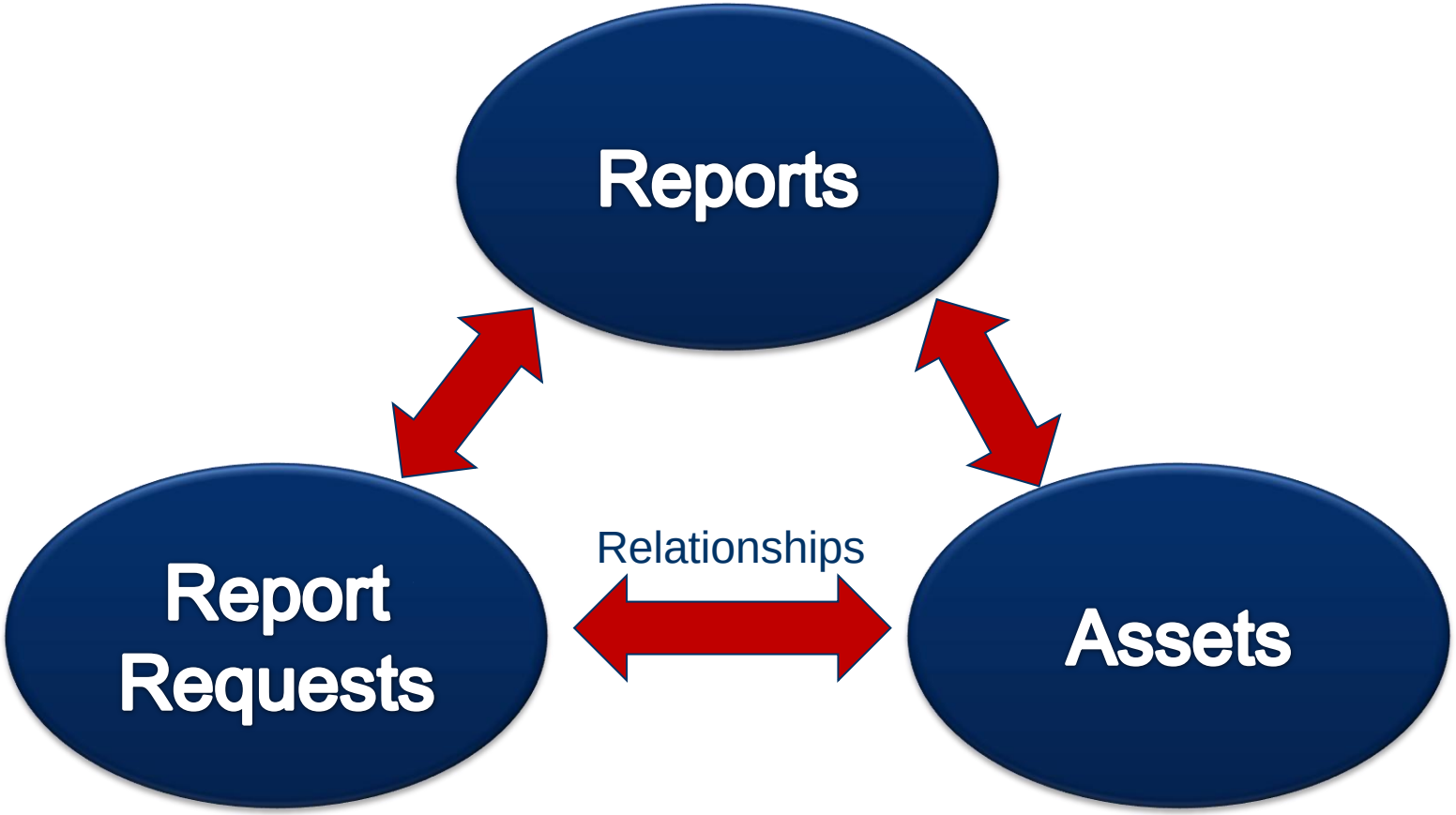
Use case: Compliance Assessment

- United States Government Configuration Baseline (USGCB) / Federal Desktop Core Configuration (FDCC)
- Federal Information Security Management Act (FISMA)
- Health Insurance Portability and Accountability Act (HIPAA)
- Sarbanes-Oxley (SOX) Compliance
- Payment Card Industry (PCI) Compliance
- Organizational policies (e.g. STIGs, NSA SCG)

