HOW CLARK COUNTY UPGRADED OUR COMMUNICATIONS NETWORK IN PREPARATION FOR VEHICLE-INFRASTRUCTURE COMMUNICATION

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ITS Manager
Clark County, WA
CLARK COUNTY / SIGNAL SECTION DEMOGRAPHICS

- North of the Columbia River from Portland, OR
- Unincorporated population of approx. 210,000
- Traffic signals owned: 109 and maintained for others: 26
- Railroad with 18 crossings
- Transportation (signals and ITS) of $2.2M annual ongoing budget
- Capital construction budget in addition which varies by year
- One manager, two engineers, six techs
Look Simba. Everything the light touches is in Clark County.

Wow.

But what about that shadowy place?

That's Portland. You must never go there, Simba.
WHAT IS A LAYER 3 NETWORK?
PAST TO PRESENT

- Roughly a 10 year process
- We went from 1970-80 era technology to typically NEMA TS2-1 cabinets
- Dual bridge DSL then to now mostly 48 count fiber
- 3 cameras then to now lots of other stuff
- We bring back everything that is IP addressable
- Send data to Portland State University for archival and study usage
Signal cabinet

ITS cabinet

Battery backup
Switches (221)

Ped push buttons (31)
MMU

Power supply monitoring
Advanced radar detection

Radar count station (36)
Stopbar radar detection

2nd Radar count station
PTZ camera (135)

PTZ camera

ITS cabinet switch

IP addressable power strip (Minuteman)—not shown
Fiber switch (sometimes router) – not shown

Bluetooth scanner – not shown (16)

Pavement Temp sensor – not shown (38)

Radio (52)
WHERE WE ARE HEADED

- Expanding our count station and Bluetooth areas
- Distributing video internally for maintenance and projects
- Sharing video between WSDOT, City of Vancouver, 911, and soon the public
- Getting data into XML and JSON feeds for 3rd party use
- Traffic responsive and adaptive coming soon
- Connected vehicles initiative
CONNECTED VEHICLES INITIATIVE

- ATMS CENTRAL SYSTEM SEND OUT JSON FEED FOR 3RD PARTY
- OUR SIGNAL TIMING IS COMPLICATED (COORDINATED AND TRAFFIC RESPONSIVE)
- WORKING WITH BMW AND AUDI VIA TRAFFIC TECHNOLOGY SERVICES SO THEY CAN ANALYZE OUR DATA
- WE WILL BE SENDING SPAT DATA
- PAYING TRAFFICWARE TO DEVELOP DATA FIELDS PARALLEL WITH JSON TO BETTER UNDERSTAND FYA, LEAD/LAG, OPTICOM CALLS, ETC.
- GIS FORMAT SO OTHER USERS HAVE GRAPHICAL INTERFACE FOR DATA
COMMUNICATIONS IS THE KEY

- Coordination
- Timing
- Detection
- Communication

I'M SO HAPPY
KEY AREAS OF FOCUS

- PLANNING
- PERSONNEL
- FUNDING
PLANNING

1. Install larger junction boxes and extra conduit
2. Develop a conceptual idea
3. Develop a master plan for IT needs
4. Work with your MPO to develop a TSMO plan
5. Develop standards for communications equipment you will use
6. Use tools (VISIO) to illustrate your logical diagramed network
7. Develop a database (ACCESS) to track IP addresses, equipment, etc.
8. Use network management software
PLANNING JUNCTION BOXES
PLANNING
MICROSOFT VISIO
172.21.VLAN.###
CLARK COUNTY IP MANAGEMENT DATABASE

Database Administration
- Add New Device Type
- Add New Project

Inventory Management
- Add Devices to Inventory
- Add Switches and Routers to Inventory

Assign Components to Intersections and get Intersection Specific Reports
- Add Devices to Intersections (and generate a report)
- Add Powerstrip on/off to Intersections (and generate a report)
- Add Switches to Intersections (and generate a report)
- Add Switches/Routers to Intersections (and generate a report)

Delete Components from Intersections
- Delete/Edit Devices from Intersections
- Delete/Edit Powerstrip from Intersections
- Delete/Edit Switches from Intersections
- Delete/Edit Switches/Routers from Intersections

Queries on the Database
- Location of Components
  - Where are my Devices?
  - Where are my powerstrip on/off?
  - Where are my radios?
  - Where are my switches/routers?
  - Where is this IP Address?
  - Undeployed Radios & Switches

- Network Information
  - Which devices are at all intersections?
  - Which intersections are in each router
  - Which intersections are in each VLAN?
  - Which VLANs are assigned to each router?

