CISPA
HELMHOLTZ CENTER FOR INFORMATION SECURITY

The Leaky Web: Automated Discovery of Cross-Site Information Leaks in Browsers and the Web

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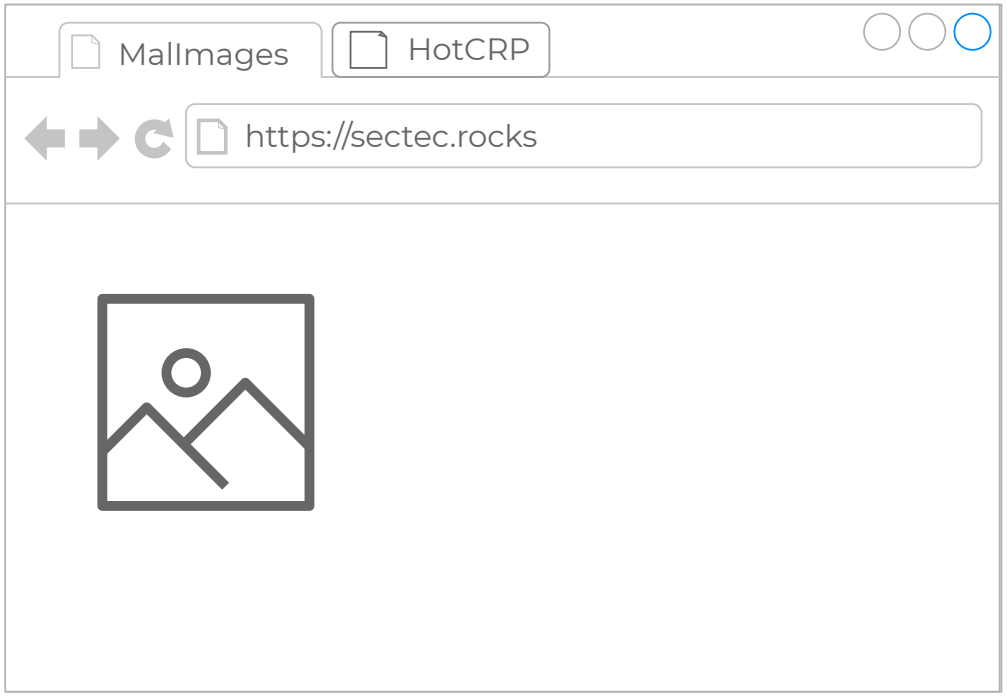
Browsers Leak Information Cross-Site



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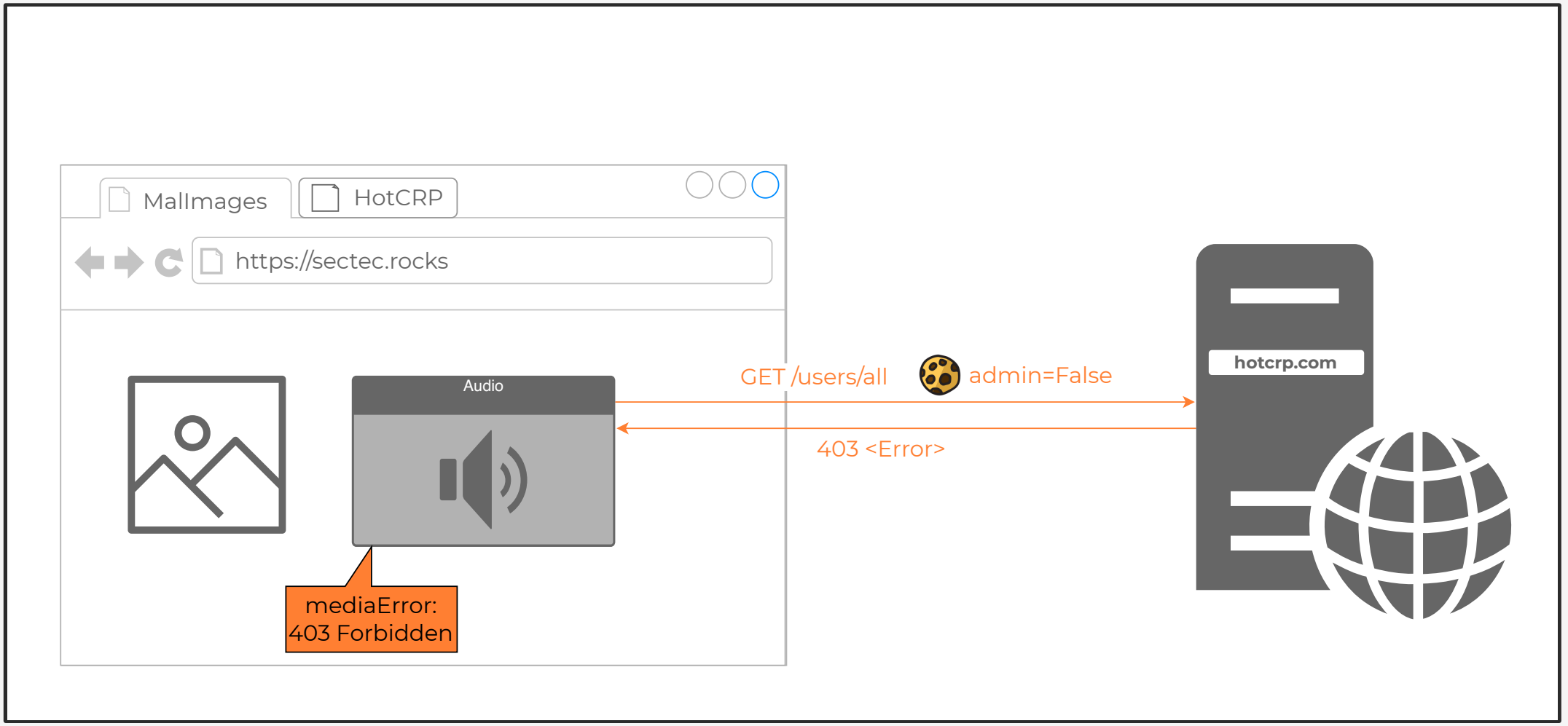

