Introduction to Object Identifiers (OIDs) and their use by WMO

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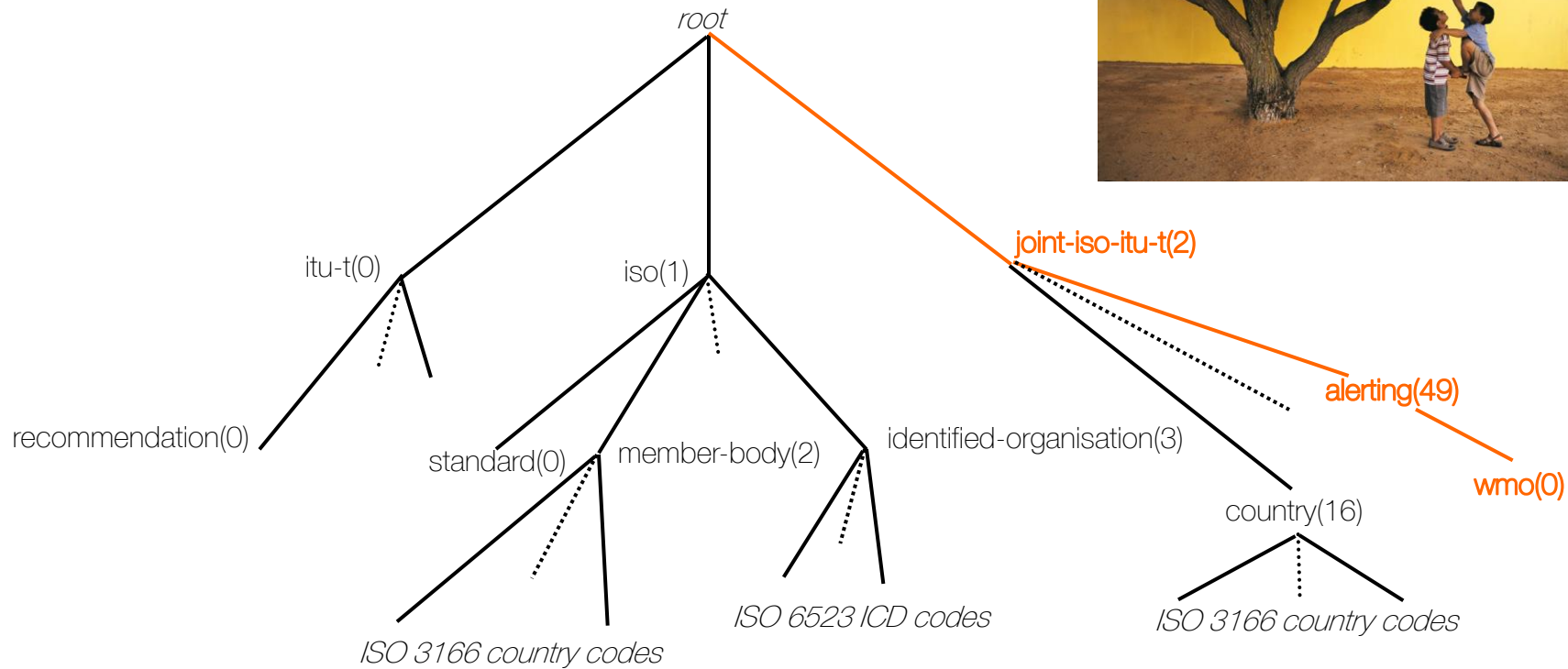
Olivier Dubuisson
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Basic concepts of Object Identifiers (OIDs)

- One of many identification schemes

- Basically very simple: A tree

- Arcs are numbered and may have an associated alphanumeric identifier (beginning with a lowercase)

- Infinitely many arcs from each node (except at the root)

- Objects are identified by the path (OID) from the root to a node

- A Registration Authority (RA) allocates arcs beneath its node to subordinate RAs, and so on, to an infinite depth

- The OID tree is a hierarchical structure of RAs

- Standardized in the Rec. ITU-T X.660 | ISO/IEC 9834 series (ITU-T SG17 and ISO/IEC JTC 1/SC 6)

- Originated in 1985, still in use!

