

# NAILING DOWN PERFORMANCE ISSUES IN SHAREPOINT ONLINE SITES (2023 EDITION)



Sean P. McDonough

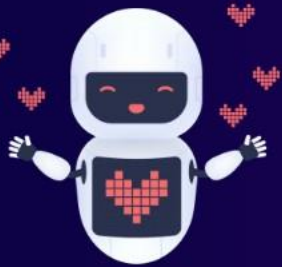
Senior Solution Architect and Consultant

Akumina, Inc.



## PHOTOGRAPHY DURING THE SESSION

Feel free to capture the moment! Taking pictures of the presentation, during the session is perfectly fine.



## SELFIES WITH THE SPEAKER

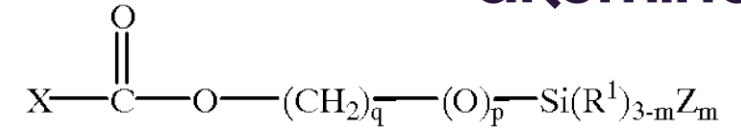
We encourage interaction! If you'd like to take a selfie with the speaker, don't hesitate to ask. Most speakers will be happy to oblige during appropriate breaks.



## RECORDING AND LIVE STREAMING

Recording or live streaming the session, in part or in full, is strictly prohibited. Thank you for respecting our content and Speakers.

# A BIT ABOUT ME ...



Started professional career as a polymer chemist for Procter & Gamble

- Transitioned within P&G to Information Systems

Developing software professionally since mid '90s

Focus has been primarily on SharePoint since 2004

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



Nowadays, I work for Akumina, Inc.

- Senior Solution Architect and Consultant

Still have Bitstream Foundry going

- Good way to organize my professional activities
- Educational and non-profit technical services



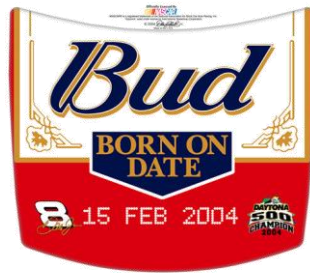
# SESSION OVERVIEW

- 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



# 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 ...
- Some of the information I’m going to share has a “shelf life.”



# 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



# 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.

# TODAY'S DISCUSSION

We'll be focusing primarily on two main things

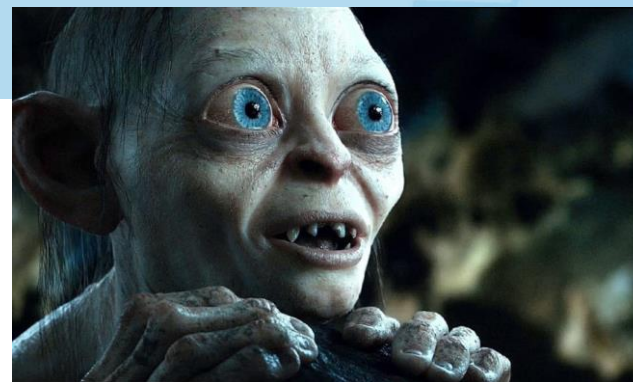
- Client-side diagnostics with the best tool we have
- Content delivery network (CDN) implementation

What else do we have?

- Some guidance and resources for troubleshooting and proactively building performant sites
- Identifying performance issues/problems (typically) beyond our control