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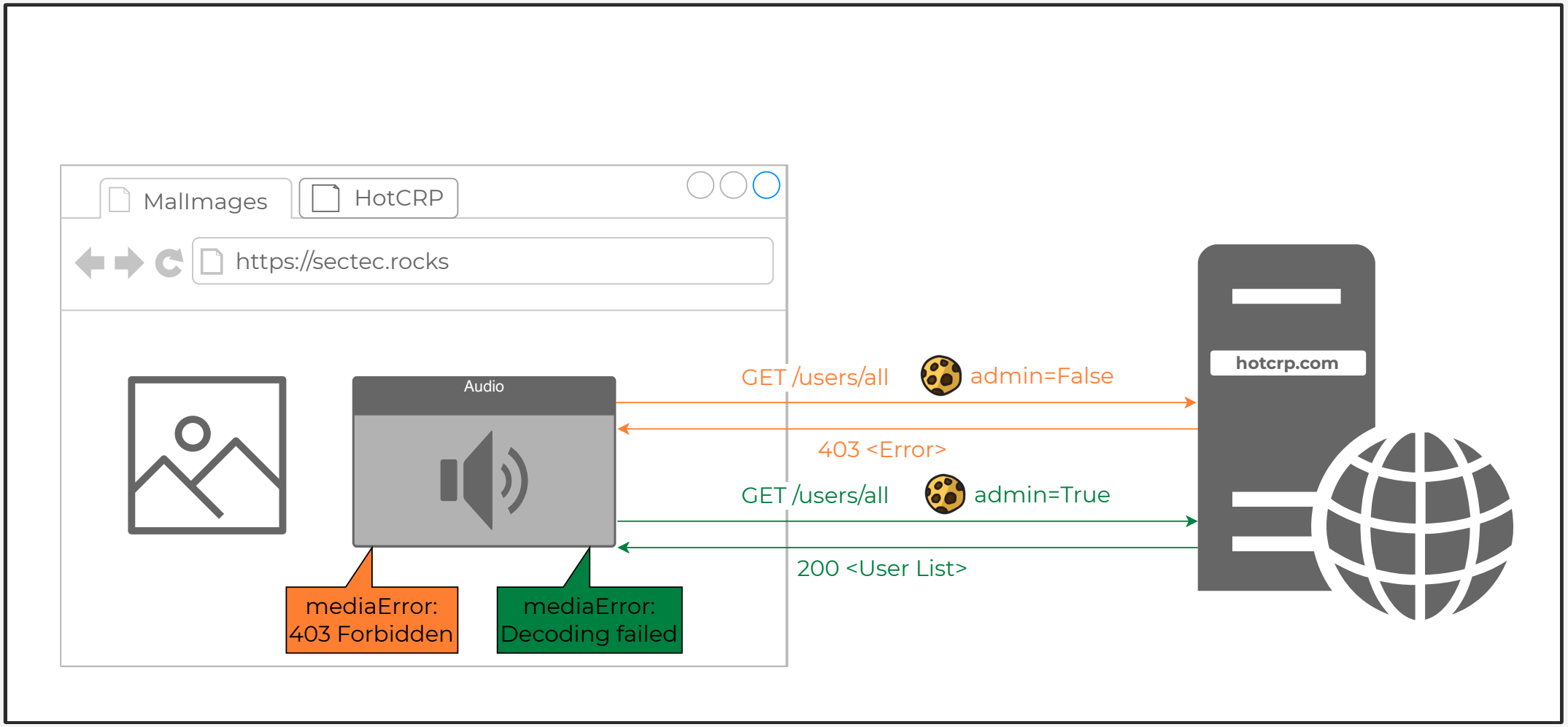

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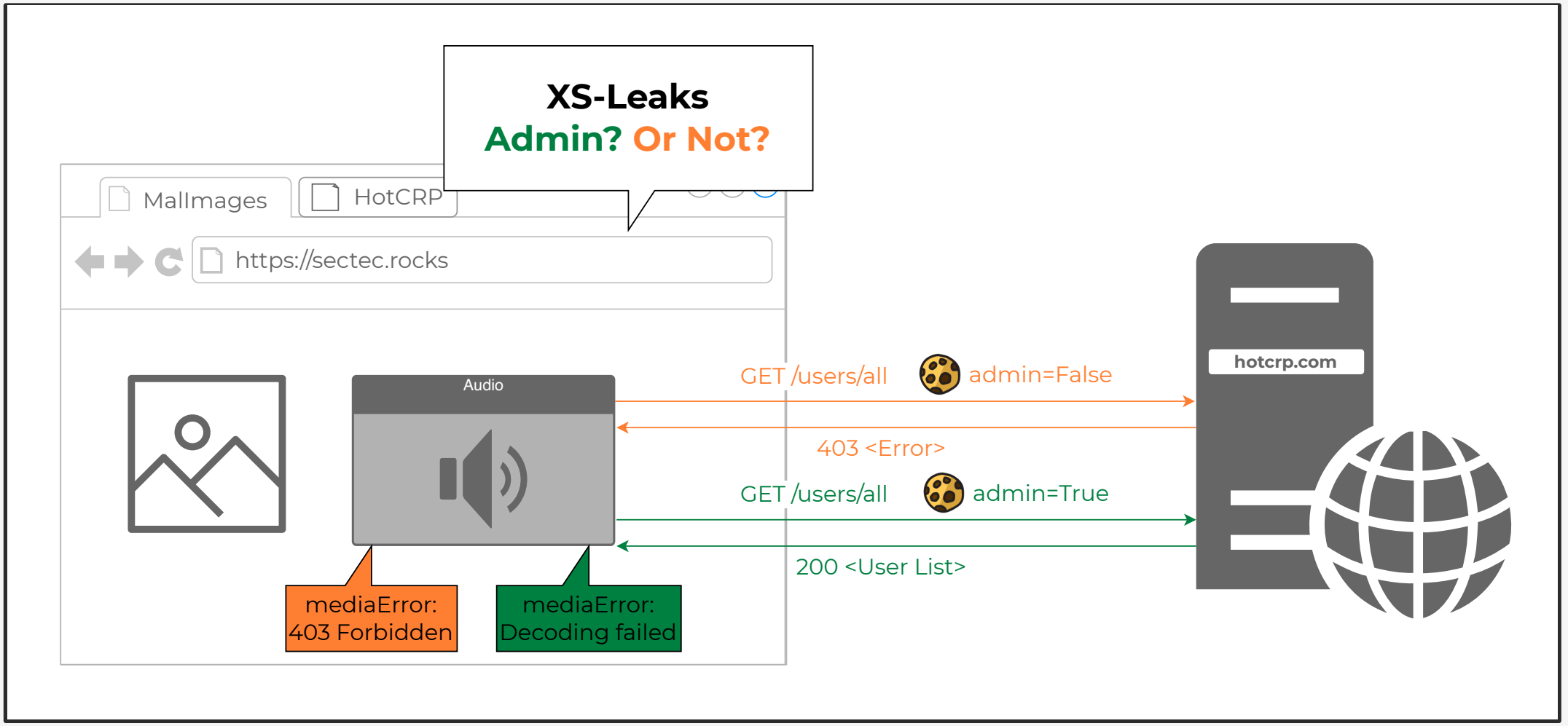
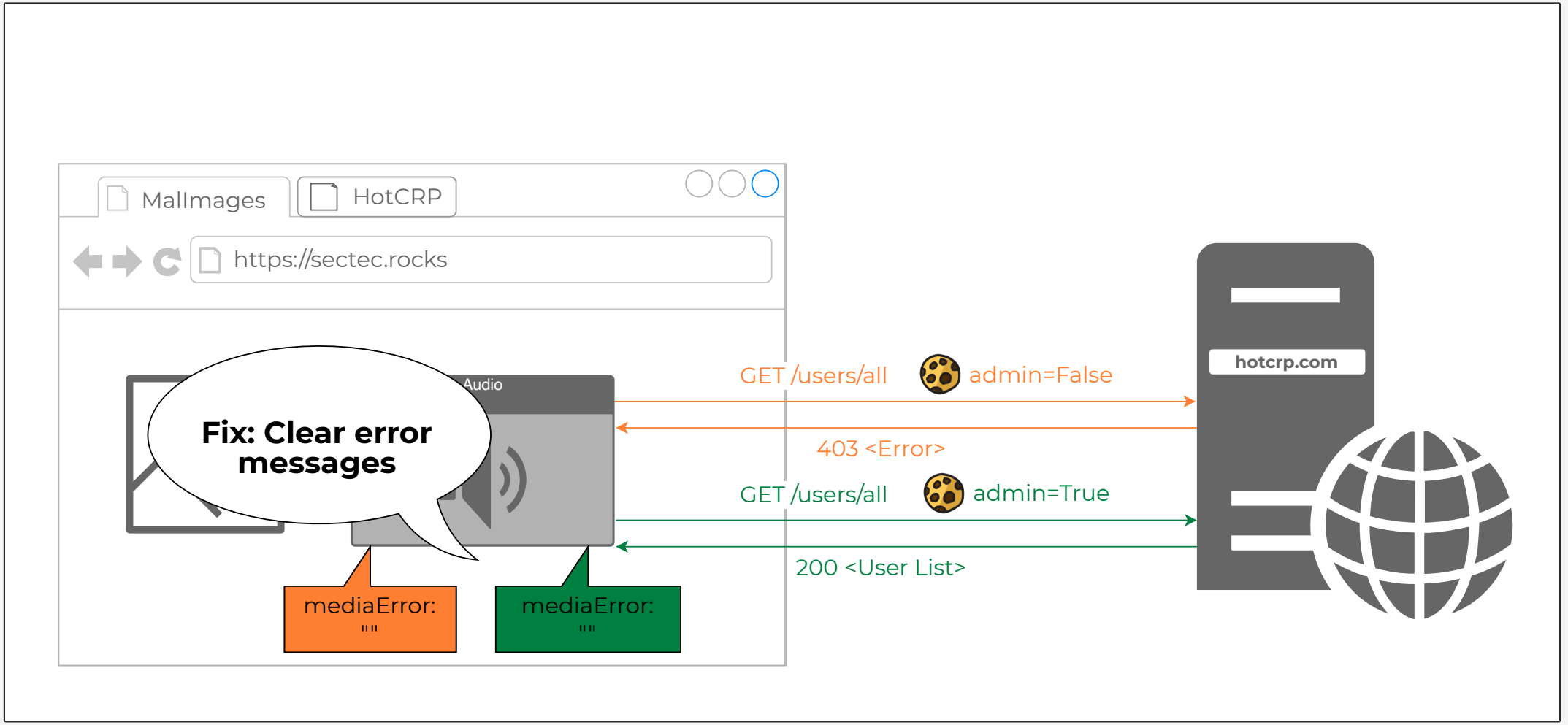


