NAILING DOWN PERFORMANCE ISSUES IN SHAREPOINT ONLINE SITES (2023 EDITION)
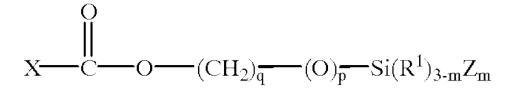
Sean P. McDonough

Consultant, Bitstream Foundry LLC

A BIT ABOUT ME ...

$$X\!-\!\underset{\displaystyle \overset{O}{\|}}{C}\!-\!O\!-\!(CH_2)_q\!-\!(O)_p\!-\!Si(R^1)_{3\text{-}m}Z_m$$

- Started professional career as a polymer chemist for P&G
  - Transitioned internally to Information Systems

- Developing software professionally since mid '90s

- Focus primarily on SharePoint since 2004

- Became a Microsoft MVP in 2016 (Office Apps & Services)

- Nowadays, I do independent consulting
  - Microsoft 365 and Akumina-based intranet creation and support
  - Operational and performance-based troubleshooting/remediation
  - Custom development, scripting aids, and solutions
  - Educational and non-profit technical services

MVP
Microsoft®
Most Valuable
Professional

akumina®

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SESSION OVERVIEW

- A bit about "born on" dates
- Holistic troubleshooting
- One tool to rule them all
- Special (content) delivery!
- Building your SPO site
- SPO troubleshooting guidance
- Q&A throughout
- Wrap-up and contact info

CHECKLIST

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A BIT ABOUT "BORN ON" DATES

A BIT ABOUT "BORN ON" DATES

This is Microsoft 365 (M365) and SharePoint Online (SPO)

Microsoft refers to these services as "evergreen services."

That carries some implications ...

The information I'm going to share has a "shelf life."

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A BIT ABOUT "BORN ON" DATES (CONTINUED)

Please don't look me up in five years and send me "fan mail" because I presented something that is no longer accurate due to a SharePoint Online service change. You may laugh, but it ~~will happen~~

has happened!

Dear Sean,

I was reviewing a presentation you put together five years ago, and I found elements that were incorrect. You are a horrible person and you should never touch SharePoint Online again.

Love you lots! :)

- an attendee

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HOLISTIC TROUBLESHOOTING

SOUND FAMILIAR?

It appears that we have some site performance issues.

Jeez, the site performance sucks!

THE HOLISTIC PART OF TROUBLESHOOTING

- A "performance issue" means something different to each person.
  - SPO is taking too long to render one or more pages
  - Network transport of SPO page data is slow or unpredictable
  - Some part of the client-side page rendering process is slow
  - Nothing is actually slow, but the site experience is simply a poor one
- All of these are valid starting points, but you need to identify objective and actionable targets/goals to make (and be able to measure) progress.
  - Reducing TTFB ("time to first byte")
  - Reducing transport issues (bandwidth, latency)
  - Smoothing-out or improving client-side script performance
- Focus on what you can control; enlist help for what you cannot.

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THE REST OF OUR TIME

- We'll be diving into two areas
    - Client-side diagnostics with the best tool we have
    - Content delivery network (CDN) implementation

- Other areas we'll also cover
    - Some guidance and resources for troubleshooting and proactively building performant sites
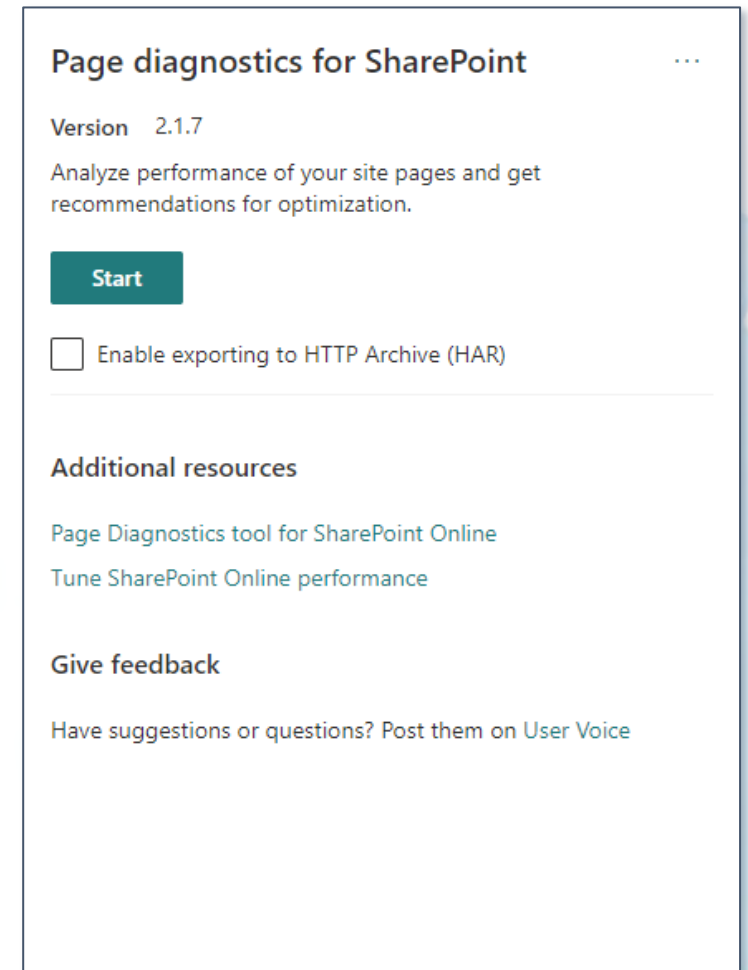   - Identifying performance issues/problems (typically) beyond our control
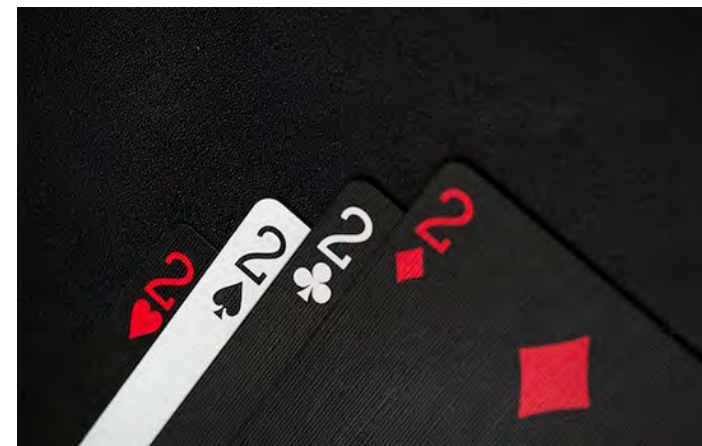
ONE TOOL TO RULE THEM ALL
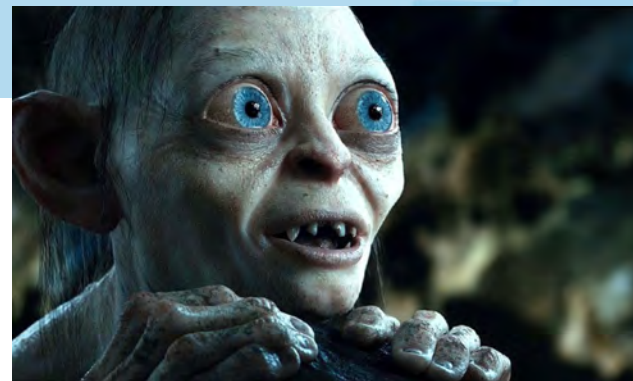
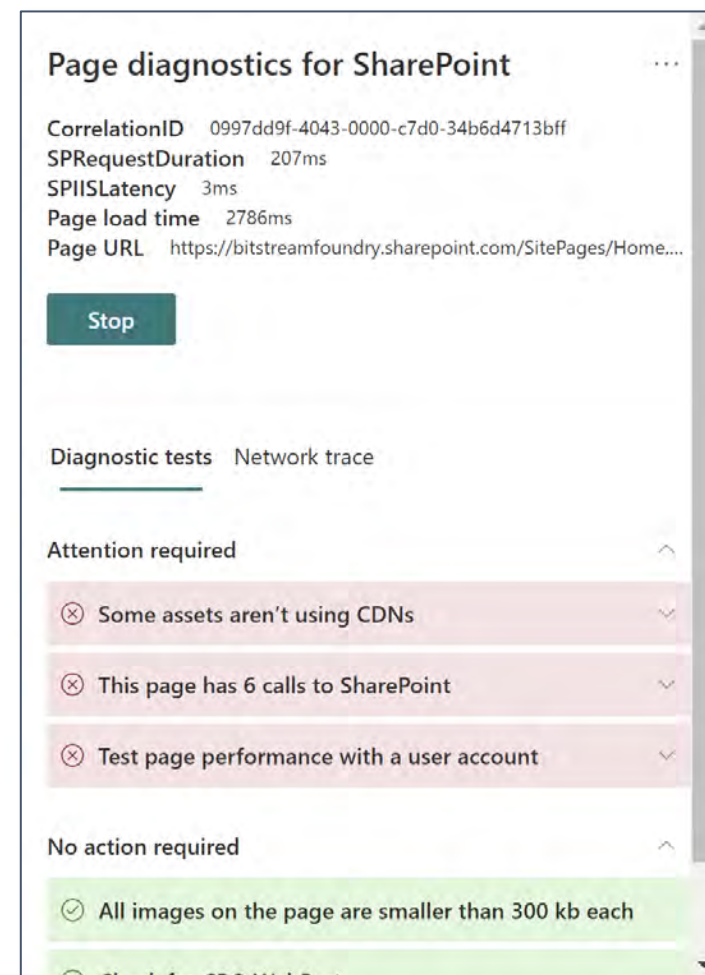# PAGE DIAGNOSTICS TOOL FOR SHAREPOINT

