Thermal zones hierarchy

Linux Plumbers Conference 2019 - Lisboa
Daniel Lezcano <daniel.lezcano@linaro.org>
<table>
<thead>
<tr>
<th>Yesterday</th>
<th>Today</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, rarely 2 thermal zones</td>
<td>More than 21 thermal zones</td>
</tr>
<tr>
<td>Feature</td>
<td>Why</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>----------------------------------------------------</td>
</tr>
<tr>
<td>Topology description</td>
<td>Close to reality representation</td>
</tr>
<tr>
<td></td>
<td>Proximity sensor detection</td>
</tr>
<tr>
<td></td>
<td>Hotspot detection</td>
</tr>
<tr>
<td>Centralized decision with a governor</td>
<td>Lot of thermal zones</td>
</tr>
<tr>
<td>Spanning sensors</td>
<td>When there are too few sensors</td>
</tr>
</tbody>
</table>
Representation: thermal zones hierarchy

● Today: Flat representation
● Proposal:
  ○ Tree representation:
    ■ Compatible with today representation
    ■ Representation of the thermal topology for the system
    ■ Gives a centralized view to a governor
  ○ Extend the semantic of the current framework:
    ■ Aggregation
      ● Thermal zones can be without sensor, cooling device or governor
      ● Thermal zones can have a weight
Topology description - close to reality

- System
  - Graphics
  - Peripherals
- CPU
  - Cluster0
  - Cluster1
    - Cores

Linaro
Topology description - hotspot

Hotspot = system.cpu.cluster1.core6
Toplogy description - proximity

System
  └─ Graphics
  └─ Peripherals
    └─ Modem not used (rpm)

CPU
  └─ Cluster0
  └─ Cluster1
    └─ Cores

Has sensor

Hotspot = system.cpu.cluster1.core6

Modem is not a hotspot => no action
Centralized topology-aware decision

System (1024)

CPU (w=512)

Graphics (w=256)

Peripherals (w=256)

Cluster0

Cluster1

Cores

Has sensor
Spanning sensor

System (1024)

CPU (w=768)

Cluster0 (w=256)

Cluster1 (w=512)

Peripherals (w=256)

Cores

Graphics

○ Has sensor