Systematic Analysis of XS-Leaks Problem Space



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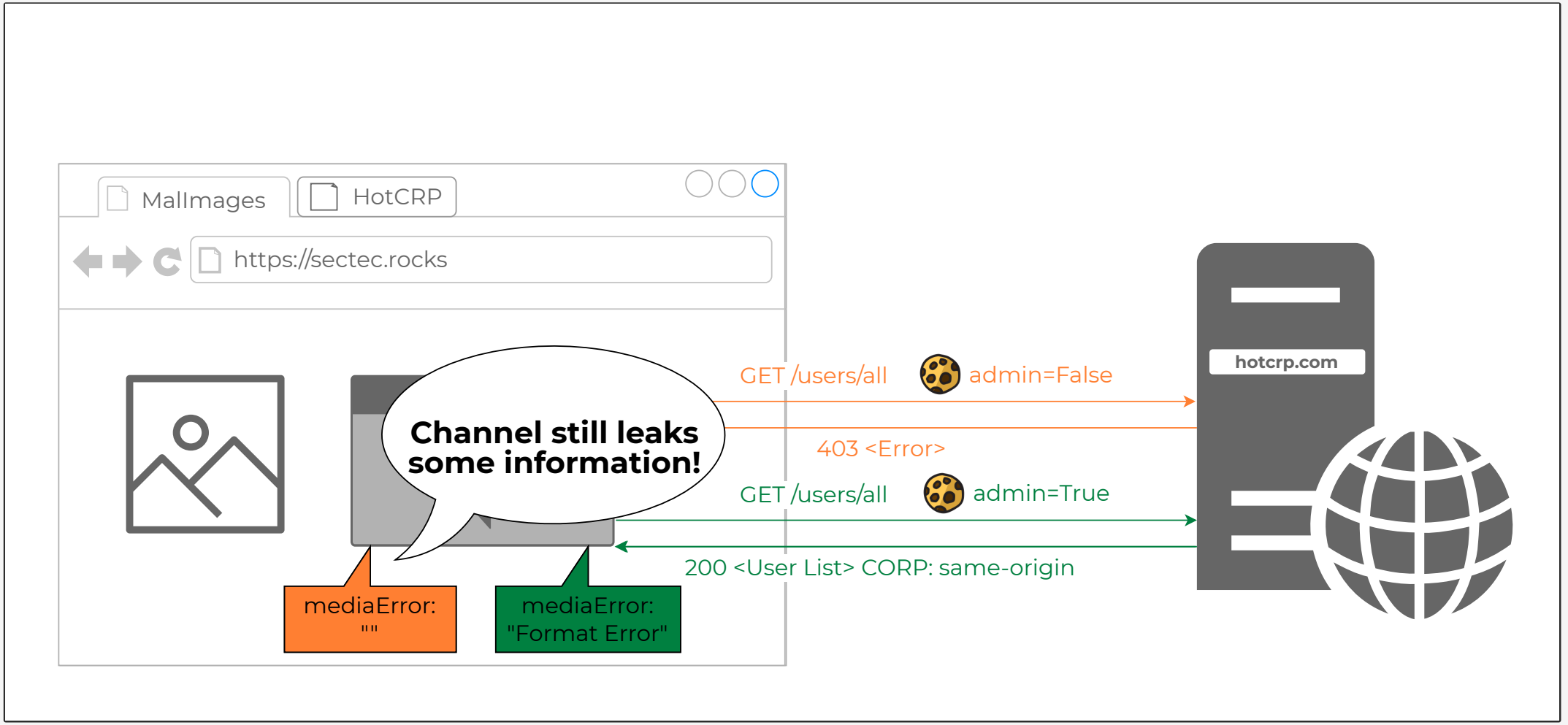

