

# Towards an Open, Web-Based Network Performance Measurement Platform

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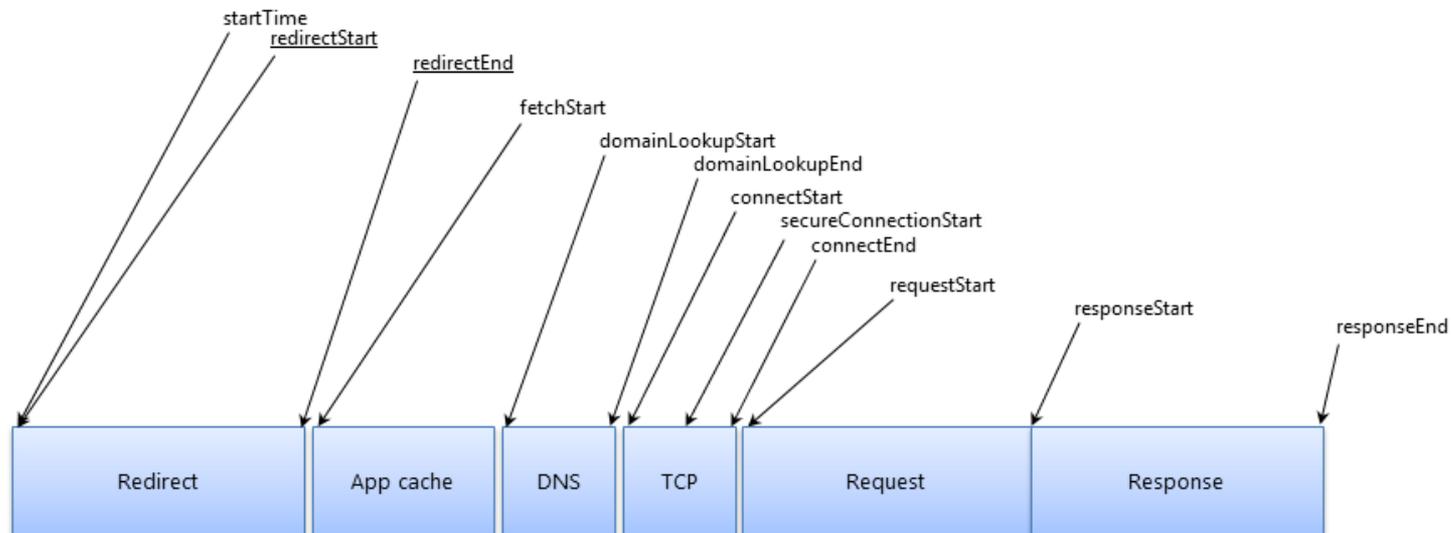
# DevOps ♥ JavaScript

- JavaScript: The duct tape of the Internet
  - JavaScript for web performance measurements?



# JavaScript for Web Performance

- W3C Web Performance Working Group
  - PerformanceResourceTiming API
  - Allows JavaScript mechanisms to provide complete client-side latency measurements



# JavaScript for Web Performance

- Example

```
// Resource Timing
var r0 = performance.getEntriesByType("resource")[0],
    loadtime = r0.duration,
    dns = r0.domainLookupEnd - r0.domainLookupStart,
    tcp = r0.connectEnd - r0.connectStart,
    ttfb = r0.responseStart - r0.startTime;
```

- accurate delay (and throughput) measurements

# JavaScript for Web Performance

- Deployment and browser support

IE	Edge *	Firefox	Chrome	Safari	Opera	iOS Safari *	Opera Mini *	Android Browser *	Chrome for Android
8			45					4.3	
9			46					4.4	
10		43	47			8.4		4.4.4	
11	13	44	48	9	34	9.2	8	47	47
	14	45	49	9.1	35	9.3			
		46	50		36				
		47	51						

# Use Cases

- 3<sup>rd</sup> party pixel tags\*
- Beacon: W3C Web Performance Working Group
  - schedule asynchronous and non-blocking delivery
  - minimizing resource contention with other time-critical operations

