The Internet Is Your New Network

Sergey Katsev, VP Engineering, Catchpoint
Agenda

• About me, and why my history is applicable here
• The Internet is complex, but you still have to fix it immediately
• Your Internet Stack: Breaking down experiences by how they can be monitored
• Changing (changed?) landscape
• How ntop fills visibility requirements for Catchpoint
About Me

Sergey leads global engineering, data analytics and quality assurance teams at Catchpoint, improving the performance and resilience of the Catchpoint platform.

Sergey holds bachelor’s and master’s degrees in Computer Engineering from the Rochester Institute of Technology. Prior to Catchpoint, he spent his career at companies trying pushing the boundaries of what’s possible on the internet, with roles at Coyote Point, Fortinet, and Interface Masters/Niagara Networks.

At these roles, Sergey developed products which improved network performance, security, and application delivery, garnering several patents. Now at Catchpoint, Sergey is using his previous experience of what can go wrong with networks and applications to make the internet more resilient.
... also look for this guy in the room.

Alessandro runs the Italian team at Catchpoint, and loves answering questions!
What I was used to: **IN MY APPLIANCE BUBBLE**

**USERS**

**APPS**

“The Box”
How digital experiences are delivered: **REALITY**

**LAST MILE/4G/5G**
- T-Mobile
- Comcast
- Verizon
- KPN
- Charter
- Sprint
- T-Deutsche Telekom
- Cable ONE
- Cox

**BACKBONE**
- T-Mobile
- AT&T
- CenturyLink
- Tata Communications
- Cogent Communications
- Orange

**DNS**
- Oracle
- Cloudflare
- Google DNS
- Neustar
- NS1

**CDN & SECURITY**
- Cedexis
- Cloudflare
- Imperva
- Akamai
- Fastly
- Limelight
- Verizon

**3RD PARTY SERVICES**
- Apple
- Amazon
- Microsoft
- Google
- SAP
- Salesforce
- DoubleClick

**INTERNET & SERVICES**
The Internet is your new Network &

THE INTERNET IS COMPLEX...

Multiple techniques are needed to understand its performance
### Sergey’s Blind Spot Scorecard (Pre-Catchpoint)

<table>
<thead>
<tr>
<th></th>
<th>Internal Application</th>
<th>External Application</th>
<th>Infrastructure / Network</th>
<th>Dependency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Control</strong></td>
<td>✅</td>
<td>✅</td>
<td>✅</td>
<td>✅</td>
</tr>
<tr>
<td><strong>Low Control</strong></td>
<td>✅</td>
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<td>✅</td>
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<td><strong>No Control</strong></td>
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## Catchpoint’s Blind Spot Scorecard (Pre-nTop)

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<td>High Control</td>
<td>Green</td>
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<td>Green</td>
</tr>
<tr>
<td>Low Control</td>
<td>Yellow</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
</tr>
<tr>
<td>No Control</td>
<td>Yellow</td>
<td>Green</td>
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The IT Mandate: Detect, Identify, Fix Faster
Delivering Resilient Digital Services

- Two Traditional Areas That Need Attention

**Code/infrastructure you own:**
- **Full control**
- APM, observability tools monitoring infrastructure, network, logs and tracing code, etc.

**3rd party services you rely upon:**
- **Limited or no control**
  - Offered SLAs
- You need to map & monitor the Internet Stack
Map the Internet Stack with Internet Performance Monitoring (IPM)

Provides full visibility into the internet stack so you can catch any issues before they impact your business.
Exercise: What applications do you care about?

<table>
<thead>
<tr>
<th>Internal Applications</th>
<th>Customer Applications</th>
<th>Dependencies</th>
</tr>
</thead>
</table>

Higher Control

Lower Control
What applications do you care about?

<table>
<thead>
<tr>
<th>Internal Applications</th>
<th>Customer Applications</th>
<th>Dependencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharepoint</td>
<td>Your SaaS Product</td>
<td>BGP (next hop)</td>
</tr>
<tr>
<td>Salesforce</td>
<td>3rd Party Integration</td>
<td>DNS</td>
</tr>
<tr>
<td>SAP</td>
<td>Zendesk</td>
<td>BGP (other hops)</td>
</tr>
<tr>
<td>Office 365</td>
<td></td>
<td>Email</td>
</tr>
<tr>
<td>Zoom</td>
<td></td>
<td>CDN</td>
</tr>
</tbody>
</table>

Which are the most important? What happens if they experience an issue? How can you tell?
What does it mean that they’re important?