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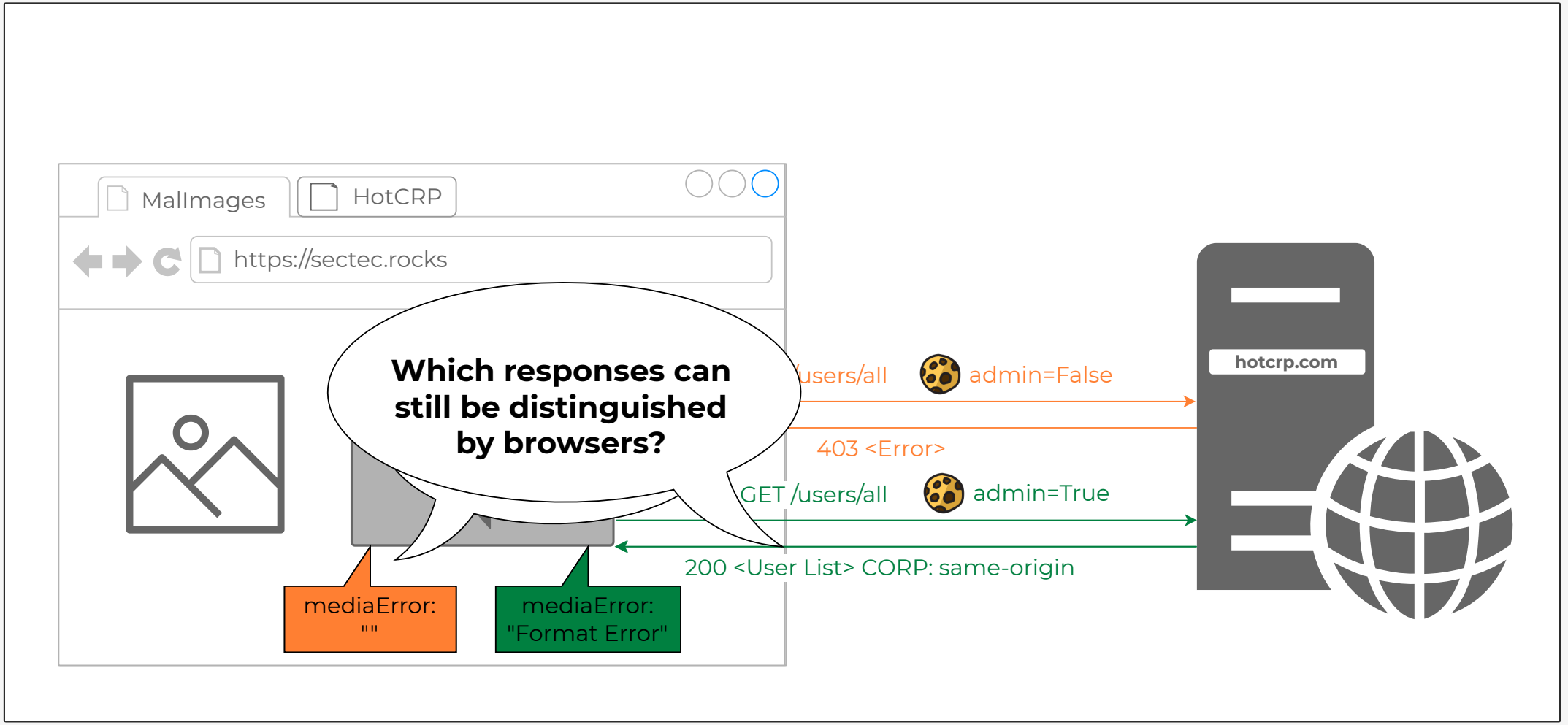

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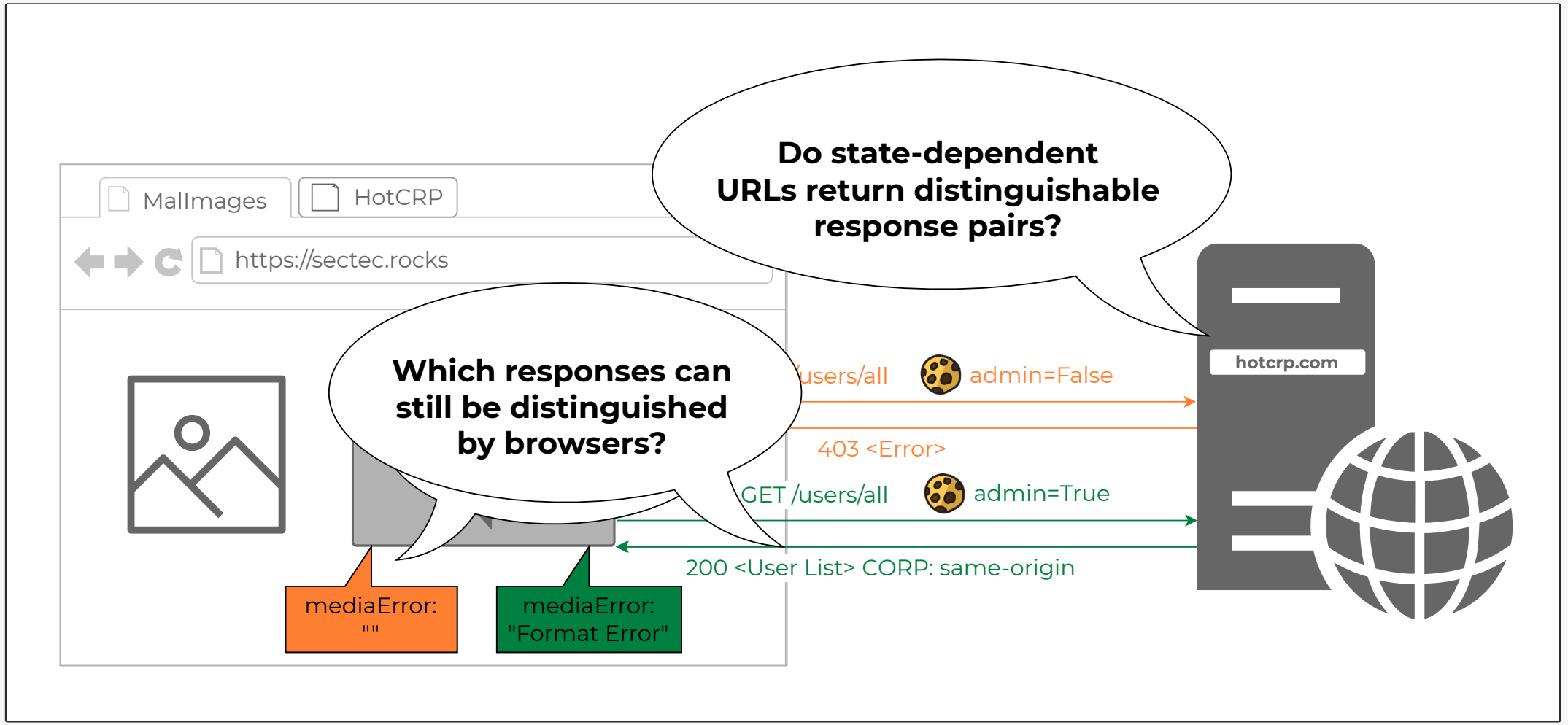