- Current version: 2.1.7 (updated January 2023)

- A tool (browser extension) from Microsoft

- Analyzes pages (classic and modern)

- Produces page data and statistics

- Suggests solutions to (potential) problems it finds

- Extensive in-product links to context-relevant resource materials

- Color-coding with stoplight colors for easy reading/interpretation

- Data can be exported for further analysis

- Completely free extension in the MS Edge & Google Chrome Store!

- https://sharepointinterface.com/2019/09/25/one-tool-to-rule-them-all/

Page diagnostics for SharePoint   ...

Version   2.1.7

Analyze performance of your site pages and get recommendations for optimization.

Start

☐ Enable exporting to HTTP Archive (HAR)

Additional resources

Page Diagnostics tool for SharePoint Online

Tune SharePoint Online performance

Give feedback

Have suggestions or questions? Post them on User Voice

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PAGE DIAGNOSTICS TOOL FOR SHAREPOINT

- Key troubleshooting metrics/datapoints:
  - SPRequestDuration
  - SPIISLatency
  - (Overall) Page load time
  - SPRequestGUID (as CorrelationID)
  - We'll examine these more closely on the next slide
- Page URL (for the memory impaired – like me!)
- These metrics were available before the PDTfS
  - We'd have to use Fiddler, <F12> dev tools, etc.
- One metric the tool doesn't report: X-SharePointHealthScore
- Helps us understand the state of the web front-end (WFE)
- These metrics give us "the equation" ...

Page diagnostics for SharePoint   ...

CorrelationID   0997dd9f-4043-0000-c7d0-34b6d4713bff
SPRequestDuration   207ms
SPIISLatency   3ms
Page load time   2786ms
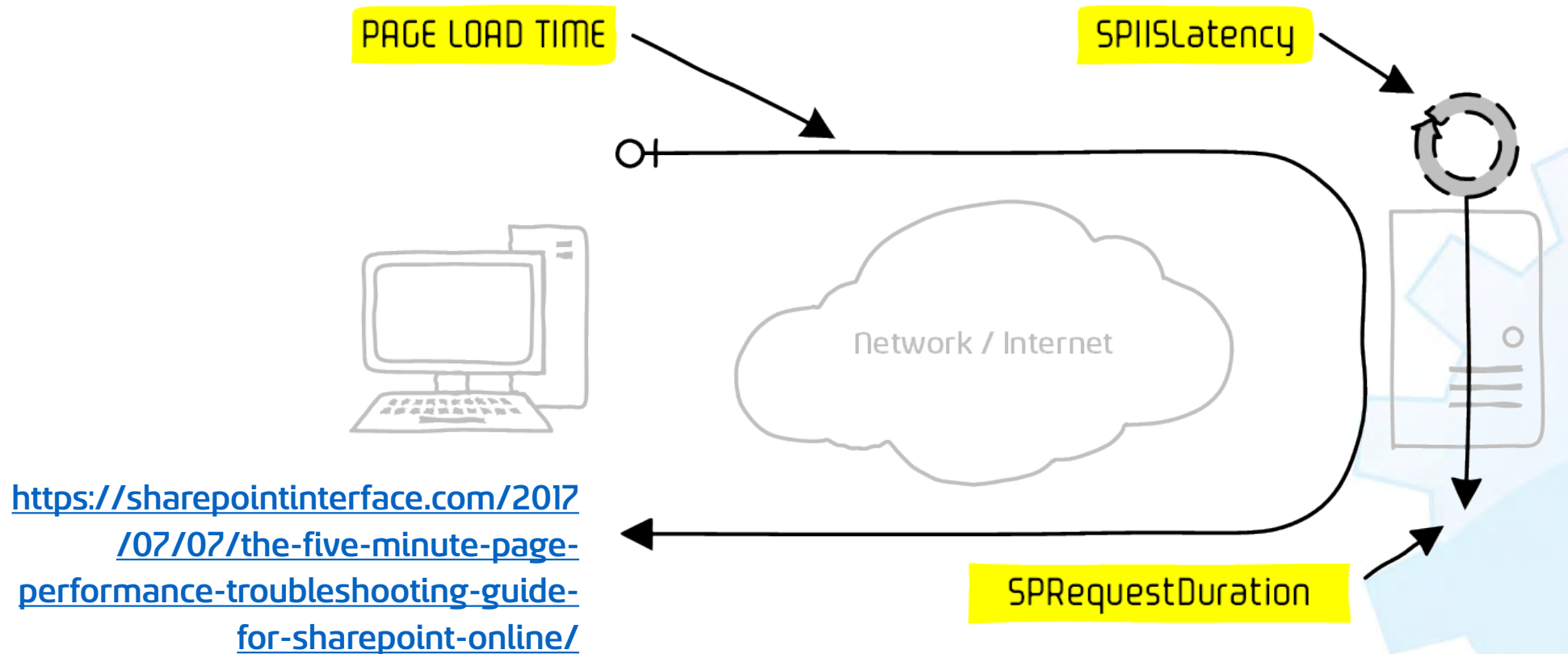Page URL   https://bitstreamfoundry.sharepoint.com/SitePages/Home....

Stop

Diagnostic tests   Network trace

Attention required

⊗ Some assets aren't using CDNs
⊗ This page has 6 calls to SharePoint
⊗ Test page performance with a user account

No action required

⊘ All images on the page are smaller than 300 kb each

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PAGE DIAGNOSTICS TOOL: "THE EQUATION"

PAGE LOAD TIME

SPIISLatency

Network / Internet

https://sharepointinterface.com/2017/07/07/the-five-minute-page-performance-troubleshooting-guide-for-sharepoint-online/

SPRequestDuration

(Page Load Time) – (SPRequestDuration + SPIISLatency) = TLE

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PAGE DIAGNOSTICS TOOL FOR SHAREPOINT

- Each page load produces diagnostic results
  - Navigational implementation check
  - Testing user check
  - Various image checks (sizes, sources, etc.)
  - CDN (Content Delivery Network) usage check
  - Content Query Web Part (CQWP) usage check
  - Server request count check
  - A whole host of other checks
- Problems are color-coded for easy reading
- Extensive in-product links to relevant MS articles

Page diagnostics for SharePoint   ...