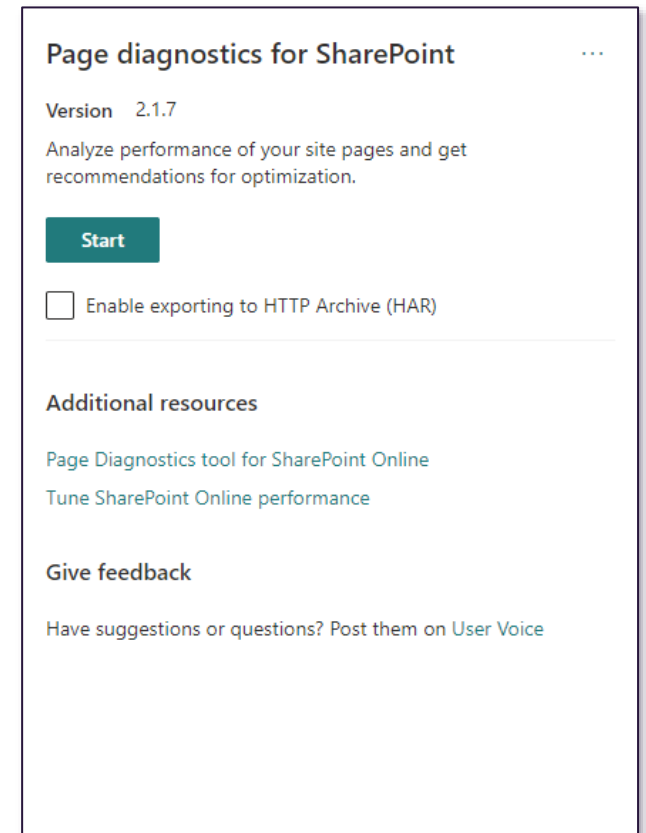
# ONE TOOL TO RULE THEM ALL



# PAGE DIAGNOSTICS TOOL FOR SHAREPOINT

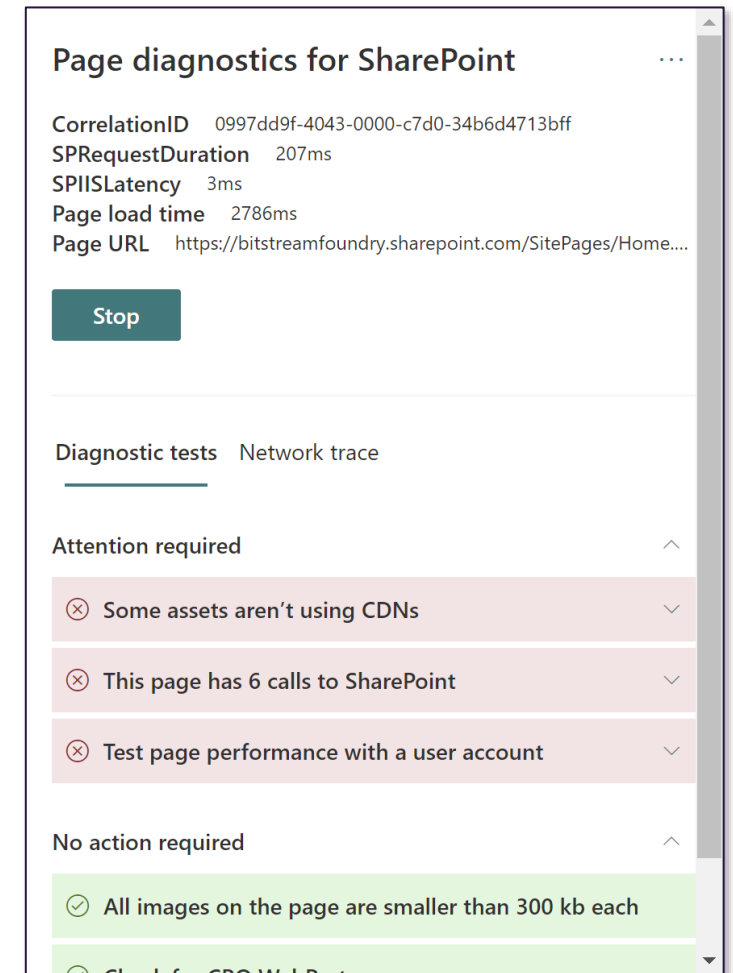


- Current version: 2.1.7 (updated January 2023)
- A tool (browser extension) from Microsoft
- Analyzes pages (classic and modern)
- Produces page data and statistics
- Suggests solutions to (potential) problems it finds
- Extensive in-product links to context-relevant resource materials
- Color-coding 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 TOOL FOR SHAREPOINT