Top of the OID tree

root

itu-t(0)

recommendation(0)

iso(1)

standard(0)

member-body(2)

ISO 3166 country codes

identified-organisation(3)

ISO 6523 ICD codes

joint-iso-itu-t(2)

alerting(49)

wmo(0)

country(16)

ISO 3166 country codes

Example: `{joint-iso-itu-t(2) alerting(49) wmo(0)}`

Note: The name of the 3 top-level arcs does not imply a hierarchical dependency to ISO or ITU-T.

What is an "object"?

- "*Anything in some world, generally the world of telecommunications and information processing or some part thereof, which is identifiable and may be registered*" [Rec. ITU-T X.660 | ISO/IEC 9834-1]

- OIDs can uniquely and universally identify:
  - standards (ITU-T Recommendations, ISO International Standards, etc.)
  - countries, companies, projects
  - encryption algorithms
  - ASN.1 modules, ASN.1 types
  - Rec. ITU-T X.500/LDAP attributes
  - Rec. ITU-T X.509 certificates (OIDs are widely deployed in e-commerce)
  - certification policies
  - SNMP MIBs
  - identification schemes (incl. RFID, 2D bar codes, etc.)
  - HL7 patient medical information
  - alerts and alerting agencies
  - etc.

- More information at http://oid-info.com/faq.htm

Some advantages

- Human-readable notation:

  ```
  {joint-iso-itu-t(2) alerting(49) wmo(0) authority(0)}
  ```

- Dot notation:

  ```
  2.49.0.0
  ```

- URN notation:

  ```
  urn:oid:2.49.0.0
  ```

- Internationalized notation (OID-IRI):

  ```
  /Alerting/WMO/0
  ```

  – Unicode labels (ISO/IEC 10646) can be associated to each OID arc

- Used in a lot of ISO standards, ITU-T Recommendations and IETF RFCs, but not only!

- Very good take up: 909,000+ OIDs described at http://oid-info.com; many more exist

- Compact binary encoding (normally used in all computer communications)

- Allows transmission over constrained networks

- Can also be used in XML documents

Procedures for the operation of a Registration Authority

- [Rec. ITU-T X.660 | ISO/IEC 9834-1](#): Main text which defines general procedures for the operation of an RA and applies to any RA ("the Constitution")

- [Rec. ITU-T X.662 | ISO/IEC 9834-3](#): rules for allocation of arc underneath top-level arc `joint-iso-itu-t(2)`

- WMO/TD NO.1556 "*Administration procedure for registering WMO alerting identifiers*"

Arcs at the 1st and 2nd levels of the OID tree

- Excerpt from the OID repository at http://oid-info.com

Web-based OID repository

- Provide details about an OID (description, rules to allocate child OIDs, contact information about the Registration Authority…)

- Not an official Registration Authority ➜ each OID has to be officially allocated by the parent RA before being described in the OID repository

- Descriptions are entered "à la wiki" by any user but are validated by the OID repository administrator

- Automatic notification by email to the RA (if known) when child OIDs are added

- Many other services: search, update of OID descriptions, tree display, registrant accounts

- Web site sponsored by Orange: http://oid-info.com

OID resolution system (ORS)

- A DNS-based protocol to provide information associated with any OID:

  - description, registration authority, creation date, etc.