Page URL   https://bitstreamfoundry.sharepoint.com/sites/SpacesTest

Stop

Diagnostic tests   Network trace

Attention required

⊗ Large images detected

No action required

⊘ Content Delivery Network (CDN) check

⊘ Requests to SharePoint

⊘ Page weight under 500 KB

⊘ No web parts using IFrames

⊘ No web parts impacting page load time

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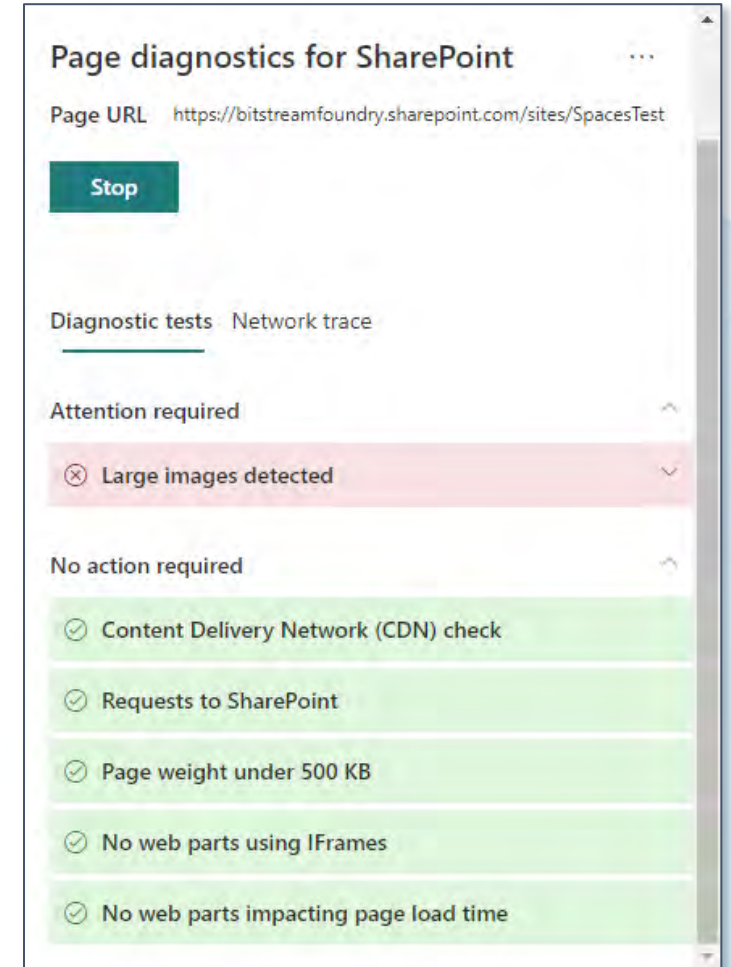
PAGE DIAGNOSTICS TOOL FOR SHAREPOINT

- Export HTTP exchange as an HAR file

  - HAR = HTTP archive

  - JSON file structure as shown on right

  - Includes all wire requests and responses

  - Can be imported into a host of tools

    - Internet Explorer / Edge

    - Fiddler

- Why? Because other tools are capable of things that PDTfS isn't

```
1  {
2    "log": {
3      "version": "1.2",
4      "creator": {
5        "name": "__MSG_AppName__",
6        "version": "2.1.6"
7      },
8      "entries": [
9        {
10         "startedDateTime": "2022-04-21T19:04:46.877Z",
11         "time": 297.6440000056755,
12         "request": {
13           "method": "GET",
14           "url": "https://bitstreamfoundry.sharepoint.com/SitePages/Home.aspx",
15           "httpVersion": "http/2.0",
16           "headers": [
17             {
18               "name": "Upgrade-Insecure-Requests",
19               "value": "1"
20             },
21             {
22               "name": "User-Agent",
23               "value": "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko)
                   Chrome/100.0.4896.127 Safari/537.36"
24             },
25             {
26               "name": "sec-ch-ua",
27               "value": "\" Not A;Brand\";v=\"99\", \"Chromium\";v=\"100\", \"Google Chrome\";v=\"100\""
28             },
29             {
30               "name": "sec-ch-ua-mobile",
31               "value": "?0"
32             },
33             {
34               "name": "sec-ch-ua-platform",
35               "value": "\"Windows\""
36             },
37             {
38               "name": ":authority",
39               "value": "bitstreamfoundry.sharepoint.com"
40             },
41             {
42               "name": ":method",
43               "value": "GET"
44             },
45             {
46               "name": ":path",
47               "value": "/SitePages/Home.aspx"
48             },
49             {
```

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PAGE DIAGNOSTICS TOOL FOR SHAREPOINT

- I've got to get it! What do I need to do?
  - Open Google Chrome (or Microsoft Edge)
  - Go to Chrome's Extensions page in the More tools menu (right)
  - Search for *Page Diagnostics for SharePoint*
  - Install the extension, accepting the permission grants
  - Start having fun!
- How do I "start having fun?"
  - Go to the SharePoint Online page you want to analyse
 - Click this button in the upper right of Chrome to get going!
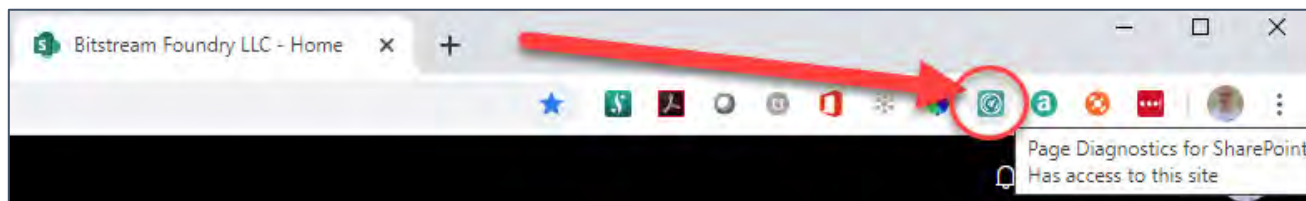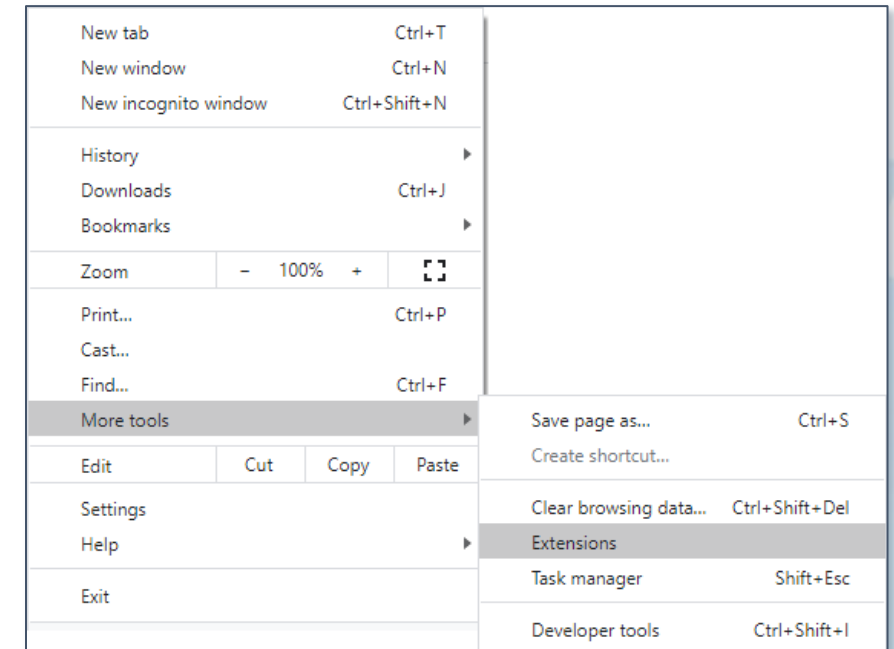
DEMO (?): PAGE DIAGNOSTICS TOOL