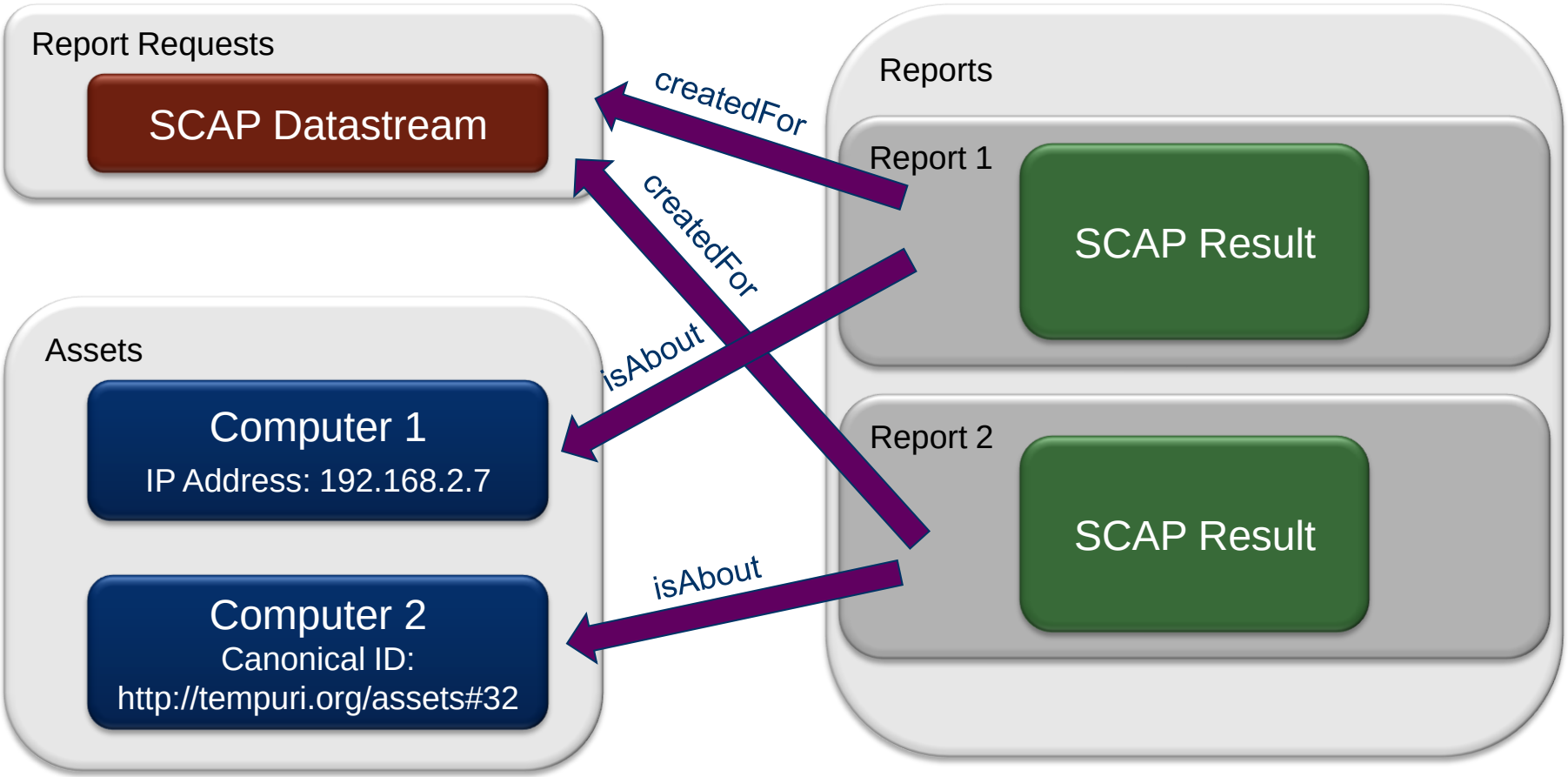
Use case: Digital Event Analysis

- Report on digital events at the host level
- Aggregate digital event messages across organization

