John Dahl

Internet BGP Peering Study

Huntington Bancshares (2018)

Issue

- New Northern Michigan Customers Complain About Poor Internet Performance. Internet Customer Footprint Confirms Increased Consumer Density around Traverse City MI (slide 2)

Research

- Internet ISP Map of Customer's Ingress Points & Density to Identify Which ISPs are Nearest to Our Customers (slide 3)
- Analyst Dashboard for Comparing Customer Locations to Internet Ingress Points by ISP (slide 4)
- Internet Path from Traverse City to Columbus Data Center for 6 Finalist ISPs (slide 5)

Finding

- Network Latency between Northern Michigan and the Columbus Data Center is doubled the expected value because our Verizon ISP peers to the South & West (Cincinnati & Kansas City) resulting in longer traveled distances and, as a consequence, higher network latencies & user response times. (slide 6)

Recommendation & Remediation

- Request Verizon BGP Peer with Global Net Access in Cleveland so traffic routes directly north more quickly to our customers thereby reducing network latency by 50%.

Post Remediation Confirmation

- Execute & Measure Production Logons from Traverse City via an Internet Agent once every 10 Minutes to confirm Response Times meet our Service Level Agreement (SLA) for our newest customers. (slide 7)

Note: Responsible for visualizations as well as research, collection, analysis & integration of data sources.

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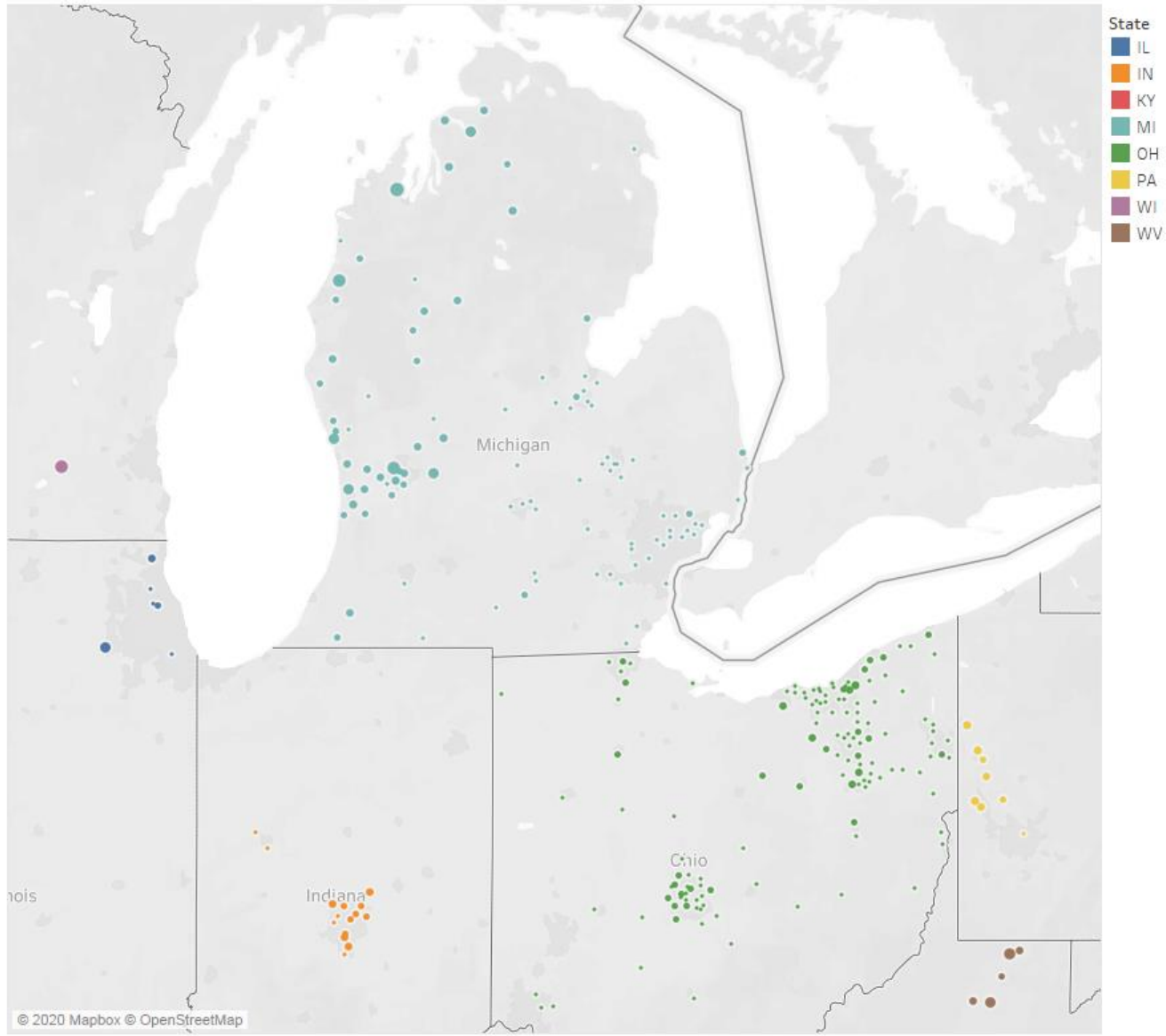