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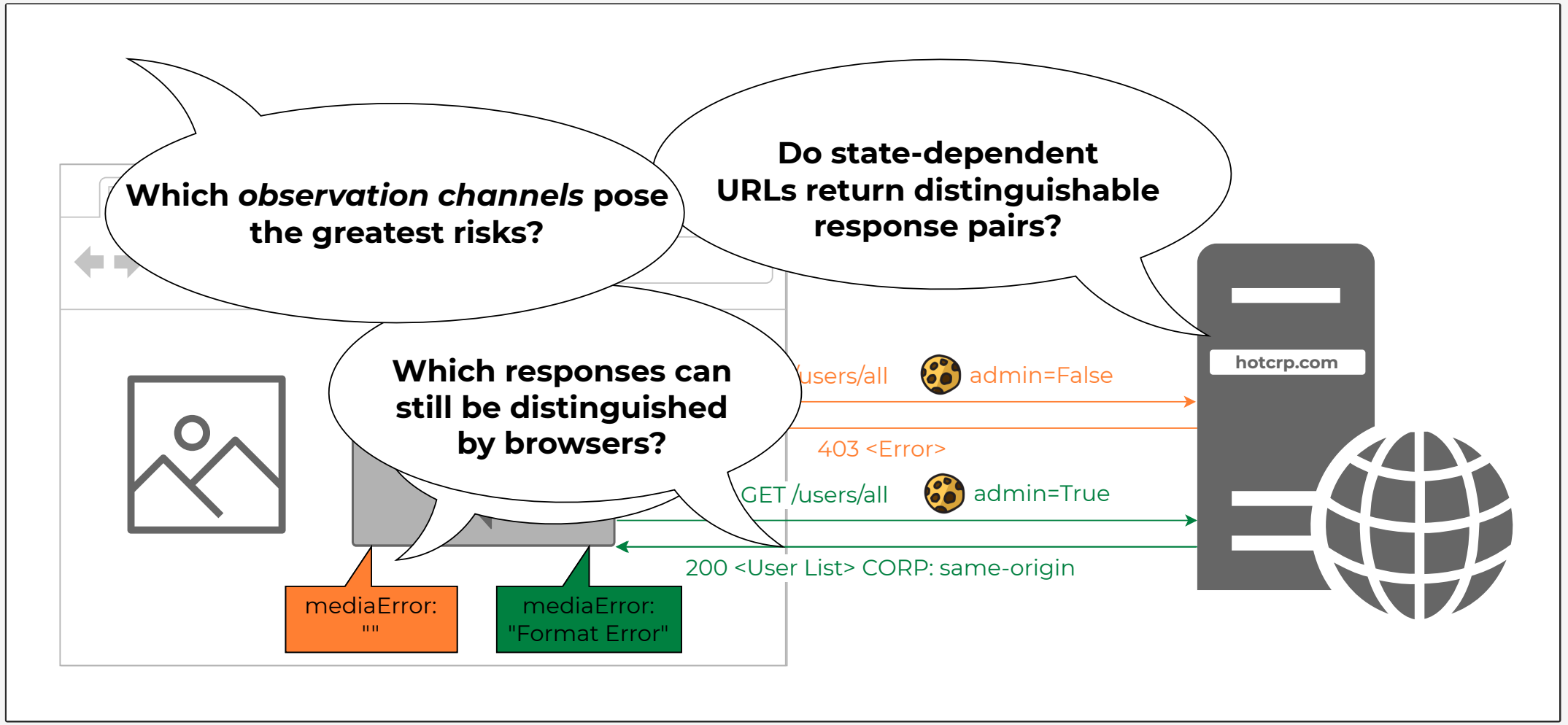

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- Create human-understandable summaries

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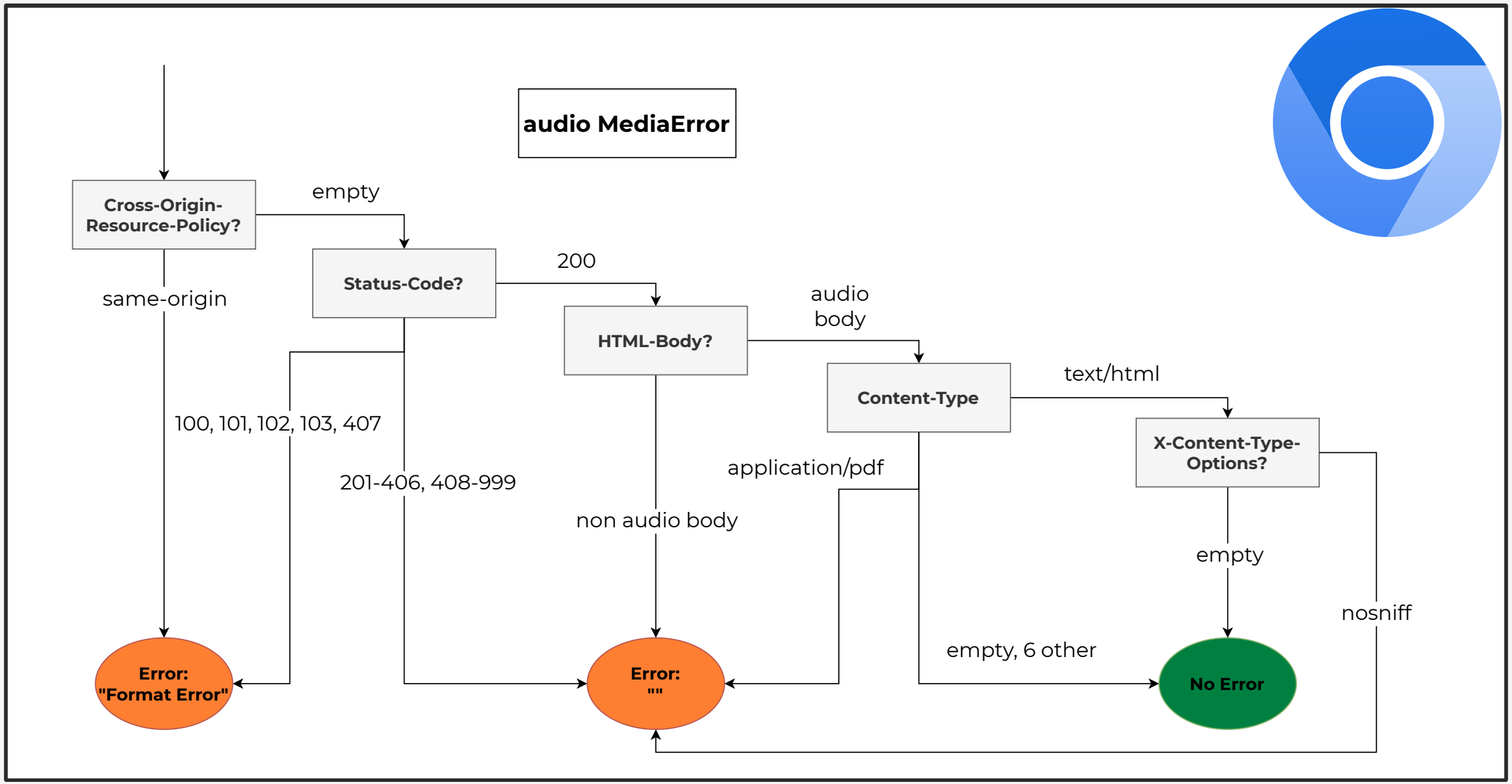
  - Cross-Origin-Read-Blocking (Chromium)