\* Use Timing-Allow-Origin Response Header

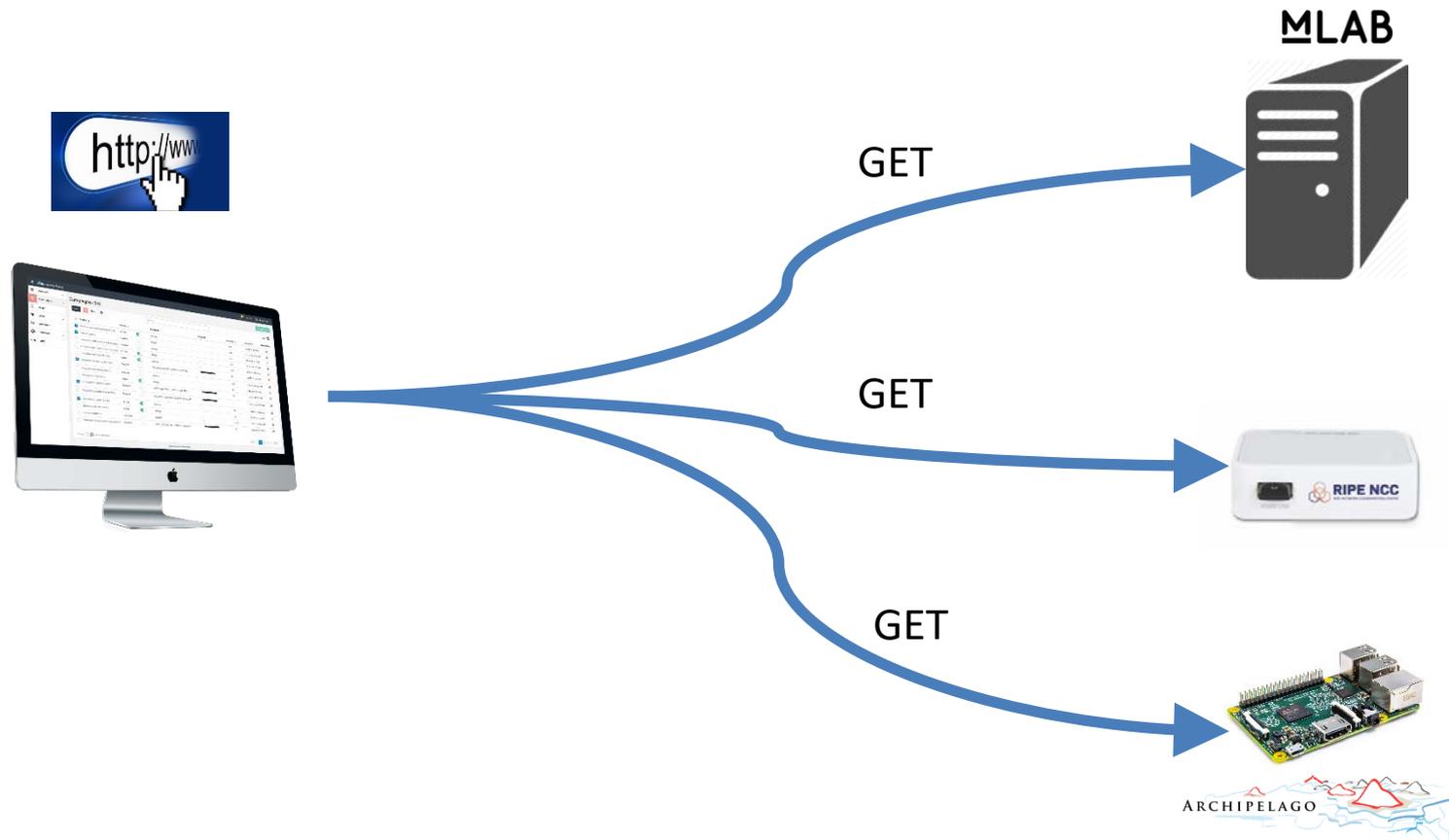
# Commercial JavaScript Based Web Performance Analytics



