PIREN/GOREX

Alan Whinery
and others
JET
04/25/17
Think About

- Your requirements in the Pacific
- Your resources in the Pacific
- Opportunities for collaboration
<table>
<thead>
<tr>
<th>Location</th>
<th>Area (sq km)</th>
<th>Major City/State</th>
<th>Population (July 2012 est)</th>
<th>Internet Usage (Jun 2012 est)</th>
<th>Population Penetration</th>
<th>GDP (PPP) per capita (ranking out of 228 - as of 2012)</th>
<th>School Life Expectancy (Yrs)</th>
<th>REN</th>
<th>Cable Landing</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook Islands</td>
<td>236</td>
<td>Rarotonga</td>
<td>19,937</td>
<td>6,000</td>
<td>30.1%</td>
<td>117</td>
<td>12</td>
<td>USPNet</td>
<td>SCCN</td>
<td>AUS &amp; HI Vanuatu</td>
</tr>
<tr>
<td>Fiji</td>
<td>18,274</td>
<td>Suva</td>
<td>890,057</td>
<td>247,275</td>
<td>27.8%</td>
<td>158</td>
<td>13</td>
<td>USPNet</td>
<td>ICN, Tonga Tonga</td>
<td>Pacific Islands</td>
</tr>
<tr>
<td>Kiribati</td>
<td>811</td>
<td>Tarawa</td>
<td>101,998</td>
<td>10,074</td>
<td>9.9%</td>
<td>145</td>
<td>12</td>
<td>USPNet</td>
<td>HANTRU-1</td>
<td>Guam &amp; Micronesia</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>181</td>
<td>Majuro</td>
<td>68,480</td>
<td>7,260</td>
<td>10.6%</td>
<td>180</td>
<td>12</td>
<td>USPNet</td>
<td>HANTRU-1</td>
<td>Guam &amp; Marshall Islands</td>
</tr>
<tr>
<td>Federated States of Micronesia</td>
<td>702</td>
<td>Pohnpei, Kosrae, Yap, Chuuk</td>
<td>106,487</td>
<td>22,213</td>
<td>20.9%</td>
<td>187</td>
<td>--</td>
<td>--</td>
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</tr>
<tr>
<td>Nauru</td>
<td>21</td>
<td>Yaren</td>
<td>9,378</td>
<td>480</td>
<td>5.1%</td>
<td>153</td>
<td>9</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Niue</td>
<td>260</td>
<td>Alofi</td>
<td>1,556</td>
<td>1,100</td>
<td>70.7%</td>
<td>144</td>
<td>13</td>
<td>USPNet</td>
<td>--</td>
<td>foreshadowed Guam</td>
</tr>
<tr>
<td>Palau</td>
<td>459</td>
<td>Koror</td>
<td>21,032</td>
<td>6,360</td>
<td>30.2%</td>
<td>125</td>
<td>15</td>
<td>--</td>
<td>PNG-ARNet</td>
<td>Australia &amp; Guam</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>462,840</td>
<td>Port Moresby</td>
<td>6,310,129</td>
<td>135,000</td>
<td>2.1%</td>
<td>179</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>Active</td>
</tr>
<tr>
<td>Samoa</td>
<td>2,831</td>
<td>Apia</td>
<td>194,320</td>
<td>17,940</td>
<td>9.2%</td>
<td>140</td>
<td>12</td>
<td>USPNet</td>
<td>SAS</td>
<td>Active</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>28,896</td>
<td>Honiara</td>
<td>584,578</td>
<td>34,313</td>
<td>5.9%</td>
<td>170</td>
<td>9</td>
<td>USPNet</td>
<td>SOC to PPC-1</td>
<td>Guam</td>
</tr>
<tr>
<td>Tonga</td>
<td>747</td>
<td>Nuku'alofa</td>
<td>106,146</td>
<td>26,479</td>
<td>24.9%</td>
<td>133</td>
<td>14</td>
<td>USPNet</td>
<td>Tonga-Fiji Fiji</td>
<td>Fiji</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>26</td>
<td>Funafuti</td>
<td>10,619</td>
<td>4,300</td>
<td>40.5%</td>
<td>169</td>
<td>11</td>
<td>USPNet</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>12,189</td>
<td>Port Villa</td>
<td>260,155</td>
<td>19,172</td>
<td>7.4%</td>
<td>156</td>
<td>10</td>
<td>USPNet</td>
<td>ICN</td>
<td>Fiji</td>
</tr>
<tr>
<td>Norfolk Island (AUS)</td>
<td>36</td>
<td>Kingston</td>
<td>2,572</td>
<td>700</td>
<td>27.2%</td>
<td>--</td>
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<td>--</td>
</tr>
<tr>
<td>French Polynesia (FR)</td>
<td>4,167</td>
<td>Papeete</td>
<td>274,512</td>
<td>144,518</td>
<td>52.6%</td>
<td>67</td>
<td>--</td>
<td>--</td>
<td>Honotua HI</td>
<td>Active</td>
</tr>
<tr>
<td>New Caledonia (FR)</td>
<td>18,575</td>
<td>Noumea</td>
<td>260,166</td>
<td>128,138</td>
<td>49.3%</td>
<td>81</td>
<td>--</td>
<td>--</td>
<td>Gondwana-1 AUS</td>
<td>Active</td>
</tr>
<tr>
<td>Wallis and Futuna (FR)</td>
<td>142</td>
<td>Mata-Utu</td>
<td>15,850</td>
<td>1,337</td>
<td>8.4%</td>
<td>164</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Tokelau (NZ)</td>
<td>12</td>
<td>--</td>
<td>1,331</td>
<td>800</td>
<td>60.1%</td>
<td>218</td>
<td>12</td>
<td>USPNet</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Pitcairn Islands (UK)</td>
<td>47</td>
<td>--</td>
<td>--</td>
<td>--</td>
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<td>--</td>
<td>--</td>
<td>--</td>
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<td>--</td>
</tr>
<tr>
<td>American Samoa (US)</td>
<td>199</td>
<td>Pago Pago</td>
<td>54,947</td>
<td>3,040</td>
<td>5.5%</td>
<td>126</td>
<td>--</td>
<td>--</td>
<td>AAG, AJC (SEA-US)</td>
<td>Active</td>
</tr>
<tr>
<td>Guam (US)</td>
<td>544</td>
<td>Hagatna</td>
<td>159,914</td>
<td>90,000</td>
<td>56.3%</td>
<td>85</td>
<td>--</td>
<td>--</td>
<td>HANTRU-1, CNMI</td>
<td>Active</td>
</tr>
<tr>
<td>Northern Mariana Islands (US)</td>
<td>464</td>
<td>Saipan</td>
<td>96,417</td>
<td>15,980</td>
<td>16.6%</td>
<td>97</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>Active</td>
</tr>
</tbody>
</table>
Guam Open R&E eXchange