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SPECIAL (CONTENT) DELIVERY!
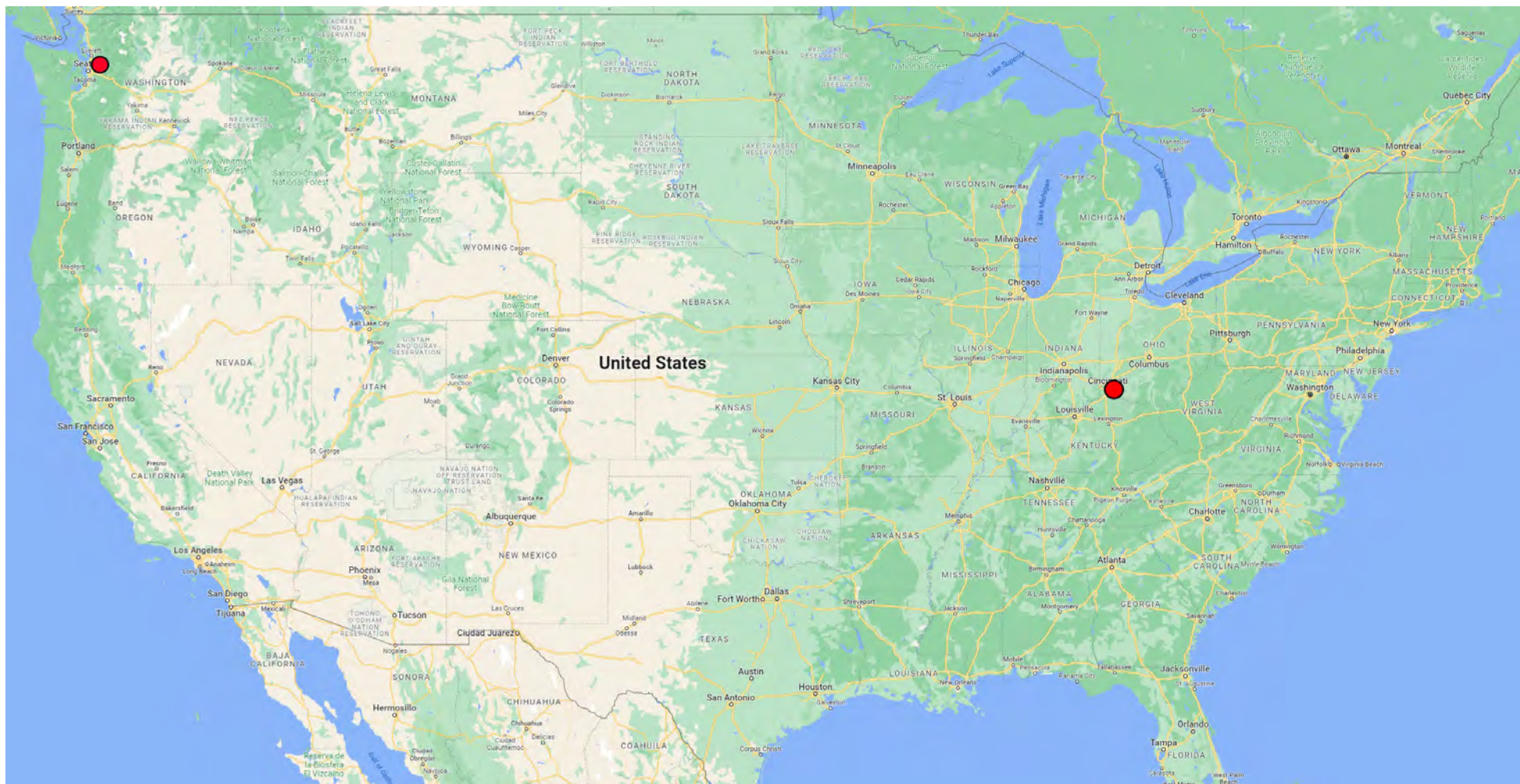
CONTENT DELIVERY NETWORKS