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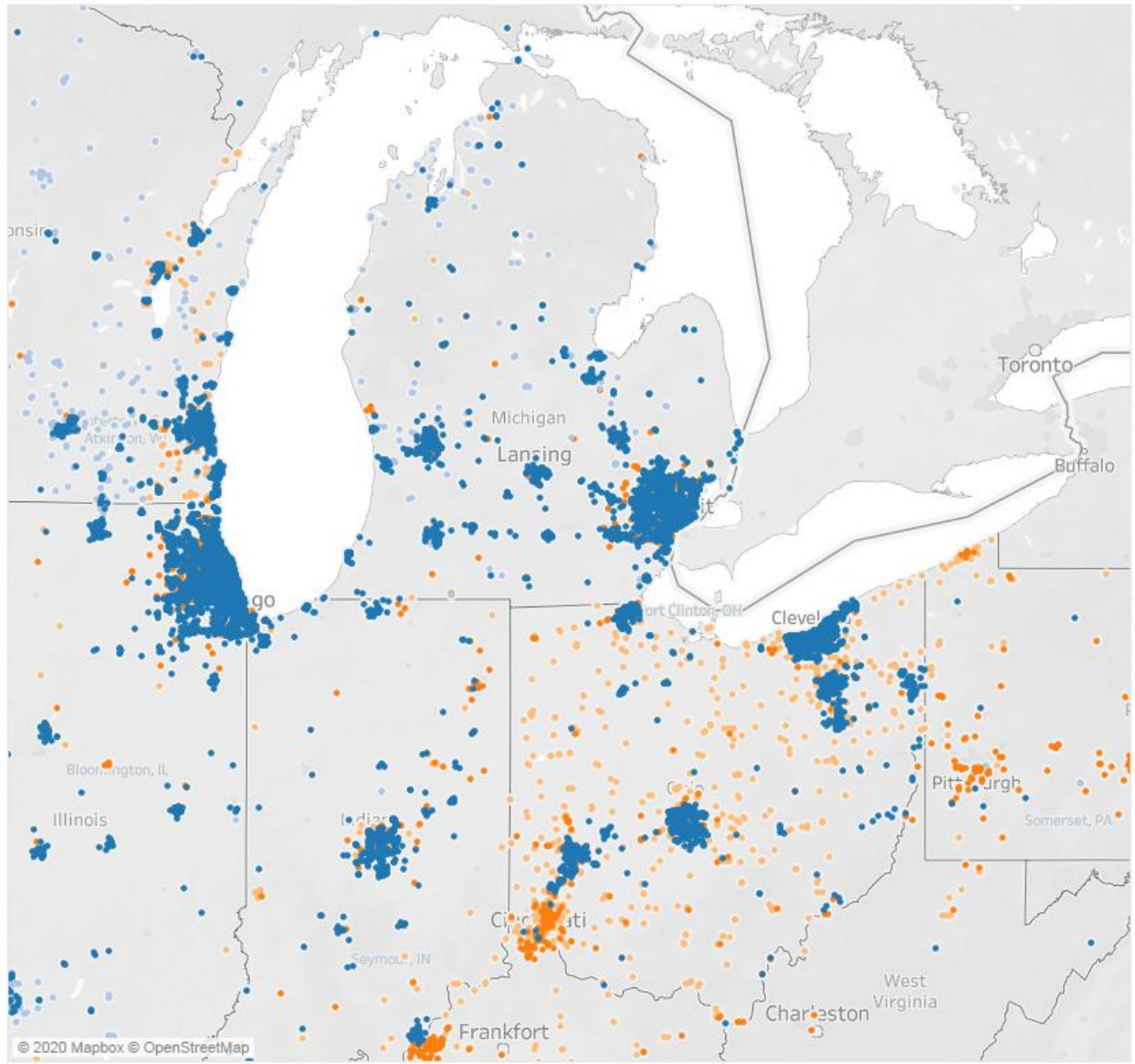