  - child OIDs

  - OID-IRI canonical form

- Rec. ITU-T X.672 | ISO/IEC 29168-1 (2011)
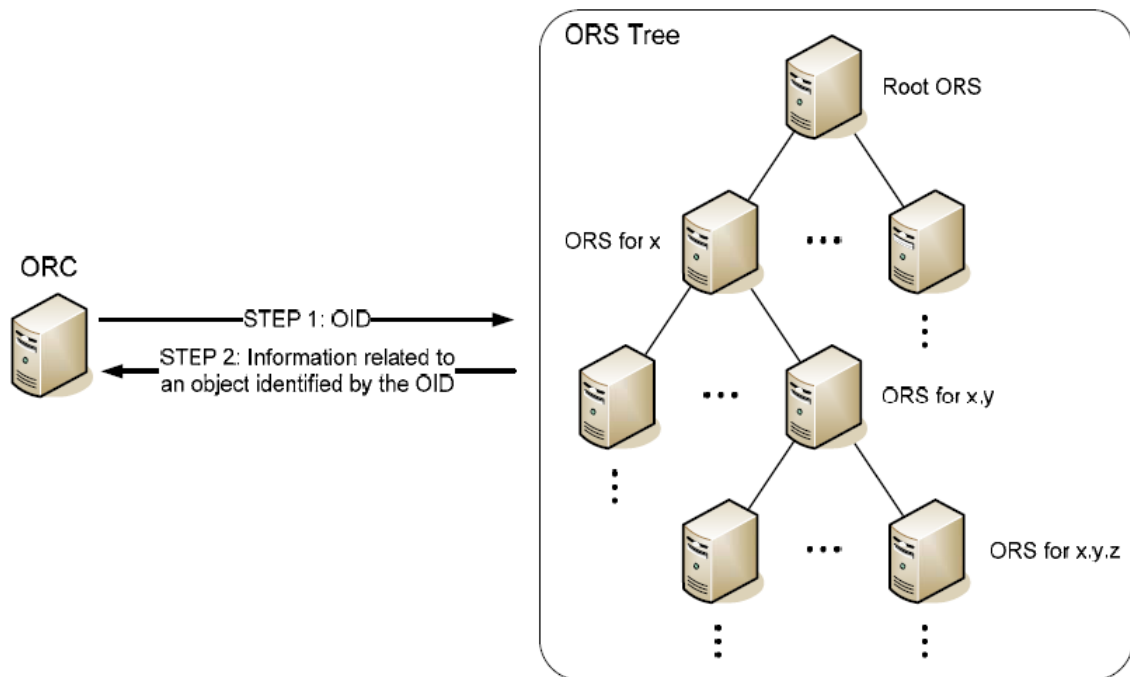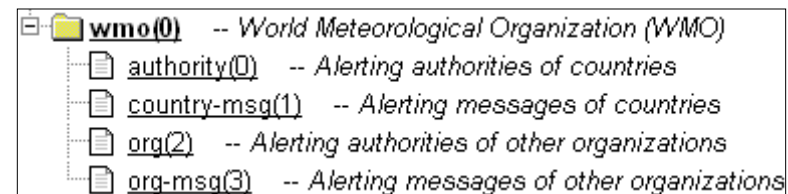
Use of OIDs for alerts

- Use of OIDs to identify alerting agencies and alert messages for early warning of populations

- Standardized in Rec. ITU-T X.674 (2011)

- Potentially all kind of alerts: weather, cybersecurity, food…

- Sub-arc `{joint-iso-itu-t(2) alerting(49) wmo(0)}` allocated to the World Meteorological Organization (WMO) for weather alerts and weather alerting agencies

  – Used with the Common Alerting Protocol (OASIS CAP, Rec. ITU-T X.1303)

WMO alerting identifiers

- **alerting authorities of countries** are registered under arc
  `{joint-iso-itu-t(2) alerting(49) wmo(0) authority(0) country(n)}`

- **alerting messages of countries** are registered under arc
  `{joint-iso-itu-t(2) alerting(49) wmo(0) country-msg(1) country(n)}`
  - one sub-arc per country
  - `n` is the numeric country code allocated by the United Nations Statistics Division
  - `country` is the ISO 3166-1 alpha-2 code
  - automatic assignment of the country OID upon designation of an initial editor in the WMO Register of Alerting Authorities to the WMO Public Weather Services Programme
  - child OIDs allocated by that editor (under the country arc)

- **alerting authorities of organizations** (other than countries) are registered under arc
  `{joint-iso-itu-t(2) alerting(49) wmo(0) org(2) abbrev(n)}`

- **alerting messages of organizations** are registered under arc
  `{joint-iso-itu-t(2) alerting(49) wmo(0) org-msg(3) abbrev(n)}`
  - `n` is a numeric value assigned to the organization
  - subject to designation of an initial editor of the WMO Register of Alerting Authorities for the organization
  - approval according to the procedures specified in clause 7 of WMO/TD No. 1556

- More information in WMO/TD No. 1556 "*Administrative procedure for registering WMO alerting identifiers*"

- Contact: Ms. Haleh Kootval

More information on OIDs

- Free standards:
  http://www.itu.int/rec/T-REC-X/en
  (Rec. ITU-T X.660 & X.670 series)

- OID repository:
  http://oid-info.com

- Other presentations:
  - http://oid-info.com/faq.htm#3
  - ITU-T OID handbook

- Frequently Asked Questions:
  http://oid-info.com/faq.htm

thank you

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