- What is a content delivery network (CDN)?
  - A collection of geographically distributed servers
  - These servers cache resources and files
  - CDNs speed access to content and maximize the chances for high-bandwidth retrieval
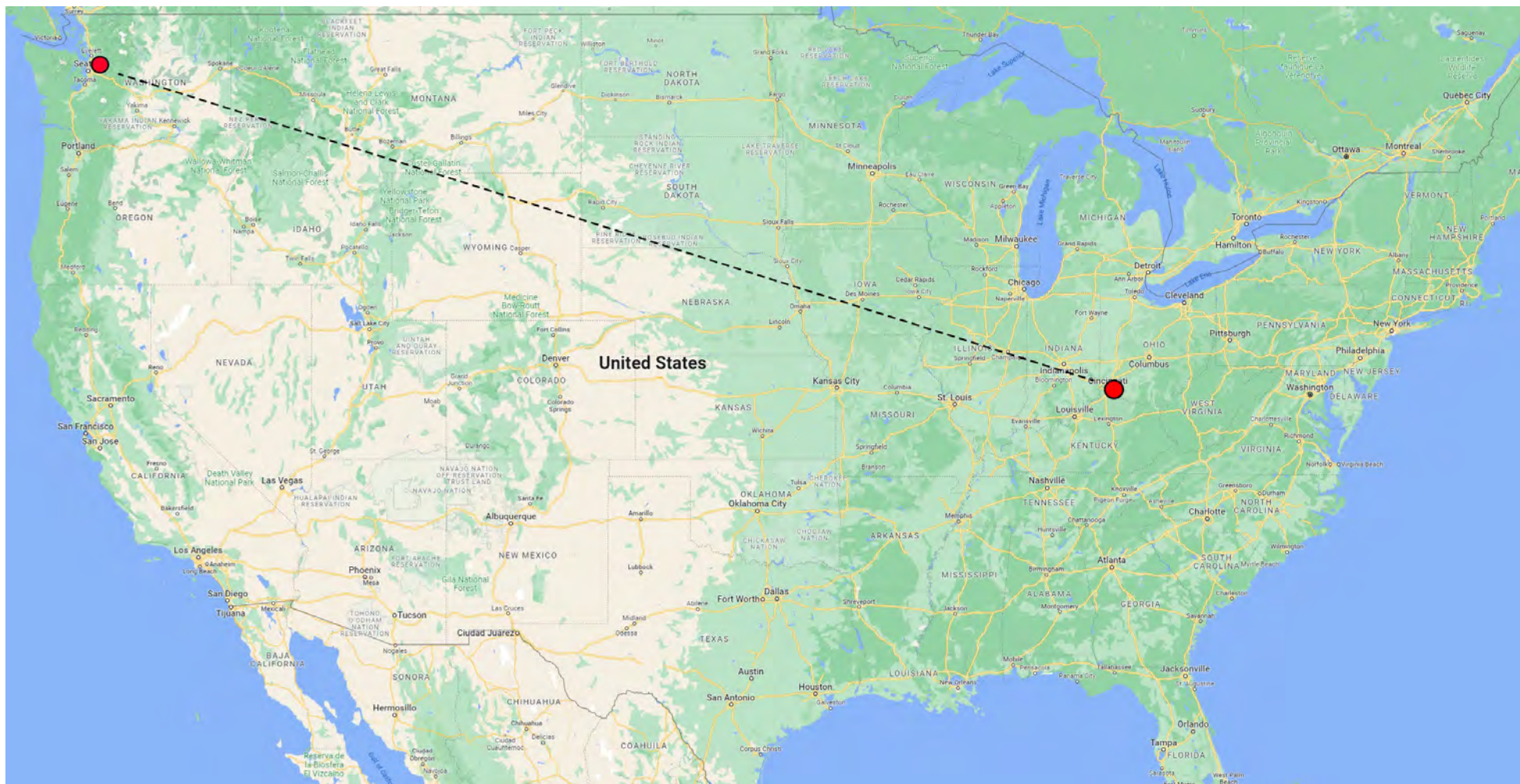
