Yahoo! JAPAN Networks and Recent Efforts

Kenya Murakoshi
Sr. Manager
Yahoo Japan Corporation
kmurakos@yahoo-corp.jp
• Yahoo! JAPAN
• Yahoo! JAPAN Networks
• Recent Efforts
• Why Backpack
• Backpack test results
• Future Plans
Founded: January 31, 1996.
Businesses: Internet Advertising, e-Commerce, Members Services, etc.
Web services: 100+
Smartphone Apps: 50+(iOS), 50+ (Android)
Employees: 6162 (as of June 30, 2017)
Head Office: Chyoda-ku, Tokyo, Japan
Up 20 consecutive years since the start of services

Full Year Revenue

¥853.7 Billion

FY2003

FY2016
Visited by 80% of Japanese internet users

Total monthly PV※1
75.7 Billion

Monthly Daily UBs ※2
93.02 million

※1. FY2017 2Q average  ※2. FY2017 2Q average
Becoming a Multi-big Data Driven Enterprise

PC → Smartphone → Data
Congestion measurement with transit guide data

https://map.yahoo.co.jp/maps?layer=crowd&v=3&lat=35.681277&lon=139.766266&z=15
Agenda

• Yahoo! JAPAN

• Yahoo! JAPAN Networks

• Recent Efforts

• Why Backpack

• Backpack test results

• Future Plans
Yahoo! JAPAN Networks
Yahoo! JAPAN Networks

Internet

CDN

Backbone Network

Yahoo! JAPAN Network Infra

Data Center Network

Copyright 2018 Yahoo Japan Corporation. All Rights Reserved.
Data Center Network

Backbone

Aggregation

Building or Floor

Building or Floor

Building or Floor

Building or Floor
Data Center Network

East-West traffic increases sharply like Hadoop
Data Center Network

Weak in the East-West Traffic

Strong in the East-West Traffic

Traditional Network

Clos Network
Data Center Network

Traditional Network

Weak in the East-West Traffic

Strong in the East-West Traffic

Clos Network
Agenda

• Yahoo! JAPAN
• Yahoo! JAPAN Networks
• Recent Efforts
  • Why Backpack
  • Backpack test results
  • Future Plans
Traffic Growth

https://code.facebook.com/posts/1782709872057497
# Recent Efforts

<table>
<thead>
<tr>
<th></th>
<th>Facebook</th>
<th>Yahoo! JAPAN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
<td>Clos Network</td>
<td>Clos Network</td>
</tr>
<tr>
<td><strong>Automation</strong></td>
<td>Home Grown Tool</td>
<td>Home Grown + OSS + Apstra</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td>FBOSS</td>
<td>EOS</td>
</tr>
<tr>
<td><strong>Chip</strong></td>
<td>Merchant Silicon</td>
<td>Merchant Silicon</td>
</tr>
<tr>
<td><strong>Box</strong></td>
<td>OCP (Wedge, Backpack)</td>
<td>Arista (OCP Edgecore, Backpack)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cisco Juniper</td>
</tr>
<tr>
<td></td>
<td>Facebook</td>
<td>Yahoo! JAPAN</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td><strong>Design</strong></td>
<td>Clos Network</td>
<td>Clos Network</td>
</tr>
<tr>
<td><strong>Automation</strong></td>
<td>Home Grown Tool</td>
<td>Home Grown + OSS + Apstra</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td>FBOSS</td>
<td>EOS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cumulus</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NX-OS Junos</td>
</tr>
<tr>
<td><strong>Chip</strong></td>
<td>Merchant Silicon</td>
<td>Merchant Silicon</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Custom Silicon</td>
</tr>
<tr>
<td><strong>Box</strong></td>
<td>OCP (Wedge, Backpack)</td>
<td>Arista (Edgecore, Backpack)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cisco Juniper</td>
</tr>
</tbody>
</table>
Internal Security Issues

Traditional Network

L3
ACL
L2

Same security policy can deploy Clos NW

Clos Network
Internal Security Issues

ACL entries per core switch
Max: 110,000
Internal Security Issues

ACL entries per core switch
Max: 110,000

Must distribute ACLs
Internal Security Issues

• Developed iptables-based security management system
• Final testing in progress

Various security policy can deploy Clos NW
Agenda

• Yahoo! JAPAN
• Yahoo! JAPAN Networks
• Recent Efforts
• **Why Backpack**
• Backpack test results
• Future Plans
## Recent Efforts