GOREX is envisioned to be a Layer 2 meet-me point located in Guam. The goal is to exchange traffic among R&E participants in Guam. Partners include: AARNet, Internet2, UH and UoG.

SEA-US Cable will connect CENIC/PW – UH/Oahu – Guam – Piti-G
Nearing completion!
SEA-US Makaha - CLS

- CENIC/PW complete – Hermosa Beach
- April 3 - SEA-US cable brought on shore at Makaha beach and into the CLS
- Cable ship enroute to Guam - anticipated landing before end of April
GOREX - progress

- TPRE Meeting – Jan 18, 2017 Honolulu, HI
  - 29 participants, 13 institutions, 5 countries attended
  - GOREX engineering breakout group
    - Participants – AARNet, I2, UH, PW/CENIC, JP, SingaAREN, UoG
    - UH 100G circuit from Guam to Oahu via SEA-US complete Summer 2017 – lands at Piti-GTA CLS
    - UH in discussion with colo sites – preferred would be in Piti-GTA CLS
    - If chosen, I2, AARNet and UoG would need on island backhaul to Piti-GTA
    - UoG desires a 10G from campus to GOREX site
  - More details at TPRE meeting @ 3:30PM today
UoG IT Cyber-Team Activities - 2017

• Jan. 2017 - PTC 2017
• Feb. 2017 - APRICOT - Ho Chi Minh City
• Mar. 2017
  • **PhNOG** and IN@IU PerfSONAR / Science DMZ Training in Philippines
  • CENIC 2017 Conference, San Diego, CA
    • UH President David Lassner - Keynote Address - *View From The Pacific-Strategic Directions*
      • [https://www.youtube.com/watch?v=-uQHqf_O06o](https://www.youtube.com/watch?v=-uQHqf_O06o)
      • NSRC/CENIC Fellowship for UoG AVP Research and Sponsored Programs
        • [https://www.youtube.com/watch?v=OmHqY7lFYcM](https://www.youtube.com/watch?v=OmHqY7lFYcM)
• Apr. 2017 - NSF EPSCoR (Guam Ecosystems Collaboratorium) Reverse Site Visit, Washington, D.C. - GOREX Highlights
• Apr. 2017 - Internet2 Global Summit, Washington, D.C.
UoG IT Operations and NOC Team

• Team is composed of:
  • 8 Operations and NOC Staff – Rotate to provide 24/7/365 Data Center Coverage
  • Team works with Campus Facilities and Maintenance in the event of a Power Outage

• Facility has redundant Generators and HVAC
• Data Center Modernization in process
President Robert Underwood welcomes the workshop participants.

30 participants from Guam, Micronesia, Marshall Islands, Northern Marianas and Palau
PIREN Outreach

- March 28 meeting – Pacific Postsecondary Education Council - Presidents meeting
  - UoG, Guam CC, College of Micronesia, Northern Marianas College, U Marshall Islands, Palau CC, American Samoa CC
  - Shared progress on GOREX, much higher level of interest and understanding of opportunities

- April 27 meeting with PolyREN in Tahiti
  - OPT French Polynesia – 1Gbps R&E for Honotua
  - UH ready to provide connectivity at termination in HNL
  - RENATER actively engaged and supporting development of domestic portion of PolyREN to connect R&E locations on Tahiti and Moorea to each other
  - Connects to the “free” 1GBPS to HI and to global R&E network fabric
  - Stakeholders: French, American, and local French Polynesia research and education institutions
PolyREN Approach in French Polynesia

UPF (Tahiti) - FP R&E Hub

FP Schools

French Research Centers

DR Fortress (HI) via Honotua

Univ of Hawaii

Commercial Internet & local peering (FP)

Gump Station (Moorea)

AARNet (AU) & REANNZ (NZ)

Pacific Wave (US)

Renater (France)
Science Drivers
Assisted Evolution in coral reefs to support adaptation to climate change

**Assisted Evolution (AE)** accelerates naturally occurring evolutionary processes to enhance stress tolerance by:

- Selectively breeding
- Modifying partnerships/symbioses
- Manipulating environmental experience

Use these “assisted” corals to:
- Restore damaged reefs
- Re-connect fragmented reefs
- Increase resilience on vulnerable reefs
- Green grey structures

**Hawaii and HIMB**

**Australia and AIMS**

**MOOREA and GUMP**
Expectations for rest of 2017

- Completion of SEA-US – expected operational by Summer 2017
- Ongoing discussions with partners to implement GOREX
- Increased partnerships with UoG – improving campus CI

Meetings this week
- TPRE follow-on – 3:30 PM today! Rm 7 Renaissance DC