Close This Database
### Add Devices to Intersections

#### Intersections
- NE Highway 59 / NE 68th Street (ATMS#: 3650)
- NE Highway 59 / NE 59th Street / Winco (ATDID#: 3720)
- NE Highway 59 / NE Hazel Dell Plaza (WalMart) (ATMS#: 2723)
- NE Highway 59 / NE Parkview Street (ATMS#: 3705)
- NE Highway 59 / NE Hazel Dell Plaza (ATDID#: 3705)

#### VLAN Assignment: 15

**Available IP Addresses:**
<table>
<thead>
<tr>
<th>IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.2</td>
</tr>
<tr>
<td>15.3</td>
</tr>
<tr>
<td>15.4</td>
</tr>
<tr>
<td>15.5</td>
</tr>
<tr>
<td>15.6</td>
</tr>
</tbody>
</table>

#### Host Ranges:
- 1 - Gateway
- 2 to 15 - Reserved
- 20 to 29 - Pedestrian detection
- 30 to 39 - Cabinet power supply
- 40 to 49 - Bicycle detection
- 50 to 67 - Traffic Signal Controller
- 68 to 69 - OSM Channel 1/2
- 70 to 89 - PTZ Cameras
- 90 to 109 - Video or Loop Detection

Choose an IP Address that is in the correct VLAN, as shown above, and in the host range shown above (VLAN HOST).

<table>
<thead>
<tr>
<th>Devices</th>
<th>IP Address</th>
<th>Project</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTZ Camera w/Axis Video Encoder</td>
<td>15.71</td>
<td>Cohu 3923 (NE)</td>
<td></td>
</tr>
<tr>
<td>PTZ Camera w/Axis Video Encoder</td>
<td>15.70</td>
<td>Cohu 3923 (SW)</td>
<td></td>
</tr>
<tr>
<td>Controller - Naztec 2670</td>
<td>15.79</td>
<td>2012 safety</td>
<td></td>
</tr>
<tr>
<td>Polara APS Pushbutton System</td>
<td>15.28</td>
<td>20132 Hwy 99 TSO 332422</td>
<td></td>
</tr>
<tr>
<td>WaveTronix Advance Radar Backpanel</td>
<td>15.211</td>
<td>99th St TSO</td>
<td>all approaches</td>
</tr>
<tr>
<td>WaveTronix Matrix Radar Backpanel</td>
<td>15.210</td>
<td>99th St TSO</td>
<td>all approaches</td>
</tr>
<tr>
<td>MMU - Rino 16000 Ethernet</td>
<td>15.190</td>
<td>99th St TSO</td>
<td></td>
</tr>
<tr>
<td>Opticom 704 Phase Selector</td>
<td>15.170</td>
<td>99th St TSO</td>
<td></td>
</tr>
<tr>
<td>Alpha 885 Remote Monitoring Unit</td>
<td>15.160</td>
<td>*Maintenance (or NONMAINT)</td>
<td>Installed 2013</td>
</tr>
<tr>
<td>Alpha Battery Backup System</td>
<td>15.164</td>
<td>*Maintenance (or NONMAINT)</td>
<td></td>
</tr>
<tr>
<td>WaveTronix HD Count Station</td>
<td>15.111</td>
<td>99th St TSO</td>
<td>N leg</td>
</tr>
<tr>
<td>WaveTronix HD Count Station</td>
<td>15.110</td>
<td>99th St TSO</td>
<td>W leg</td>
</tr>
</tbody>
</table>
## NE Highway 99 / NE 99th Street