Top 20 MidWest ISPs

- [x] AT&T Internet Services
- [ ] AT&T Services
- [ ] AT&T WorldNet Servic..
- [ ] Broadview Networks
- [x] Charter Communicati..
- [ ] Comcast Business Co..
- [ ] Comcast Cable Comm..
- [ ] Comcast IP Services
- [ ] Earthlink
- [ ] FDCservers.net
- [ ] Hurricane Electric
- [ ] Integra Telecom
- [x] Level 3 Communicatio..
- [ ] MCI Communications ..
- [ ] PaeTec Communicatio..
- [ ] Qwest Communicatio..
- [ ] SOURCEDNS
- [x] Time Warner Cable Int..
- [ ] XO Communications

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- Charter Communicati..
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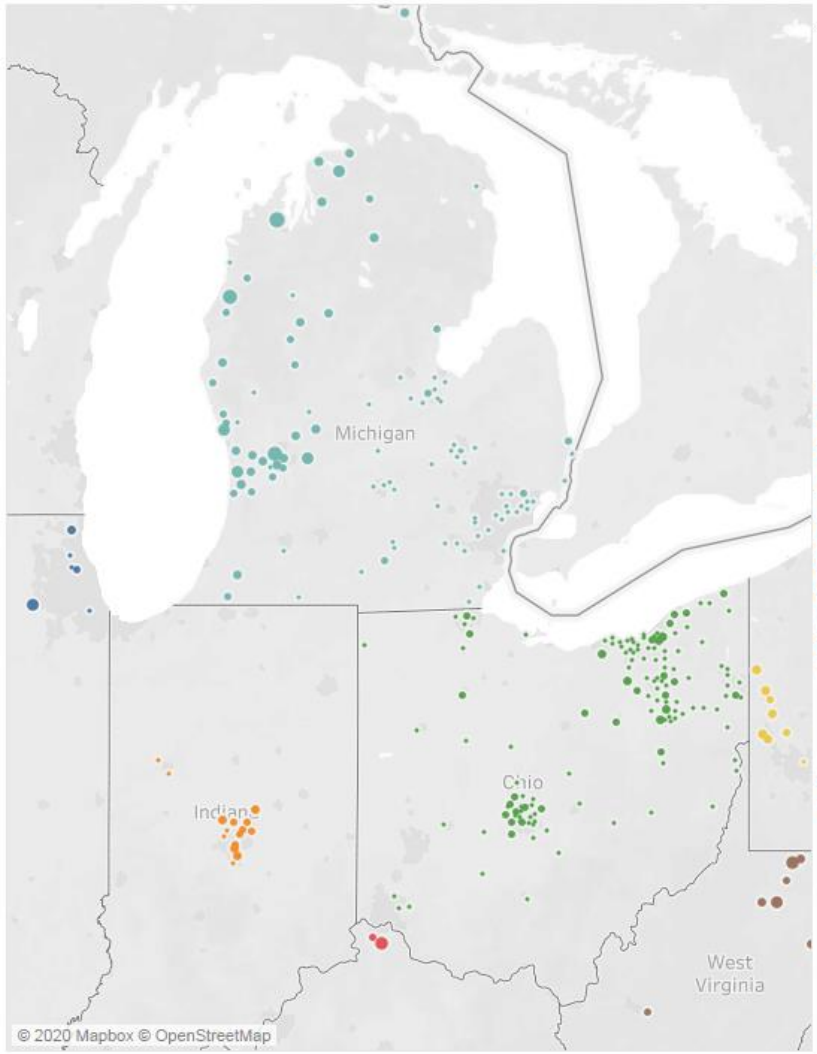
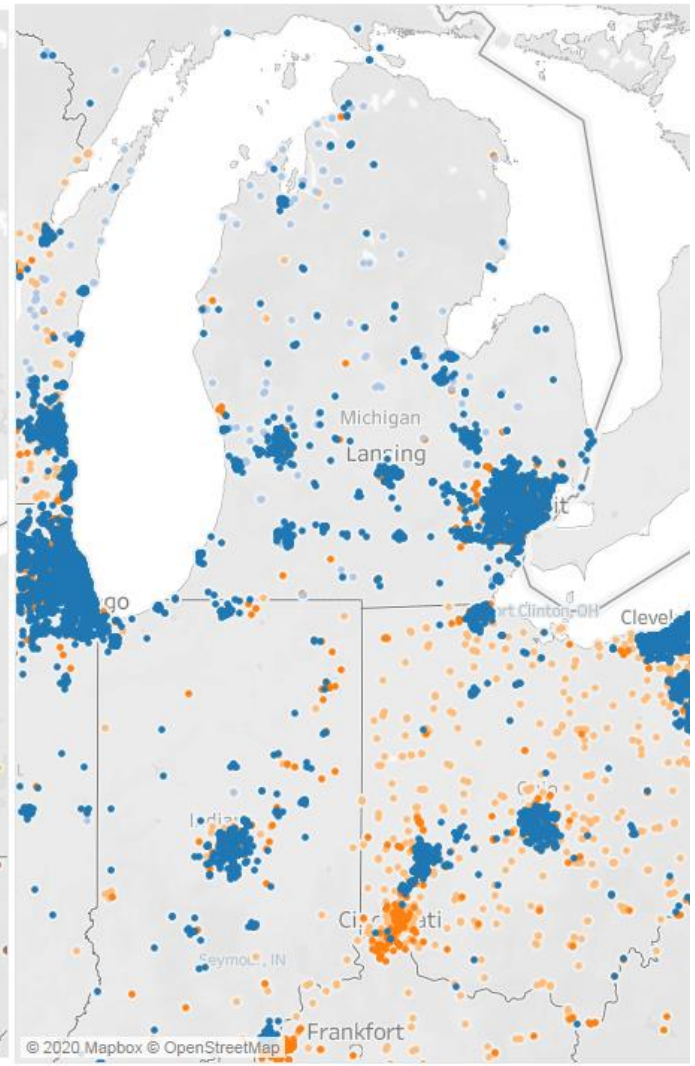
Source Nodes: Internet Customers