<table>
<thead>
<tr>
<th></th>
<th>Facebook</th>
<th>Yahoo! JAPAN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
<td>Clos Network</td>
<td>Clos Network</td>
</tr>
<tr>
<td><strong>Automation</strong></td>
<td>Home Grown Tool</td>
<td>Home Grown + OSS + Apstra</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td>FBOSS</td>
<td>EOS</td>
</tr>
<tr>
<td><strong>Chip</strong></td>
<td>Merchant Silicon</td>
<td>Merchant Silicon</td>
</tr>
<tr>
<td><strong>Box</strong></td>
<td>OCP (Wedge, Backpack)</td>
<td>Arista (Open Core, Backpack)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cisco Juniper</td>
</tr>
</tbody>
</table>
Backpack

http://www.opencompute.org/products/
Backpack

http://www.opencompute.org/products/
Why Backpack?

• When Clos Network is deployed with Box switches, 3-tier required.
• Until now we chose Chassis switches
## Why Backpack?

<table>
<thead>
<tr>
<th></th>
<th>2-Tier with Chassis SW</th>
<th>3-Tier with Box SW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pros</strong></td>
<td>High port densities (no Rack, Cable, Optics)</td>
<td>SW Upgrades = Short time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No Single Point of Failure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Same Operation = Simple</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td>Software Upgrades = Long time</td>
<td>Rack U required</td>
</tr>
<tr>
<td></td>
<td>SUP = Single Point of Failure</td>
<td>Cable management</td>
</tr>
<tr>
<td></td>
<td>ISSU = Complexity</td>
<td>Optics Cost</td>
</tr>
</tbody>
</table>
# Why Backpack?

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Tier with Chassis SW</td>
<td>3-Tier with Box SW</td>
</tr>
<tr>
<td>High port densities (no Rack, Cable, Optics)</td>
<td>SW Upgrades = Long time</td>
</tr>
<tr>
<td></td>
<td>No Single Point of Failure</td>
</tr>
<tr>
<td></td>
<td>Same Operation = Simple</td>
</tr>
<tr>
<td><strong>Backpack</strong> best of everything</td>
<td><strong>Rack U required</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Cable management</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Optics Cost</strong></td>
</tr>
</tbody>
</table>
Why Backpack?
Why Backpack?
Agenda

• Yahoo! JAPAN
• Yahoo! JAPAN Networks
• Recent Efforts
• Why Backpack
• Backpack test results
• Next Our Plans
Test results

• Facebook Backpack  x2
• 100G SR  x8
• Accton AS7712-32X  x2
• IXIA 2slot Chassis  x1
• IXIA 100G module  x1
• IXIA 10G module  x1
• DL360G7 HC  x2
• DL360p Gen8  x1
• Dell Z9100-ON  x1

https://techblog.yahoo.co.jp/advent-calendar-2017/datacenternetwork_backpack/
Test results

• Undelay
Test results

- Overlay
## Test results

<table>
<thead>
<tr>
<th>large classification</th>
<th>middle classification</th>
<th>small classification</th>
<th>Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. BGP EVPN</td>
<td>1-1. Single Home</td>
<td>1-1-1. BGP EVPN Neighbor</td>
<td>PASS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1-1-2. BGP EVPN Route</td>
<td>PASS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1-1-3. Mac Mobility</td>
<td>PASS</td>
</tr>
<tr>
<td></td>
<td>1-2. Dual Home</td>
<td>1-2-1. VxLAN Anycast IP</td>
<td>PASS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2-1-2. Data Plane Packet</td>
<td>PASS</td>
</tr>
<tr>
<td></td>
<td>2-2. Dual Home</td>
<td>2-2-1. Control Plane Packet</td>
<td>PASS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2-2-2. Data Plane Packet</td>
<td>PASS</td>
</tr>
<tr>
<td>3. RFC2544 test</td>
<td>3-1. Underlay</td>
<td>3-1-1. 1 flow</td>
<td>PASS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-1-2. 200 flows</td>
<td>PASS</td>
</tr>
<tr>
<td></td>
<td>3-2. Overlay</td>
<td>3-2-1. 1 flow</td>
<td>PASS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-2-2. 2000 flows</td>
<td>PASS</td>
</tr>
</tbody>
</table>
Agenda

• Yahoo! JAPAN
• Yahoo! JAPAN Networks
• Recent Efforts
• Why Backpack
• Backpack test results
• Future Plans
Future Plans

Plan to use Backpack for data analysis on infra used by science department in summer 2018.

Analyze accumulated data
• Searching log
• Access log
• Audio assist log
• News articles and video browsing history log
• Shopping order log
• etc
Q&A