- Revenue / productivity impact - if they’re down for some or all (availability & reachability), if they’re slow (performance), if they have errors (reliability).

- Resiliency is composed of:
  - Customer experience
  - Workforce Productivity & Morale
  - Application Performance
  - Network Performance
  - Reduced third party risk

- In summary: An important application must be resilient.
  
  But how can you tell?
Active (Synthetic) vs. Passive (RUM) monitoring

Active

- Proactively find issues by simulating activities
- Only as good as the locations (vantage points) and level of simulation
- Because every measurement is the same, data has high Signal to Noise ratio

Passive

- Measure actual application activity, from real users
- If you see a problem in the data, a customer already saw a problem in real life!
- Very noisy
- Harder
High Control Application (Your Applications)

- **Synthetic & RUM:** Measure from where users are
- **APM & NPM:** Measure from “inside”
- If internal-use application, can add endpoint monitoring.
- Combine to get full visibility

**High Control Application**

- Internal User
- External User
- RUM
- Your Network
- APM
- NPM

**Endpoint Monitoring**

**Synthetic**
Low Control Application (SaaS, 3rd Party, …)

- Synthetic: Measure from where users are
- RUM, APM & Server-side NPM: Not possible
- Endpoint monitoring for internal users provides both Synthetic and RUM ability*

Endpoint Monitoring

Internal User

External User

RUM

Synthetic

High Control Application

Your Network

APM

NPM
The Future of Work Is Hybrid

Percentage of Employees Indicating Their Remote Work Preferences

- Both — Home & Office: 62%
- Remote — Home: 25%
- Not Remote — Office: 13%

Source: 2020 Gartner Improving Employee Engagement Survey
Endpoint monitoring in a nutshell

- Web Applications: Browser extension to observe performance
- Native & Web: Synthetically test APIs
- Device: Collect OS/hardware telemetry
- Native Application: Use ntop!
UCaaS Monitoring using ntop + Synthetic

Customer Needs:

- Know in advance if a call will produce un-usable audio/video before the call starts ← Synthetic, aggregated RUM
- Have confidence that important client calls will not unexpectedly drop out or stutter ← Synthetic, RUM
- Test which UCaaS service will produce the best connection between two or more devices ← RUM
- Determine the possible fault for a call interruption - and distinguish between device, network, and application faults ← Synthetic, RUM
- Store historical call data to track patterns or abnormalities in service quality
- Warn all employees in areas with potentially interrupted service so they can shift their schedules or use a backup UCaaS system ← Synthetic, aggregated RUM

Solution:

- Measure APIs using Synthetic
- Collect performance metrics like R-Factor using nProbe protocol dissection (Zoom & Teams)
- Combine both to obtain the right level of insights
Real-time Transport Protocol (RTP) Monitoring with ntop

- RTP monitoring extended to report call quality for common VoIP desktop apps
  - Zoom and Microsoft Teams
- Call quality represented by R-Factor and MOS metrics
- Additional RTP metrics provide more insights
  - Jitter
  - RTT
  - Packet Loss

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<tr>
<th>User Satisfaction Level</th>
<th>MOS</th>
<th>R-Factor</th>
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<tr>
<td>Maximum using 0.711</td>
<td>4.4&lt;</td>
<td>93</td>
</tr>
<tr>
<td>Excellent</td>
<td>4.3 – 5.0</td>
<td>90 – 100</td>
</tr>
<tr>
<td>Good</td>
<td>4.0 – 4.3</td>
<td>80 – 90</td>
</tr>
<tr>
<td>Satisfied</td>
<td>3.6 – 4</td>
<td>70 – 80</td>
</tr>
<tr>
<td>Dissatisfied</td>
<td>3.1 – 3.6</td>
<td>60 – 70</td>
</tr>
<tr>
<td>Fully dissatisfied</td>
<td>2.1 – 2.6</td>
<td>50 – 60</td>
</tr>
<tr>
<td>Not recommended</td>
<td>1.0 – 2.6</td>
<td>Less than 50</td>
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Endpoint Monitoring with Catchpoint + ntop
## Catchpoint’s Blind Spot Scorecard (with ntop)

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What makes Catchpoint + ntop special?

Monitor **what** matters

Our focus is on monitoring every aspect of the internet stack

Monitor from **where** it matters

The largest observability network **inside** the internet

To **catch** issues **before** they become incidents

HD real-time data, advanced correlation, experience scores and analysis/drill-down tools