Internet Ingress: Top 20 MidWest ISPs



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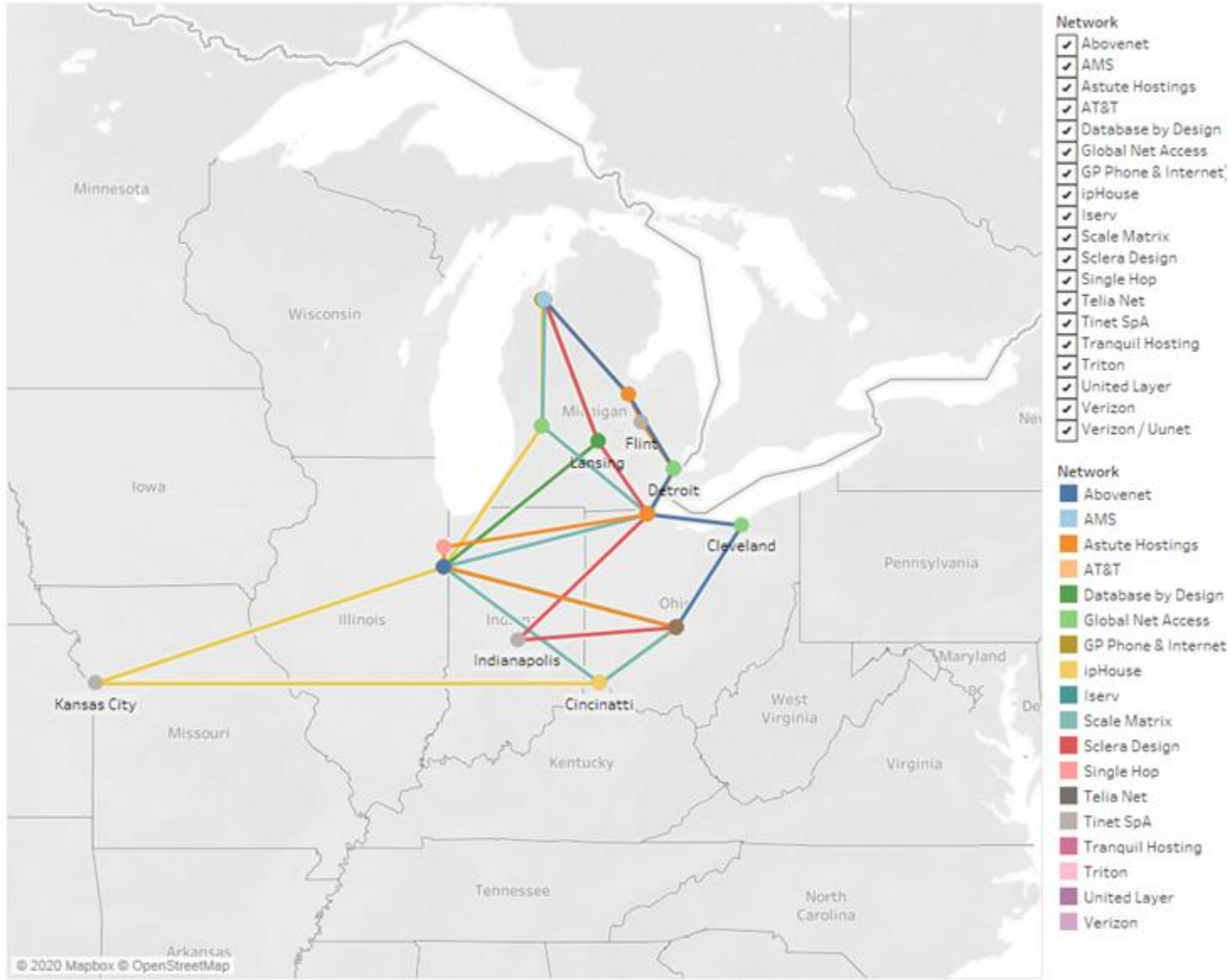

Network
- Abovenet
- AMS
- Astute Hostings
- AT&T
- Database by Design
- Global Net Access
- GP Phone & Internet
- ipHouse
- Iserv
- Scale Matrix
- Sclera Design
- Single Hop
- Telia Net
- Tinet SpA
- Tranquil Hosting
- Triton
- United Layer
- Verizon
- Verizon / Uunet

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Connectivity: Traverse City <> Columbus

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- [x] United Layer
- [x] Verizon
- [x] Verizon / Uunet

Network Latencies

Network	City	Cumulative Latency
Verizon	Traverse City (Verizon)	1
Scale Matrix	Saginaw	6
United Layer	Detroit	8
AT&T	Toledo	10
Global Net Access	Cleveland	14
Verizon / Uunet	Columbus	17

Network	City	Cumulative Latency
GP Phone & Internet)	Traverse City (GP Phone)	1
United Layer	Grand Rapids	7
Astute Hostings	Chicago	16
Tinet SpA	Kansas City	25
ipHouse	Cincinatti	33
Verizon / Uunet	Columbus	35