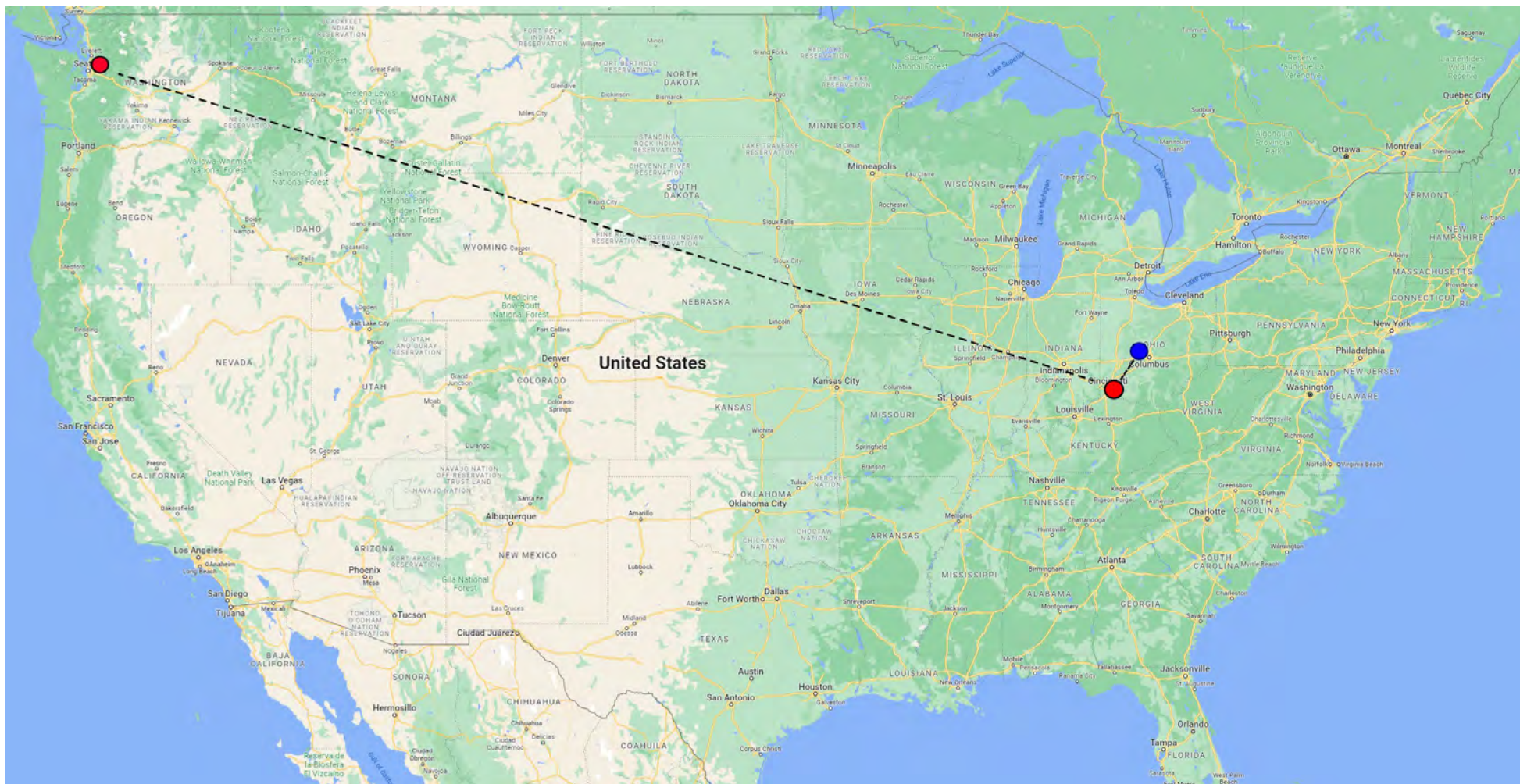- How?
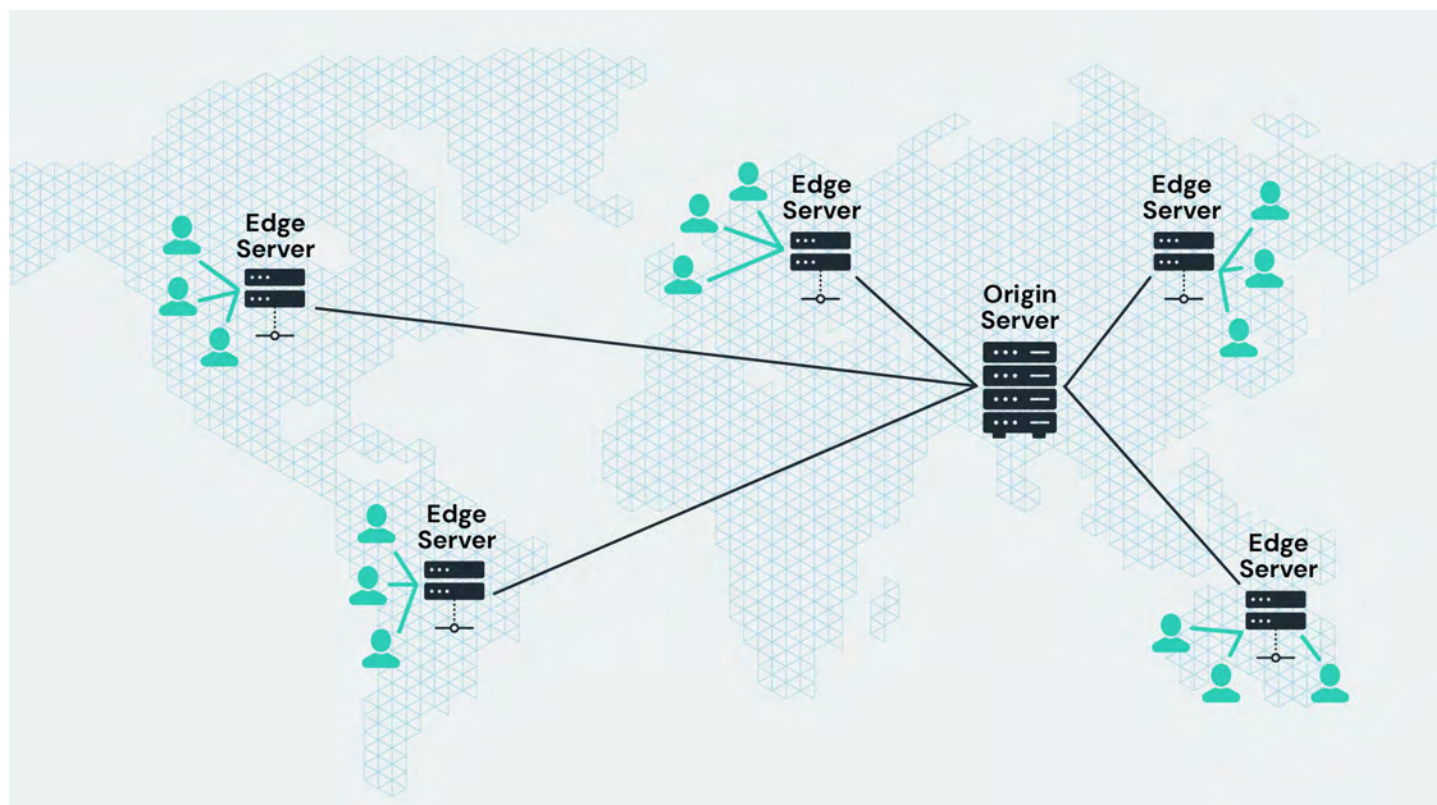
CDN ILLUSTRATION SCENARIO
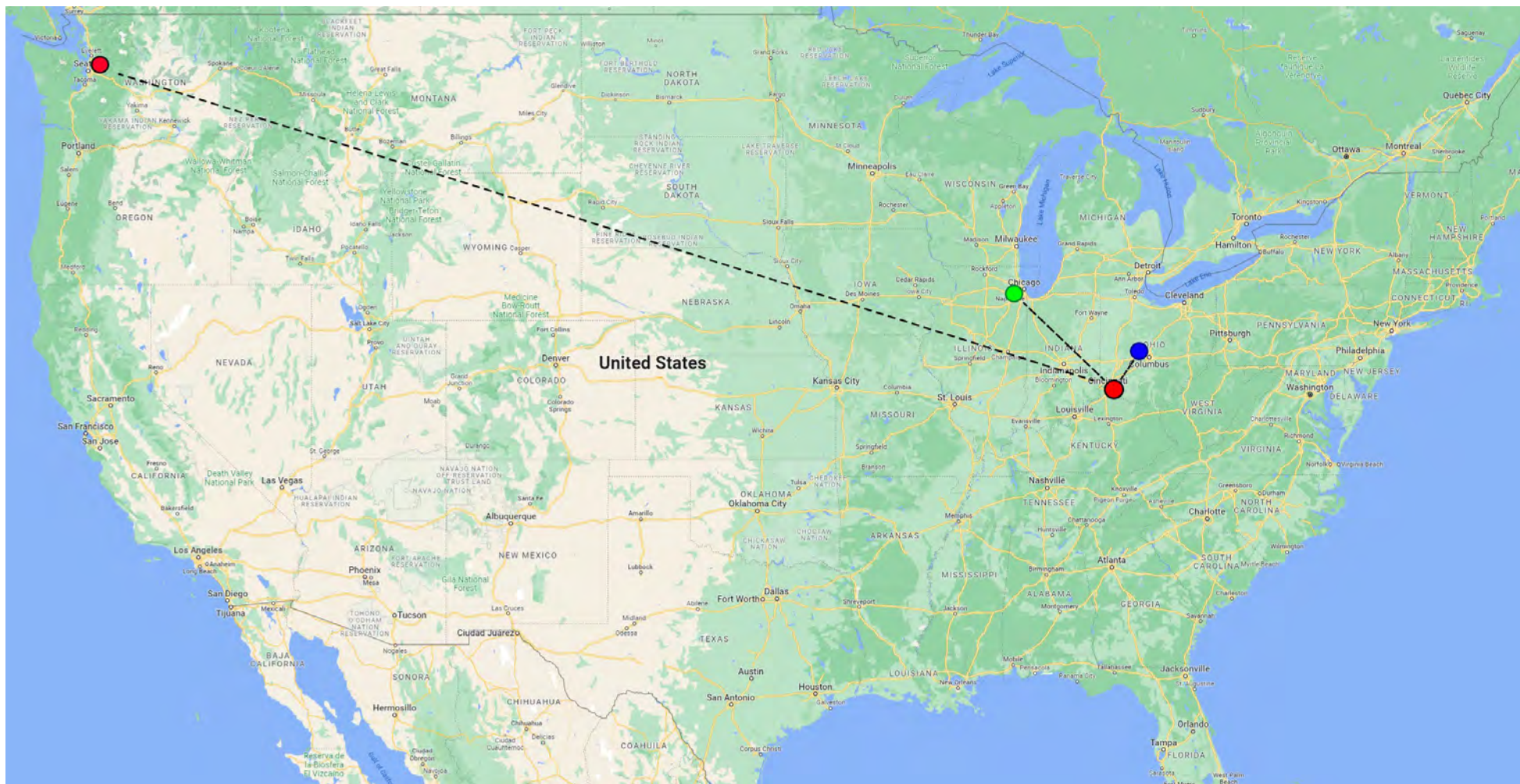
CDN ILLUSTRATION SCENARIO
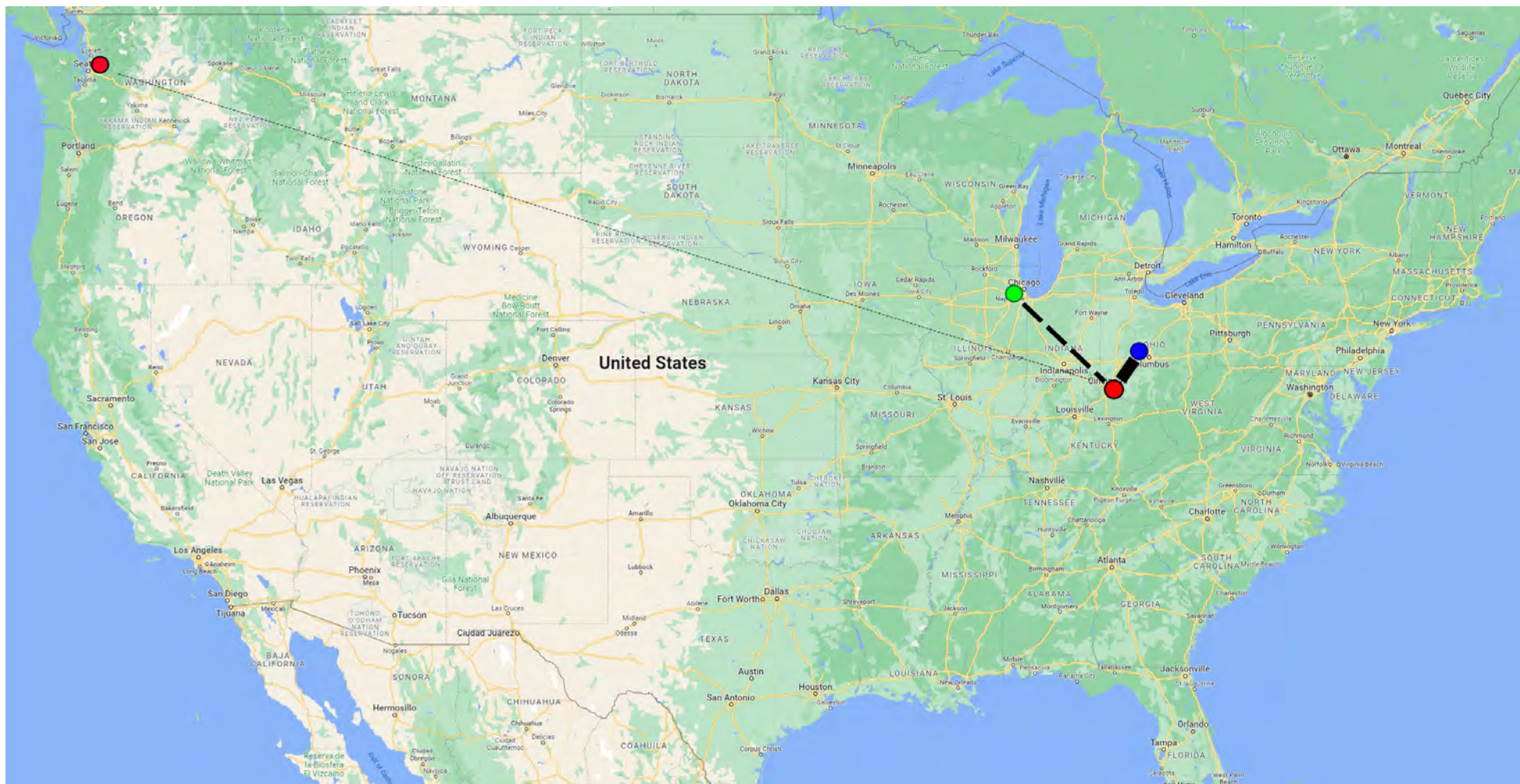
CDN ILLUSTRATION SCENARIO