Clark County Department of Public Works - Transportation

### Devices

<table>
<thead>
<tr>
<th>Device</th>
<th>IP Address</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller - Nartec 2070</td>
<td>172.21.15.50</td>
<td></td>
</tr>
<tr>
<td>Opticom 764 Phase Selector</td>
<td>172.21.15.170</td>
<td></td>
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<tr>
<td>Polara APS Pushbutton System</td>
<td>172.21.15.26</td>
<td></td>
</tr>
<tr>
<td>MMU - Reno 1500G Ethernet</td>
<td>172.21.15.190</td>
<td></td>
</tr>
<tr>
<td>PTZ Camera/Axis Video Encoder</td>
<td>172.21.15.71</td>
<td>Cohu 3925 (NE)</td>
</tr>
<tr>
<td>PTZ Camera/Axis Video Encoder</td>
<td>172.21.15.70</td>
<td>Cohu 3925 (SW)</td>
</tr>
<tr>
<td>Wavetronix Advance Radar Backpanel</td>
<td>172.21.15.211</td>
<td>all approaches</td>
</tr>
<tr>
<td>Wavetronix HD Count Station</td>
<td>172.21.15.111</td>
<td>N leg</td>
</tr>
<tr>
<td>Wavetronix HD Count Station</td>
<td>172.21.15.110</td>
<td>W leg</td>
</tr>
<tr>
<td>Wavetronix Matrix Radar Backpanel</td>
<td>172.21.15.210</td>
<td>all approaches</td>
</tr>
<tr>
<td>Alpha Battery Backup System</td>
<td>172.21.15.164</td>
<td></td>
</tr>
<tr>
<td>Alpha BBS Remote Monitoring Unit</td>
<td>172.21.15.165</td>
<td></td>
</tr>
</tbody>
</table>

### Switches & Routers

<table>
<thead>
<tr>
<th>Router</th>
<th>IP Address</th>
<th>Phone Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS900</td>
<td>172.21.7.113</td>
<td>900-0110-25479</td>
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<tr>
<td>RS900</td>
<td>172.21.7.80</td>
<td>900-1011-49965</td>
</tr>
<tr>
<td>RS900</td>
<td>172.21.7.79</td>
<td>900-1011-49966</td>
</tr>
<tr>
<td>RSG2200</td>
<td>172.21.7.107</td>
<td>922-0511-02011</td>
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<tr>
<td>RSG2200</td>
<td>172.21.7.78</td>
<td>922-1111-02388</td>
</tr>
</tbody>
</table>

### Radios

<table>
<thead>
<tr>
<th>ID</th>
<th>IP Address</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1504000105</td>
<td>172.21.7.219</td>
<td>faces east</td>
</tr>
</tbody>
</table>
PERSONNEL

1. INNOVATION
2. LEARN FROM THOSE WHO CAME BEFORE YOU
3. GET YOUR ENGINEERING STAFF ON-BOARD
4. GET YOUR MAINTENANCE STAFF ON-BOARD
5. REVIEW ADEQUATE STAFFING LEVELS
6. WORK WITH YOUR IT DEPARTMENT TO GET THEM ON BOARD
FUNDING

1. BUILD PARTNERSHIPS WITH REGIONAL PLAYERS
2. EMPHASIZE GRANTS “COMPLY WITH THE REGIONAL PLAN” OR “TSMO PLAN”
3. ENLIST THE REGIONAL GRANTING AGENCY TO SEE IF THERE IS DATA THEY WOULD LIKE TO SEE
4. BUILD OUT YOUR FIBER NETWORK BY FUNDING SIGNAL IMPROVEMENTS
5. PROMOTE WHAT YOU’VE DONE AND ARE DOING TO HIGHER MANAGEMENT AND TO ELECTED OFFICIALS
6. GET OTHER DEPARTMENTS USING YOUR DATA
RECAP

• PREPARE A PLAN FOR FUTURE CONNECTIVITY OF YOUR SYSTEM

• GET ADEQUATE QUANTITY AND QUALITY OF PERSONNEL

• FIND A NEED AND FILL IT BY USING GRANTS TO LEVERAGE COMMUNICATIONS
THANK YOU!

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