Decision Tree Summaries of Observation Channels



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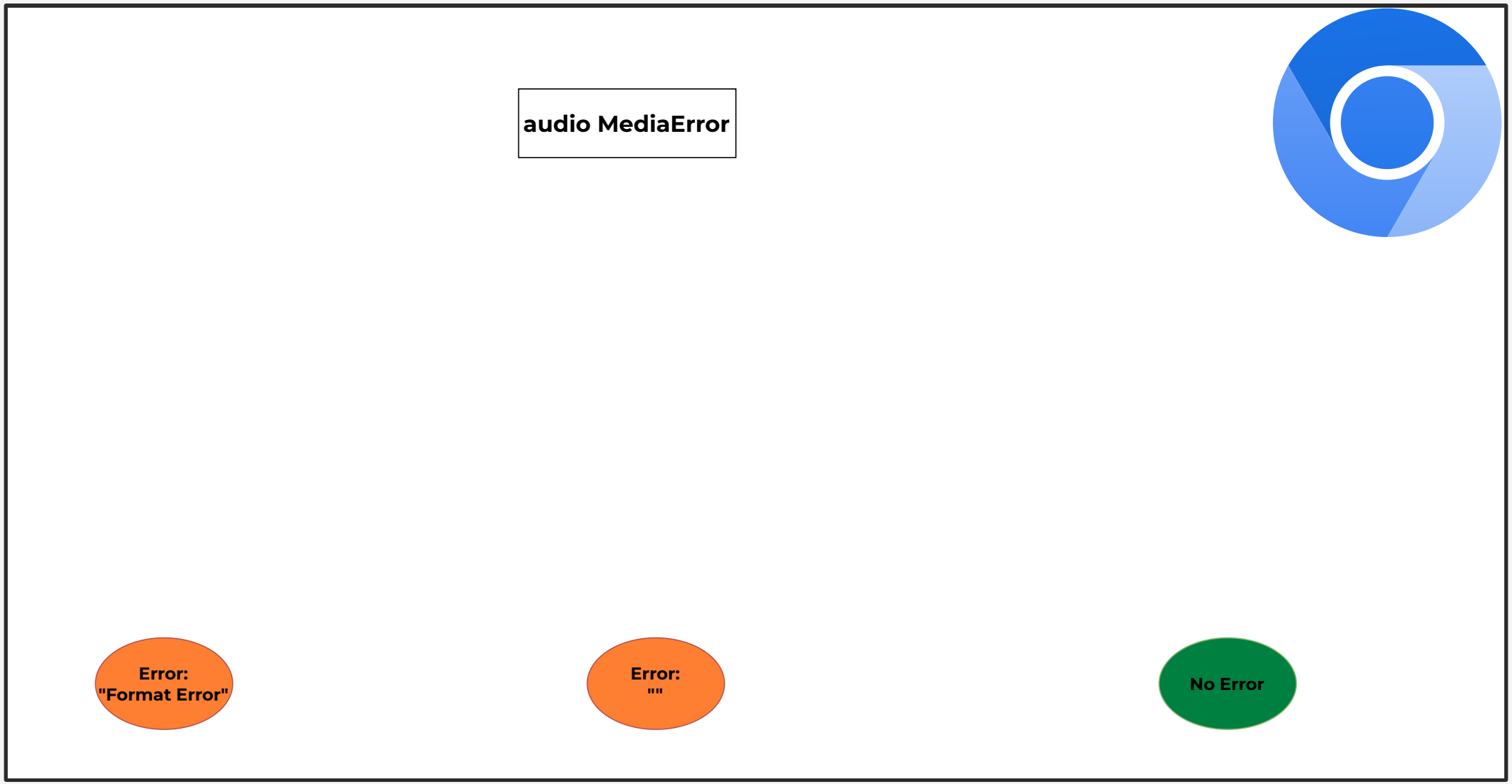

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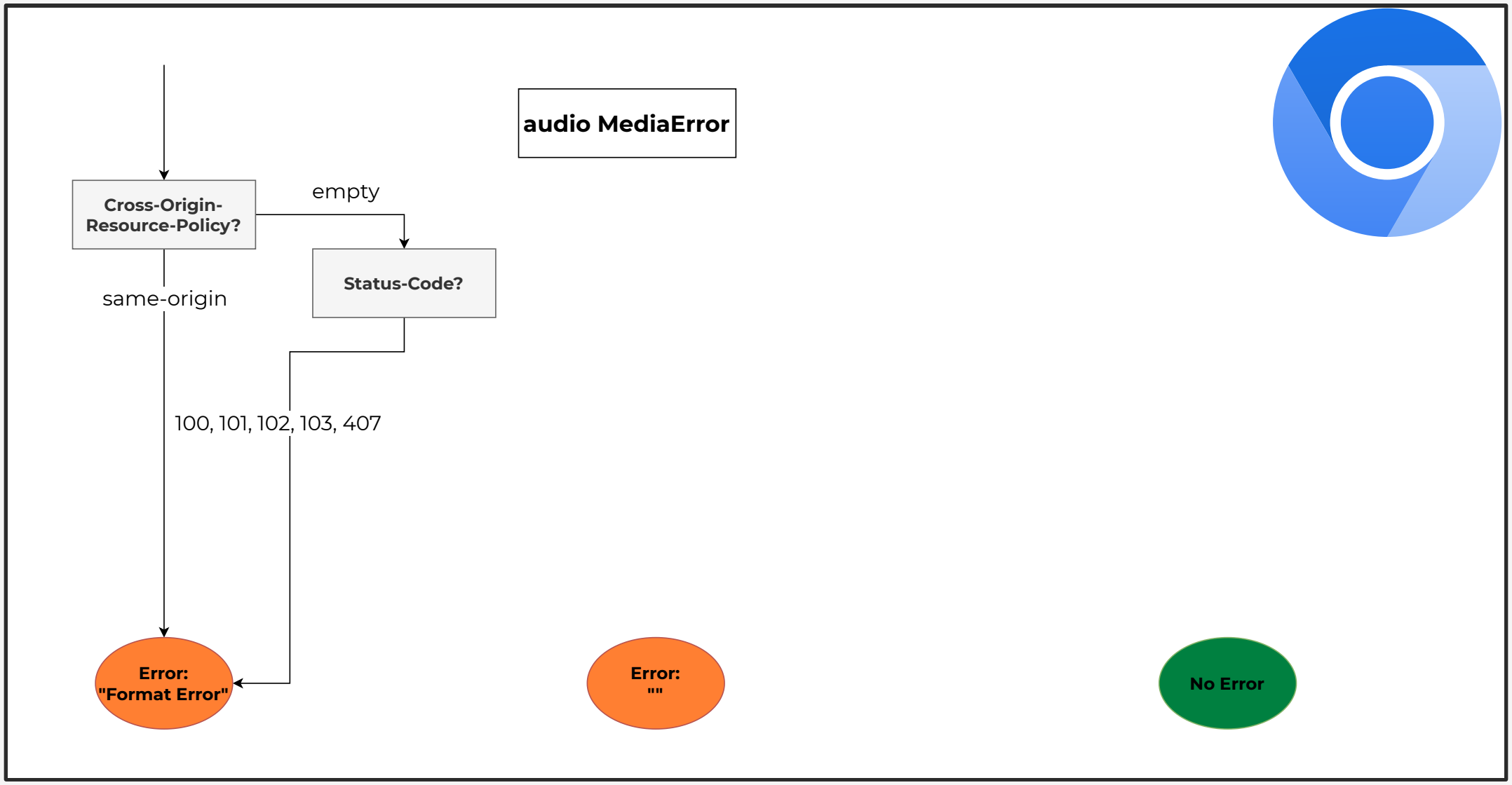

