Measuring the Dual-Stack IPv6/IPv4 Experience

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Motivation

• Web sites typically depend on secondary resources (e.g., images, JavaScript, CSS).
• Each of those resources might, in turn, depend on other resources.
• Questions:
  • What does an in-depth of Web-side IPv6 deployment look like?
  • Besides the main resource, what is the constituency of IPv6-enabled resources in the tree of dependencies?
  • What does the overall user experience look like over IPv4 and IPv6?
  • Is the experience consistent across different vantage points?
Methodology

• Identify (recursive) dependencies for a Web site
• Identify IPv4 and IPv6 availability for each resource
• Characterize the dependency graph, based on IPv4/IPv6 availability
• Measure the overall experience difference using IPv4/IPv6
Identifying Web Site Dependencies

• Goal: identify dynamically-loaded resources, including those invoked with scripts.

• Tool: “Page Graph” extension for Google Chrome.

• Each page loaded in by a user/researcher using the extension, output exported to json.

https://github.com/cyrus-and/chrome-page-graph
Identifying IPv4/IPv6 Resources

• Create graph based on HTTP dependencies.
• Each node is marked based on IPv4/IPv6 availability.
Characterizing Dependency Graph

- Total number of nodes: 5
- Number of IPv4 vs IPv6 nodes: 5, 3
- IPv4-only (or IPv6-only) areas
- IPv6 (or IPv4) “islands”
Preliminary Results – Alexa Top Sites (top “n”)
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