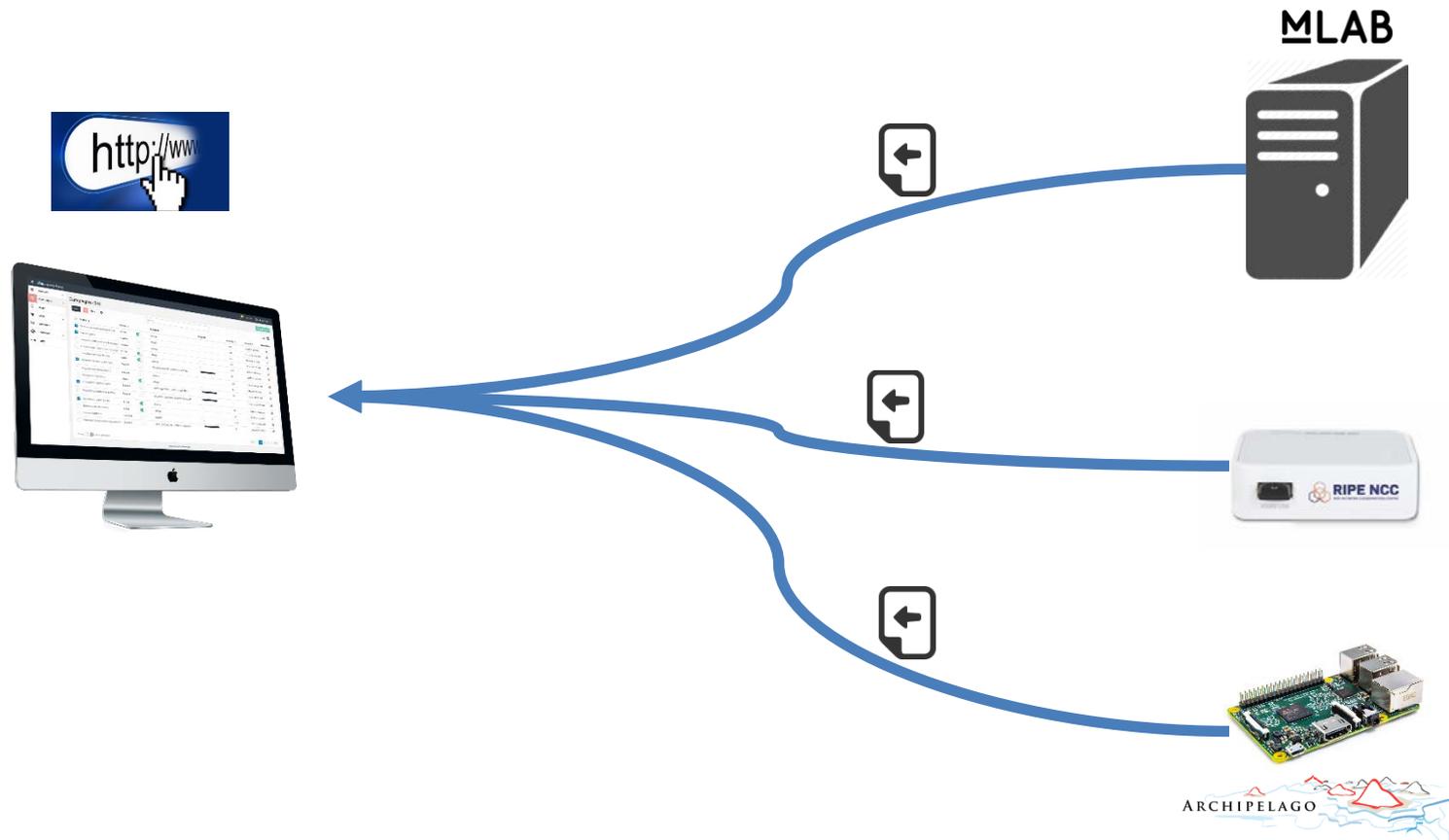
# Towards an Open Web Performance Measurement Platform

- Design and deployment experience with a CDN
- **Clients:** Use JavaScript to crowdsource network performance measurements
  - Recruit content providers to invoke client measurements
  - Or...
- **Servers:** Sufficient measurement web servers
  - M-LAB
  - perfSONAR
  - Ark
  - RIPE Atlas
  - Cloud instances

# Towards an Open Web Performance Measurement Platform



# Towards an Open Web Performance Measurement Platform



# Technical & Non-technical Issues

- Incentives for web publishers to participate
  - Open API
- Control framework and use cases
  - How many servers to contact?
  - Which servers to contact?
- IRB issues
  - consent
  - anonymization
  - aggregation