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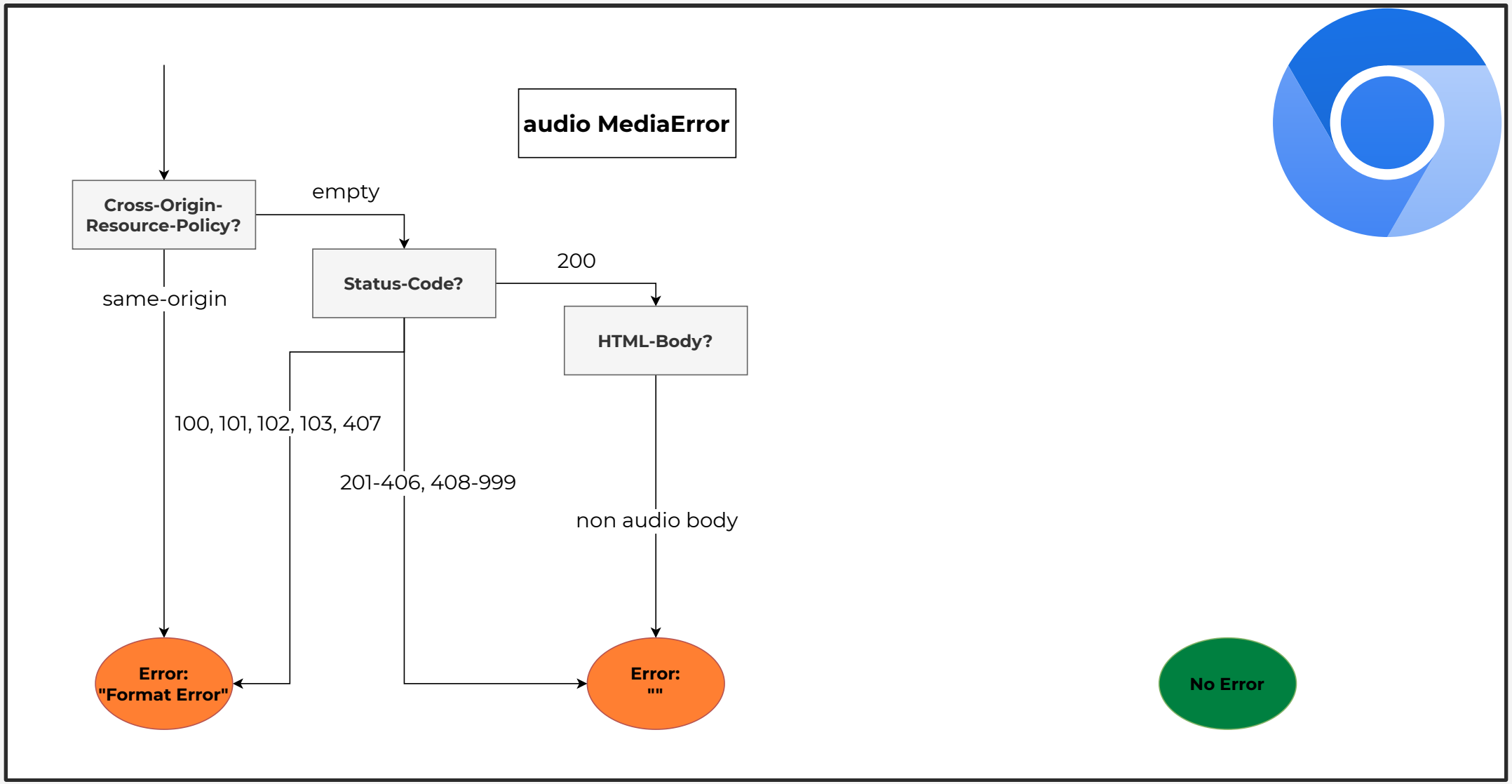

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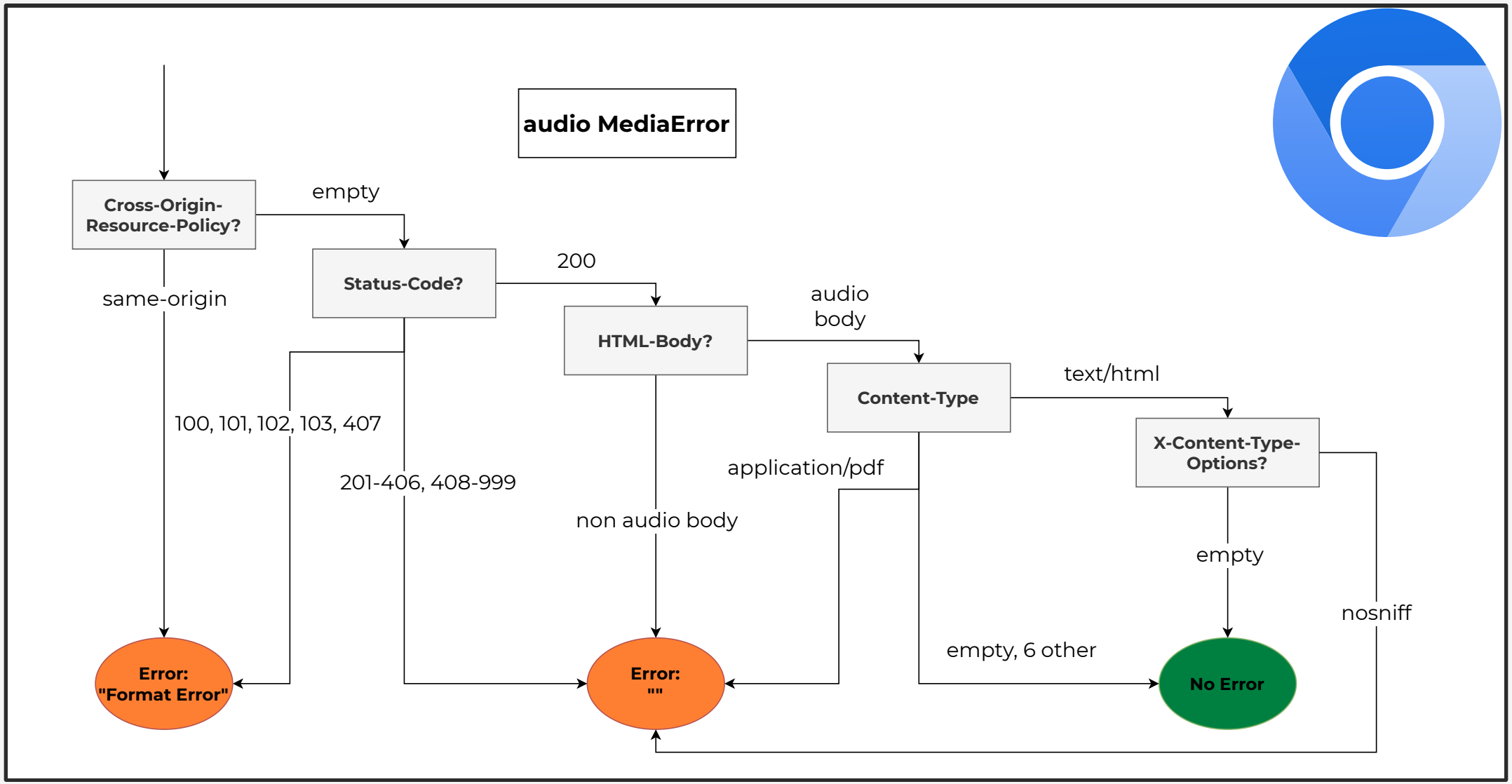

