Deterministic Networking for the Industrial IoT

- Monitoring the Snow Melt Process in the Sierra Nevada
- Monitoring Frost Events for a Peach Orchard in Mendoza

Keoma Brun-Laguna, Thomas Watteyne, Pascale Minet
EVA team - (brand new!) Inria-Paris & REALMS associate team
https://kbl.netlib.re/blog/

RESCOM days, Inria-Lille, 13 January 2016
(Long-term) Goal of my Research

• Study the limits of TSCH networks
  • Can we achieve Control Loop?
  • Network tuning impact on Energy Consumption?

• We need connectivity information
  • Fit-IoT Lab
  • Real deployments
EVA Research Team
Wireless Networking for Evolving & Adaptive Applications

Paul M.
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and many more!
REALMS Associate Team

Prof. Steven Glaser
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Goal

Monitor the Snow Melt Process in the Sierra Nevada Using Reliable Low-power Wireless Mesh Networks
So, why snow?
<table>
<thead>
<tr>
<th>Name</th>
<th>Operational Since</th>
<th>Elevation (m)</th>
<th># Devices (Managers/NeoMotes/Repeaters)</th>
<th># Sensors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>2013</td>
<td>2269</td>
<td>37 (1/10/27)</td>
<td>70</td>
</tr>
<tr>
<td>Bear Trap</td>
<td>2013</td>
<td>1518</td>
<td>38 (1/10/27)</td>
<td>70</td>
</tr>
<tr>
<td>Caples Lake</td>
<td>2013</td>
<td>2437</td>
<td>37 (1/11/25)</td>
<td>79</td>
</tr>
<tr>
<td>Dolly Rice</td>
<td>2014</td>
<td>1980</td>
<td>11 (1/10/0)</td>
<td>70</td>
</tr>
<tr>
<td>Duncan Peak</td>
<td>2013</td>
<td>2907</td>
<td>42 (1/11/30)</td>
<td>78</td>
</tr>
<tr>
<td>Echo Peak</td>
<td>2013</td>
<td>2478</td>
<td>54 (1/10/43)</td>
<td>71</td>
</tr>
<tr>
<td>Mount Lincoln</td>
<td>2013</td>
<td>2477</td>
<td>36 (1/11/24)</td>
<td>78</td>
</tr>
<tr>
<td>Onion Creek</td>
<td>2013</td>
<td>1891</td>
<td>11 (1/10/0)</td>
<td>72</td>
</tr>
<tr>
<td>Owens Camp</td>
<td>2014</td>
<td>1586</td>
<td>24 (1/11/12)</td>
<td>77</td>
</tr>
<tr>
<td>Robbs Saddle</td>
<td>2013</td>
<td>1812</td>
<td>33 (1/10/22)</td>
<td>70</td>
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<tr>
<td>Schniders</td>
<td>2013</td>
<td>2673</td>
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<td>70</td>
</tr>
<tr>
<td>Talbot Camp</td>
<td>2014</td>
<td>1738</td>
<td>11 (1/10/0)</td>
<td>70</td>
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<tr>
<td>Van Vleck</td>
<td>2013</td>
<td>2069</td>
<td>38 (1/10/27)</td>
<td>70</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>414 (11/134/264)</strong></td>
<td></td>
<td><strong>945</strong></td>
</tr>
</tbody>
</table>
My contribution

Object-based end-to-end data and connectivity data management solution

Application-level objects:
- 1 object == 1 sensor reading or statistic
- multiple objects per packet
- Protected by object security
PEACH SticAmSud
PrEcision Agriculture through Climate research
STIC Am-Sud
PrEcision Agriculture through Climate researchH, 2016-2019

Prof. Diego Dujovne
UDP

Gustavo Mercado
UTN

Equipe EV A - Keoma Brun-Laguna
Goal

Monitor the Weather and predict Frost Events
Thank you

- Study the limits of TSCH networks
  - Can we achieve Control Loop?
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- We need connectivity information
  - FiT-IoT Lab
  - Real deployment (Sierra Nevada and Mendoza orchards)