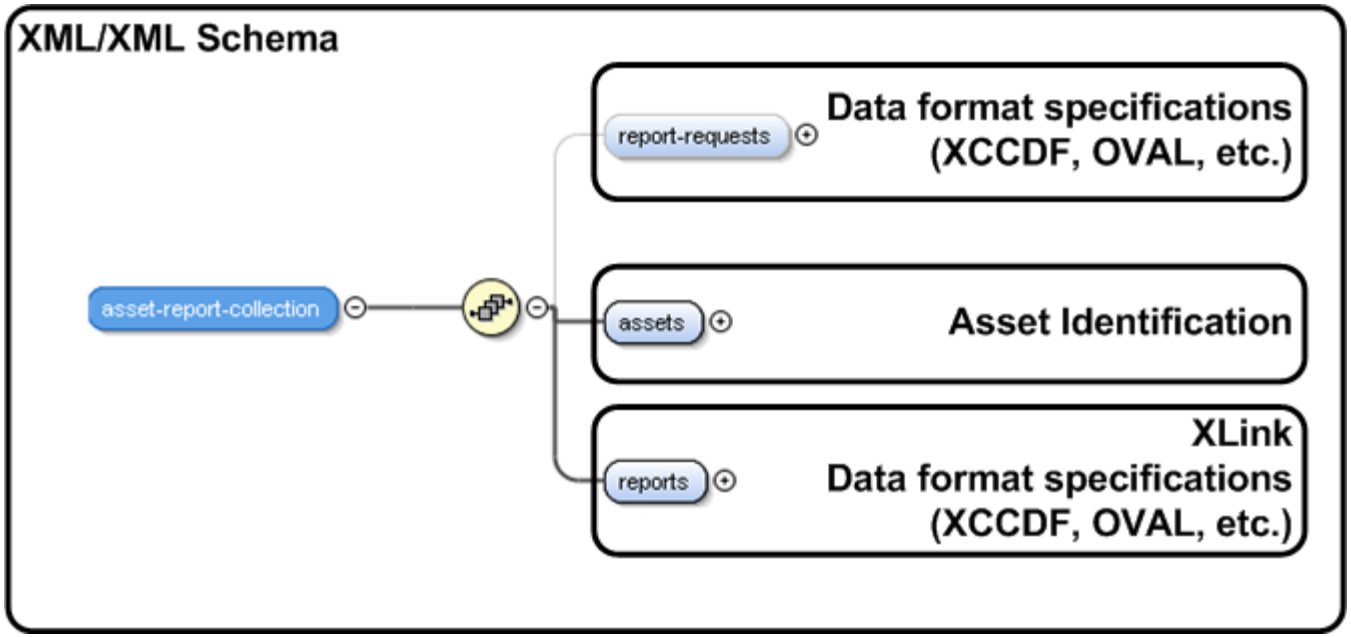
ARF Model



Example


Report Requests
SCAP Datastream
Assets
Computer 1
IP Address: 192.168.2.7
Computer 2
Canonical ID:
http://tempuri.org/assets#32
createdFor
createdFor
isAbout
isAbout
Reports
Report 1
SCAP Result
Report 2
SCAP Result

ARF's Relationship to Other Specifications



XLink

- A W3C specification describing the method of establishing links in XML
- Used in ARF to reference remote content

Why Use ARF

- Adds higher-level, standardized layer on top of reports about assets
- Adds ability to correlate and fuse data by cutting across specification boundaries
- Leverages standardized asset identification language
- Ties requests and responses about assets together

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Status

- Concluded public comment period in January
- Incorporated feedback from public comment period and from the participants of the working group
- Preparing to begin the final release process
- Planning for inclusion in SCAP 1.2

Asset Summary Reporting (ASR)

- Documenting the requirements for a summary format
- Considering an asset population querying solution that could be applicable to summary reporting AND tasking, among other applications
- Developing the ASR data model

Get Involved

- Contact any of the following people
  - Adam Halbardier – adam.halbardier@nist.gov
  - John Wunder – jwunder@mitre.org
  - Dave Waltermire – dave.waltermire@nist.gov
- Join the asset-dev@nist.gov mailing list (contact Dave Waltermire to be added)
- Ask about getting involved in the working group

Questions & Answers / Feedback

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