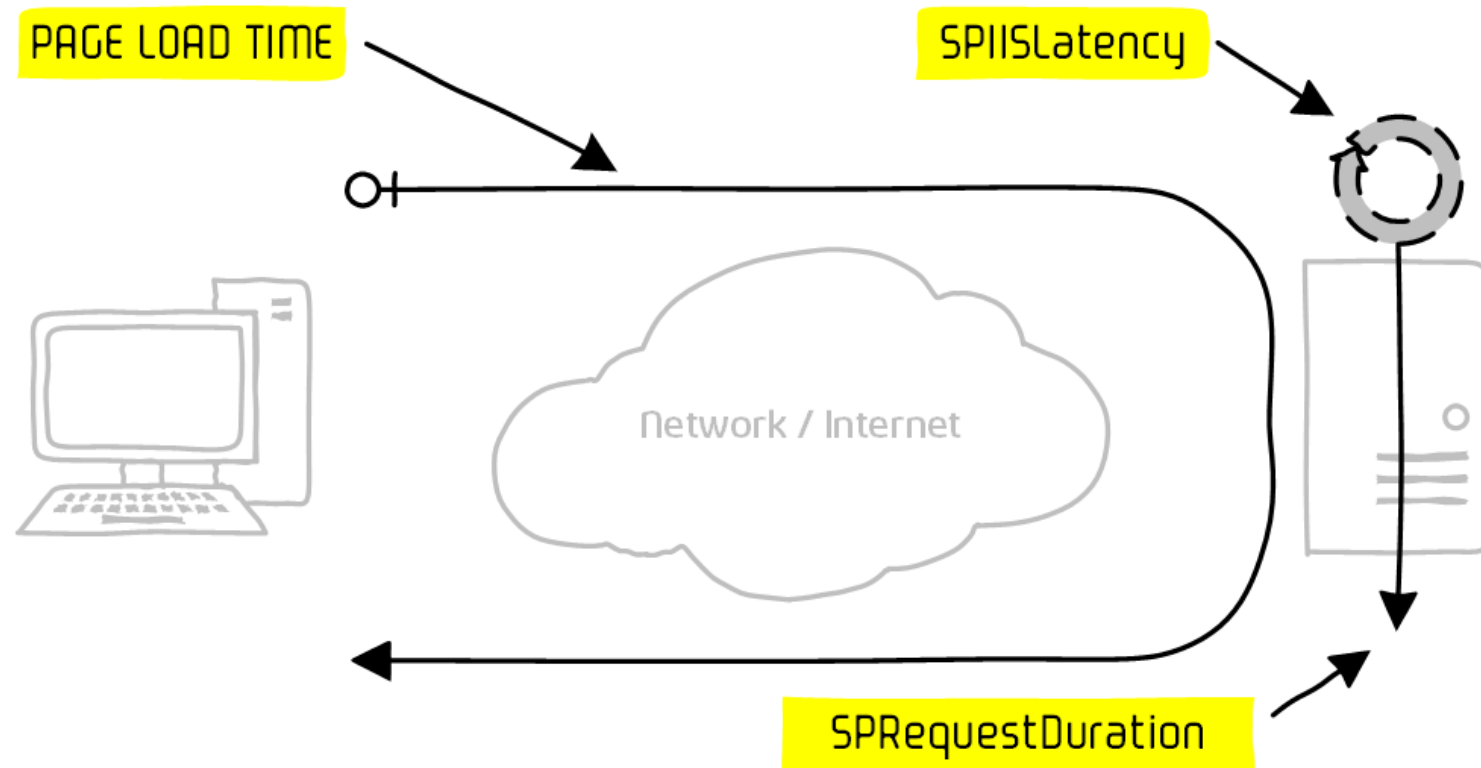
- Key troubleshooting metrics (we'll explain these more next):
  - SPRequestDuration
  - SPIISlatency
  - Page load time
  - SPRequestGUID (as CorrelationID)
- Page URL (for the memory impaired – like me!)
- These metrics were available before the PDTfS
  - We'd have to use Fiddler, <F12> dev tools, etc.
- One metric the tool doesn't report: X-SharePointHealthScore
- Helps us understand the state of the web front-end (WFE)
- $(\text{Page Load Time}) - (\text{SPRequestDuration} + \text{SPIISlatency}) = \text{TLE}$ 
  - **TLE** – **T**ime **L**ost **E**lsewhere



The screenshot shows the 'Page diagnostics for SharePoint' interface. At the top, it displays several key metrics: CorrelationID (0997dd9f-4043-0000-c7d0-34b6d4713bff), SPRequestDuration (207ms), SPIISlatency (3ms), Page load time (2786ms), and Page URL (https://bitstreamfoundry.sharepoint.com/SitePages/Home...). Below the metrics is a 'Stop' button. The interface is divided into sections: 'Diagnostic tests' (with 'Network trace' selected), 'Attention required' (containing three red error messages: 'Some assets aren't using CDNs', 'This page has 6 calls to SharePoint', and 'Test page performance with a user account'), and 'No action required' (containing one green success message: 'All images on the page are smaller than 300 kb each').



