IEEE Registration Authority

OUI Registry Tiers proposal

Glenn Parsons, RAC Chair
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RAC Members

- Glenn Parsons, Chair
- Geoff Thompson, (LMSC prime) IEEE 802
- Clint Chaplin, (LMSC alternate) IEEE 802
- Bob Davis, (MSC prime)
- Leonard Tsai, (MSC alternate)
- Tom Kurihara, (VTS / ITS prime) IEEE 1609
- Geoffrey Garner, (I&M prime) IEEE 1588
- George Riley, ex-officio (CS SAB)

Staff
- Angela Thomas, RAC Secretary
- Karen Lambert, Registrar
Current OUI based identifiers

- Company_id is a 24-bit OUI value assigned by the IEEE-RA
- CDI-32™ is a concatenation of a 24-bit OUI value assigned by the IEEE-RA and an 8-bit extension identifier assigned by the organization with that OUI assignment.
- TCDI-40™ is a concatenation of a 24-bit OUI value assigned by the IEEE-RA and a 16-bit extension identifier assigned by the organization with that OUI assignment.
- MAC-48 (obsolete label) / EUI-48™ is a concatenation of a 24-bit OUI value assigned by the IEEE-RA and a 24-bit extension identifier assigned by the organization with that OUI assignment.
- EUI-60 (deprecated) is a concatenation of a 24-bit OUI assigned by the IEEE-RA and a 36-bit extension identifier assigned by the organization with that OUI assignment.
- EUI-64™ is a concatenation of the 24-bit or 36-bit OUI value assigned by the IEEE-RA and a 40-bit or 28-bit extension identifier assigned by the organization with that OUI assignment.
- IPv6 is a concatenation of a 64-bit EUI-64™ (derived from a MAC-48/EUI-48™) and a 64-bit extension identifier assigned by the device with the MAC-48/EUI-48™ assignment.
## Current creation

<table>
<thead>
<tr>
<th>Identifier</th>
<th>registry</th>
<th>OUI:ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company_id</td>
<td>OUI</td>
<td>1:1</td>
</tr>
<tr>
<td>CDI-32</td>
<td>OUI</td>
<td></td>
</tr>
<tr>
<td>TCDI-40</td>
<td>OUI, OUI36</td>
<td></td>
</tr>
<tr>
<td>MAC48/EUI48</td>
<td>OUI</td>
<td>1:16M</td>
</tr>
<tr>
<td>EUI60</td>
<td>OUI, OUI36</td>
<td>1:4K</td>
</tr>
<tr>
<td>EUI64</td>
<td>OUI, OUI36</td>
<td>1:1T</td>
</tr>
<tr>
<td>IPv6</td>
<td>OUI, IAB, OUI36</td>
<td></td>
</tr>
</tbody>
</table>

Some identifiers (e.g., Company_id) can only be created from one registry.
Rationale for change

• **RAC “Prime directive”**
  - Do not run out of global MAC48 addresses for 100 years
    • ~250 billion EUI48 (of ~70 trillion possible) addresses have been assigned

• **Volume**
  - A few vendors are volume users
    • >32M MAC (EUI-48) addresses assigned per month
  - Most other vendors would prefer a more options as they use less
    • This would reduce “lost” or “unused” addresses

• **Virtualization**
  - Usage of global MAC (EUI-48) addresses by software
    • Traditionally RAC limited vendors to only a few per hardware device
  - Reuse of global MAC (EUI-48) addresses per rack / cluster / data center
    • Guidance needed, even though this is not permitted
  - Assignment of address blocks to data centers (instead of vendors)

• **Future**
  - Explore feasibility of “EUI-128” identifier for VMs
Proposal

- Maintain existing OUI & OUI-36 registries
- Create new registries for EUI-48 sizes
  - 16M, 1M, 4K, 1
- Disconnect addresses from Company identifier
  - Assign 24 & 36 bit Company identifiers without addresses
  - Assign these within the “local space”
- Suggest VMs create addresses based on new Company identifiers in the “local space”
  - Resulting in reusable local addresses, with some organization
- Rework pricing structure accordingly...
New Proposed OUI-based Registries

- **OUI**
  - existing
- **OUI-36**
  - existing
- **CompanyID-24**
- **CompanyID-36**
- **Addresses-A (48 bit)**
- **Addresses-B (36 bit)**
- **Addresses-C (28 bit)**
- **Addresses-D (24 bit)**

<table>
<thead>
<tr>
<th>Registry</th>
<th>EUI48</th>
<th>EUI64</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addresses-A</td>
<td>1</td>
<td>65536</td>
</tr>
<tr>
<td>Addresses-B</td>
<td>4096</td>
<td>268435456</td>
</tr>
<tr>
<td>OUI36</td>
<td></td>
<td>~270 million</td>
</tr>
<tr>
<td>Addresses-C</td>
<td>1048576</td>
<td>68719476736</td>
</tr>
<tr>
<td></td>
<td>~1 million</td>
<td>~69 billion</td>
</tr>
<tr>
<td>Addresses-D</td>
<td>16777216</td>
<td>1099511627776</td>
</tr>
<tr>
<td>OUI</td>
<td></td>
<td>~1 trillion</td>
</tr>
<tr>
<td></td>
<td>~16 million</td>
<td></td>
</tr>
</tbody>
</table>
RAC Proposal – October 2012

- Key Identifiers
  1. 24 bit Company ID
  2. 36 bit Company ID
  3. 48 bit EUI-48 address
  4. 64 bit EUI-64 address

- Existing Registries
  - OUI : 1, 3, 4
  - OUI-36: 2, 3, 4

- New Registries:
  - Addresses Size A: 3, 4
  - Addresses Size B: 3, 4
  - Addresses Size C: 3, 4
  - Addresses Size D: 3, 4
  - Company ID 24 bit: 1
  - Company ID 36 bit: 2

- Alternative A
  - Addresses registries
    - Do not include company ID assignment, they are reserved for other use
  - Company ID registries
    - Do not include address assignments
    - Values taken from address registries

- Alternative B
  - Addresses registries
    - Do not include company ID assignment, they are reserved for IEEE RA (and left unassigned for now)
  - Company ID registries
    - Do not include address assignments
    - Values taken from local space
  - Virtualization
    - Data centers are sold “CompanyIDs” and may use these to create addresses in the local space
Process

- RAC & RAP (sub-groups of the IEEE-SA BOG) working together to develop reorganization of the OUI set of registries
  - Awaiting recommendation from consultant
  - Registry structure proposal will be socialized with customers and WGs seeking feedback on impact

- Evaluate feedback and finalize proposal
  - Discussion during Nov 8th RAC meeting

- BOG would like to approve reorganization and pricing in Dec 2012, or Mar 2013 at the latest
Backup
## Current OUI-based Registries

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<th>EUI48 (MAC address)</th>
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<tr>
<td>1 24-bit identifier</td>
<td>OUI</td>
<td>16777216</td>
</tr>
<tr>
<td>1 36-bit identifier</td>
<td>OUI36</td>
<td>4096</td>
</tr>
<tr>
<td>-</td>
<td>IAB</td>
<td>4096</td>
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<td>4096</td>
</tr>
<tr>
<td>1 24-bit identifier</td>
<td>CompanyID-24</td>
<td>-</td>
</tr>
<tr>
<td>1 36-bit identifier</td>
<td>CompanyID-36</td>
<td>-</td>
</tr>
<tr>
<td>-</td>
<td>Addresses-A</td>
<td>1</td>
</tr>
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