CDN ILLUSTRATION SCENARIO

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CDN ILLUSTRATION SCENARIO

CONFIGURING SPO TO USE A CDN

- It's very easy to setup and customize for your SPO site
  - https://learn.microsoft.com/en-us/microsoft-365/enterprise/use-microsoft-365-cdn-with-spo

- Three different setup paths
  - Set up and configure the CDN by using the SharePoint Online Management Shell
  - Set up and configure the CDN by using PnP PowerShell
  - Set up and configure the CDN by using the CLI for Microsoft 365

| PowerShell	Copy
`Connect-SPOService -Url https://<YourTenantName>-admin.sharepoint.com`	

PowerShell	Copy
`Set-SPOTenantCdnEnabled -CdnType Both -Enable $true`	

SPO CDN OPTIONS

- What is the nature of the content you wish to serve from CDN?
    - Public origin
    - Private origin
    - Both public and private origin

- Which lists/libraries are cached in the CDN by default?
    - */MASTERPAGE *(public)*
    - */STYLE LIBRARY *(public)*
    - */CLIENTSIDEASSETS *(public)*
    - */siteassets *(private)*
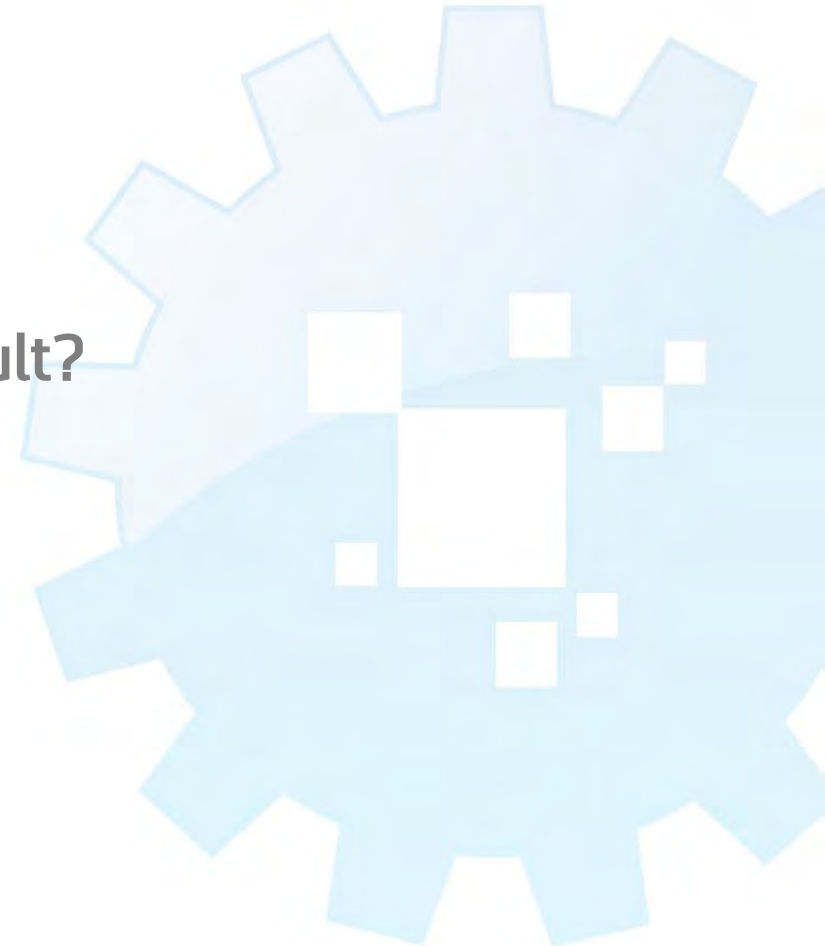
SPO CDN OPTIONS

- What file types go into the CDN (by default)?
    - .css
    - .eot
    - .gif
    - .ico
    - .jpeg
    - .jpg
    - .js
    - .map
    - .png
    - .svg
    - .ttf
    - .woff

SOME ADDITIONAL CDN NOTES

- Fetching files from multiple URLs is actually faster for your browser
  - Sidesteps the (typical) six concurrent download limit
  - RFC 2616

- See my "What CDN Usage does for SharePoint Online (SPO) Performance" post for more details: https://sharepointinterface.com/2020/08/22/what-cdn-usage-does-for-sharepoint-online-spo-performance/

BUILDING YOUR SPO SITE

BUILDING YOUR SPO SITE

Believe it or not, SPO has been around for over a decade. In that time, Microsoft has assembled some excellent guidance. It all starts here:

https://aka.ms/portalhealth

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BUILDING YOUR SPO SITE

- Everything you need from conceptual design through to implementation and rollout

- Contains far more than I can cover in the short time we have here

  - I'll be drawing attention and adding color commentary to just a few topics

- Links to tools (PDTfS, Launch Scheduler, and others)

- Also provides troubleshooting links

STRAIGHT FROM THE MOUTH OF MICROSOFT

- The guy on the right is Scott Stewart, Principal Product Manager on Microsoft's OneDrive and SharePoint Engineering team

- When building your portal, Scott's top advice:
  - Enable CDN usage
  - Keep your pages light with fewer references (<25)
  - Employ lazy loading (i.e., load "above the fold") and don't load resources until the user scrolls to them
  - Keep custom webparts simple
  - Bundle your JavaScript assets
  - Employ caching wherever you can

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SPO TROUBLESHOOTING GUIDANCE

THE BASIS OF MANY PERF ISSUES

- Developers don't factor the cloud into their designs
- The cloud is different from on-premises
- You have less bandwidth, greater latency
- The impact of bad decisions are amplified
- The issues associated with "too many" and "too big"
- Living in the cloud means living lean

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GENERAL GUIDANCE

- Use SharePoint's modern experience, not classic

- DO NOT turn on SharePoint Publishing

- Understand your navigation options

- Leverage Search to your advantage

- Understand any (Java)scripts you leverage and their potential performance impact

- Follow the recommendations of the Page Diagnostics Tool

- Cache EVERYTHING you (safely) can

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CURRENT STATE OF NAVIGATION

- Site navigation choice has a profound impact on performance

- We went through a confusing period ... but we're good now!

- Where we are right now:
    - Cached structural navigation: the default and usually best choice
    - Managed navigation: decent choice
    - Search-based navigation: high-performing option
    - (Non-)cached structural navigation: simply sucks rocks

- Each navigation choice has its caveats

- Refer to: https://support.microsoft.com/en-us/office/structural-navigation-and-performance-f163053f-8eca-4b9c-b973-36b395093b43

OH YEAH, AND ONE MORE THING …

- Do you have plans to dump an SPO "classic" root site?

- Are you considering a site swap?
  - Typically used "modernize" root sites
  - Accomplished via `Invoke-SPOSiteSwap`

- You will need to get familiar with the PDTfS
  - Read the `Invoke-SPOSiteSwap` fine print

- Don't wait until you're running the PowerShell to discover problems!

https://docs.microsoft.com/en-us/powershell/module/sharepoint-online/invoke-spositeswap?view=sharepoint-ps

---

If the target is the root site at https://tenant-name.sharepoint.com ⧉ , then the following preparation activities should be performed prior to performing the swap:

1. Any Featured links defined in SharePoint Start Page at https://tenant-name.sharepoint.com/_layouts/15/sharepoint.aspx ⧉ will not be displayed after performing the swap. If required, the Featured links should be documented so they can be manually recreated after the swap.

2. Functionality such as external sharing and application interfaces are dependent on the policies and permissions defined at the root site. Review the source site to ensure that it has the required policies and permissions as per the existing root site. This includes external sharing settings as well as site permissions.

3. Larger tenants that have more than ~10,000 licenses will need to run the Page Diagnostic Tool against the source site (ensure that the user running the Page Diagnostic Tool has edit rights on the source site). Any analysis results that have the category Attention required (Red) or Improvement opportunities (Orange) will need to be remediated before performing the swap.

The source and target sites can't be connected to an Office 365 group. They also can't be hub sites or associated with a hub. If a site is a hub site, unregister it as a hub site, swap the root site, and then register the site as a hub site. If a site is associated with a hub, disassociate the site, swap the root site, and then reassociate the site.

If the Publishing feature has previously been activated or is currently activated on the source site, Invoke-SPOSiteSwap cannot be used.

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WHAT IF YOUR SITE IS STILL SLOW?