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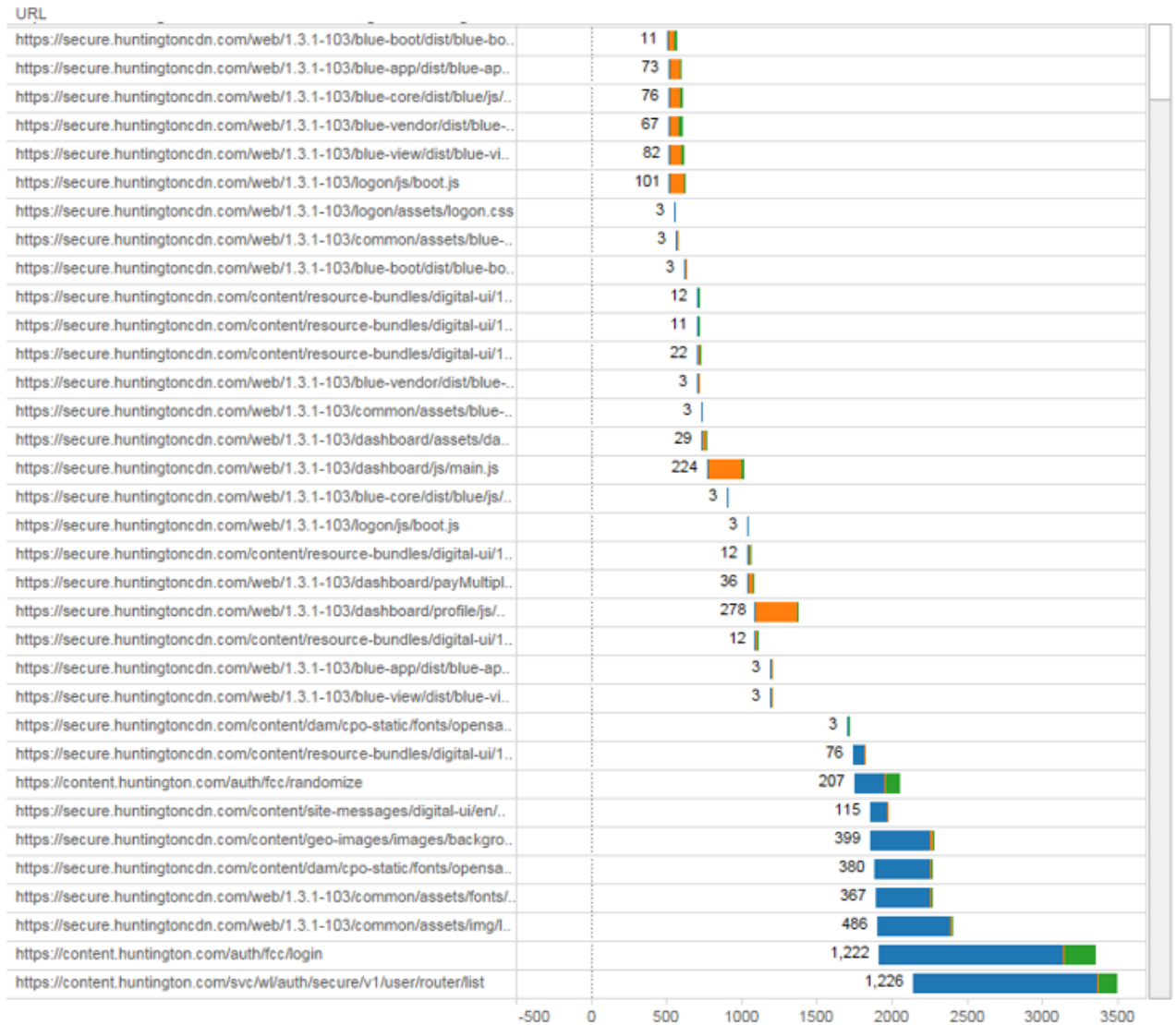
Post Remediation Confirmation: Logon Measurements Every 10 minutes

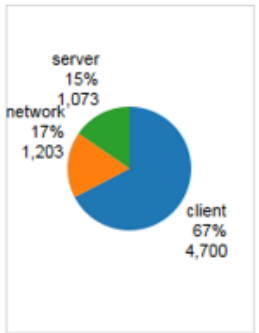
Logon HTTP Waterfall: Traverse CIty @ 10:20AM 2018 Nov 4



Processing Tiers

- client
- network
- server

Time Consumption by Tier (ms)



Today's Login Response Times (ms)