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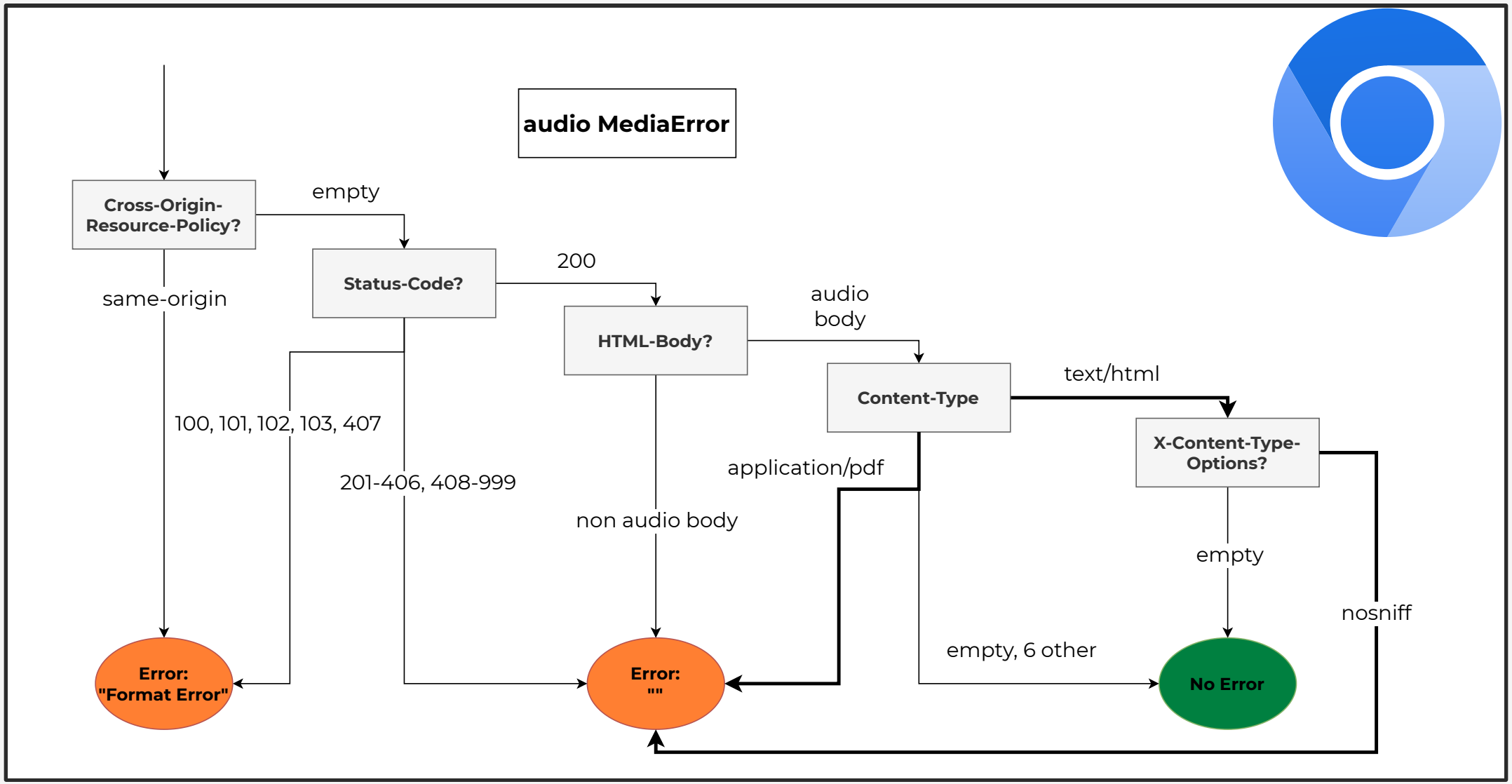

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4. Dynamic confirmation (necessary due to SameSite cookies, fetch metadata, …)

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Cookie acceptance inference (Chromium)	3,160	1,097	**34,7 %**

Browsers and Channels Behave Differently

Observation Channel	Vulnerable only Chromium	Vulnerable only Firefox	Vulnerable either

Selected observation channels for visit inference

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link-stylesheet-events-fired (Top 9)	49	8	**58**

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Response Distinguishing Oracle

	Response 1	Response 2
Status-Code	200	403
Body-Content	HTML body	HTML body
Content-Type	text/html	text/html
X-Content-Type-Options	empty	empty
X-Frame-Options	empty	empty
Content-Disposition	empty	empty
Location	empty	empty
Cross-Origin-Opener-Policy	empty	empty
Cross-Origin-Resource-Policy	empty	empty
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Distinguish!

Inclusion method	Observation method	Browser	Observation 1	Observation 2
object	events-fired	chromium	load	error
object	events-fired	firefox	load	error
object	events-fired	webkit	load	uncalled
script	el-error	firefox	[object ErrorEvent]-undefined-undefined	uncalled
script	el-error	webkit	[object ErrorEvent]-undefined-undefined	uncalled
script	events-fired	chromium	load	error
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Show more channels (8/23 shown)

Limitations

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- Window.open:
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Thanks for your attention!

Questions?

https://github.com/cispa/xs-observations

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