- Validate that you've done what you can through the Page Diagnostics Tool

- If your TLE is high, start looking at other things in your environment
  - Whitelisting M365/O365 destinations
  - Web proxies, especially authenticating proxies
  - DNS Lookups
  - Asymmetric and/or unnecessary routing
  - Internet egress points
  - Age of networking equipment
  - Other local factors and weirdness (e.g., TCP port exhaustion: https://docs.microsoft.com/en-us/windows/client-management/troubleshoot-tcpip-port-exhaust)

- If all else fails, contact Microsoft Support Services!
  - They will be happy when you share what you've tried
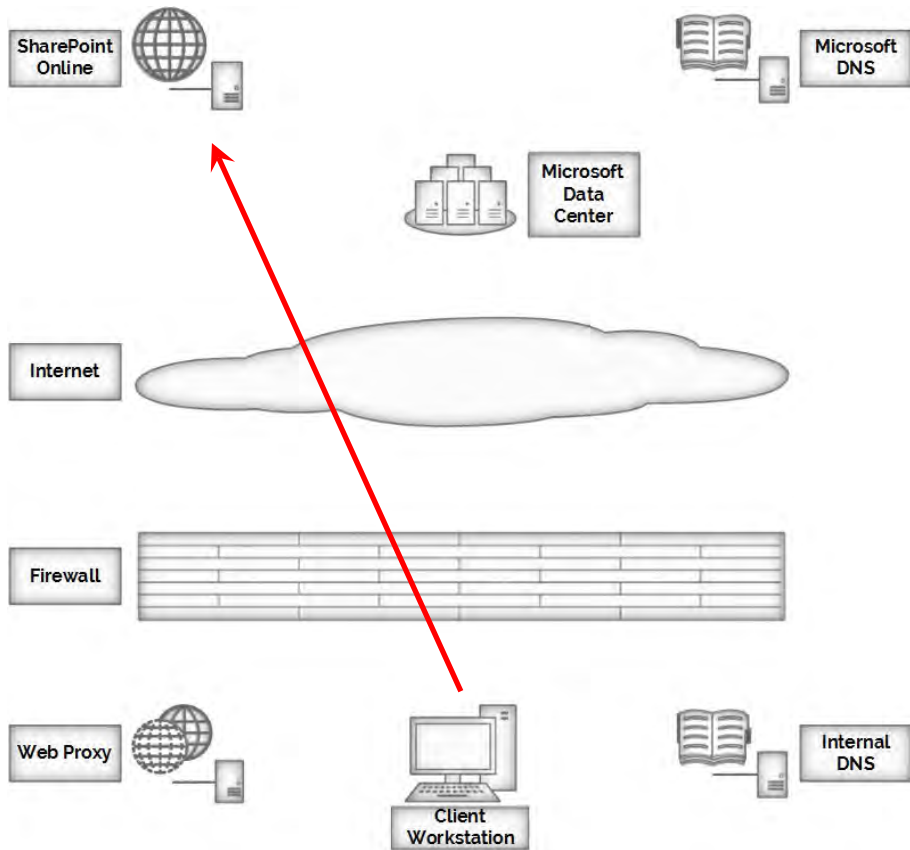
bitstream
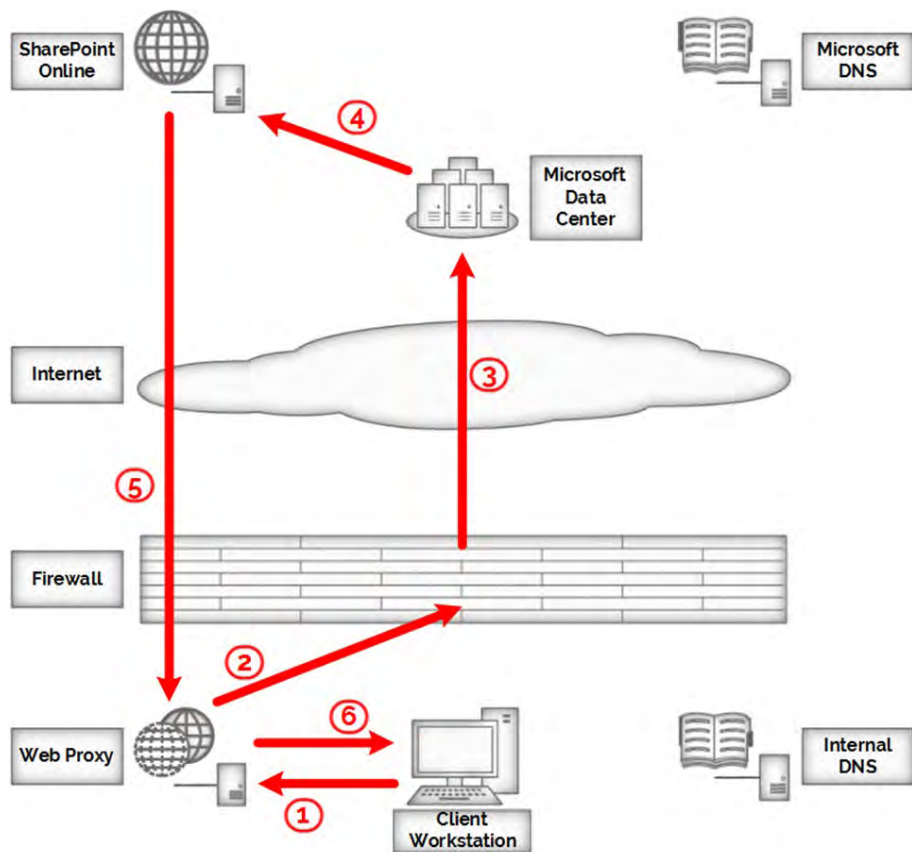FOUNDRY

WHAT IF YOUR SITE IS STILL SLOW?

- Remember: we were looking at a simplified page request cycle

- In reality: a lot of networking gear sits between your browser and SPO

- You may think your SPO request is doing this …

WHAT IF YOUR SITE IS STILL SLOW?

- Remember: we were looking at a simplified page request cycle

- In reality: a lot of networking gear sits between your browser and SPO

- You may think your SPO request is doing this … … when it may be doing something like this
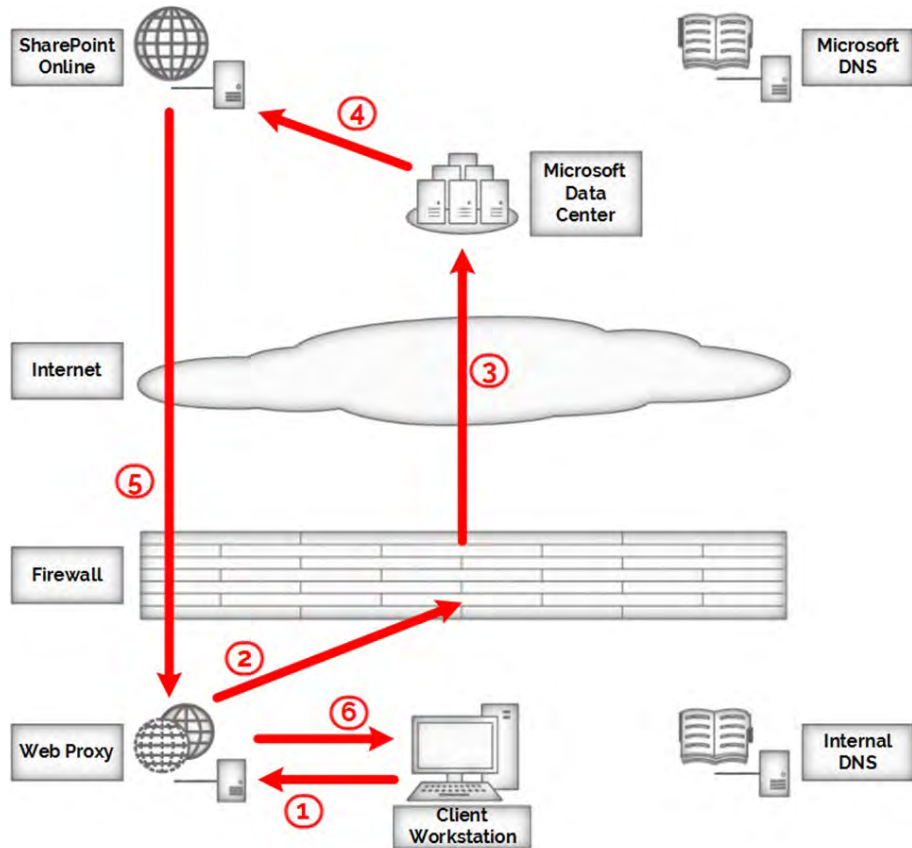
WHAT IF YOUR SITE IS STILL SLOW?

- Remember: we were looking at a simplified page request cycle

- In reality: a lot of networking gear sits between your browser and SPO

- You may think your SPO request is doing this … … when it may be doing something like this

- The most common network issues I've seen:
  - Slow DNS lookups make everything look slower
  - Proxies – especially authenticating proxies – add unnecessary overhead
  - Spending too much time on the Internet getting to the Microsoft backbone is sub-optimal.

- May need to do some serious detective work

WRAP-UP AND CONTACT INFO

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Final Questions?

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