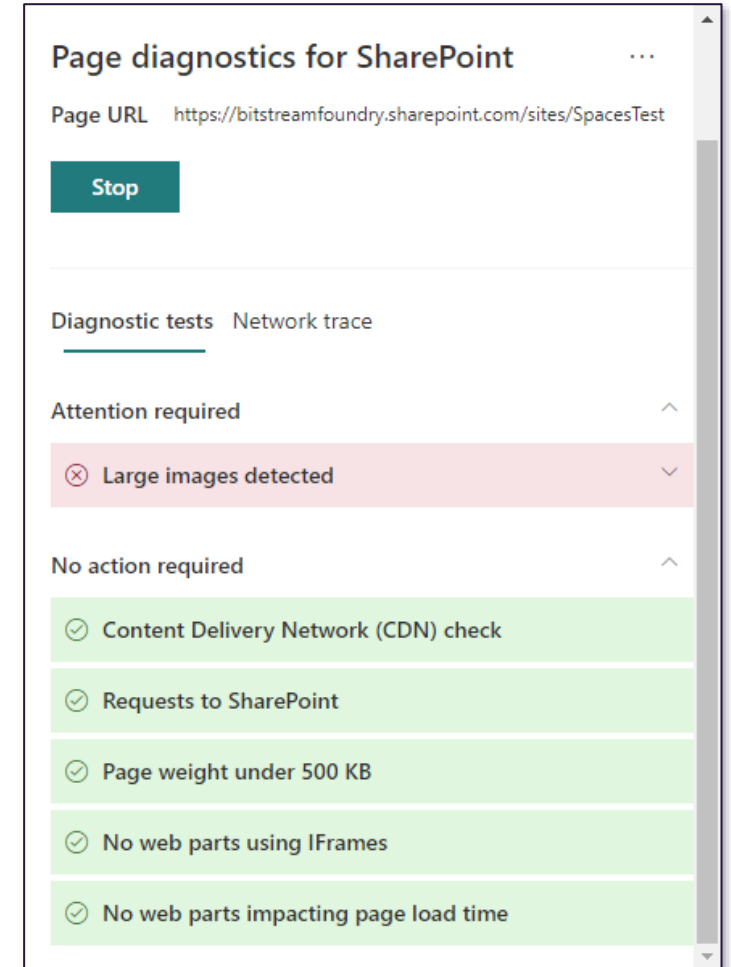
# PAGE DIAGNOSTICS TOOL: AKA - THE EQUATION



$$(\text{Page Load Time}) - (\text{SPRequestDuration} + \text{SPIISlatency}) = \text{TLE}$$

# 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 TOOL FOR SHAREPOINT

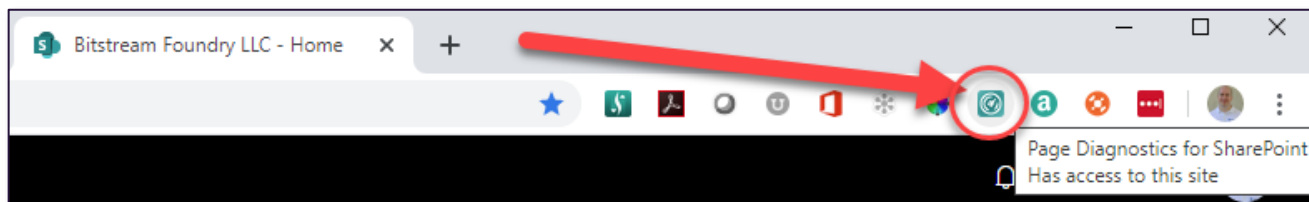
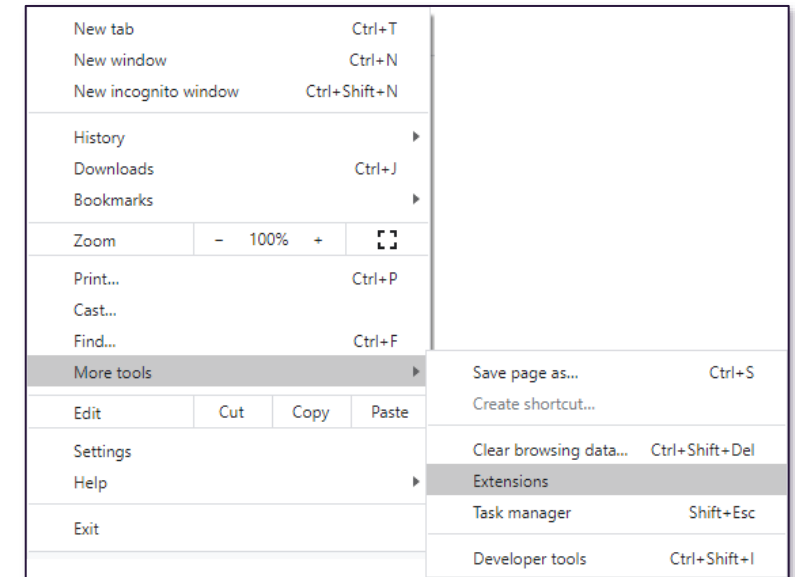


- Export HTTP exchange as an HAR file
  - HAR = HTTP archive
  - JSON file structure as shown on right
  - Includes all wire requests and responses
- Can be imported into a host of tools
  - Internet Explorer / Edge
  - Fiddler
- Why? Because other tools are capable of things that PDTfS isn't

```
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            {
```

# 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

# SPECIAL (CONTENT) DELIVERY!



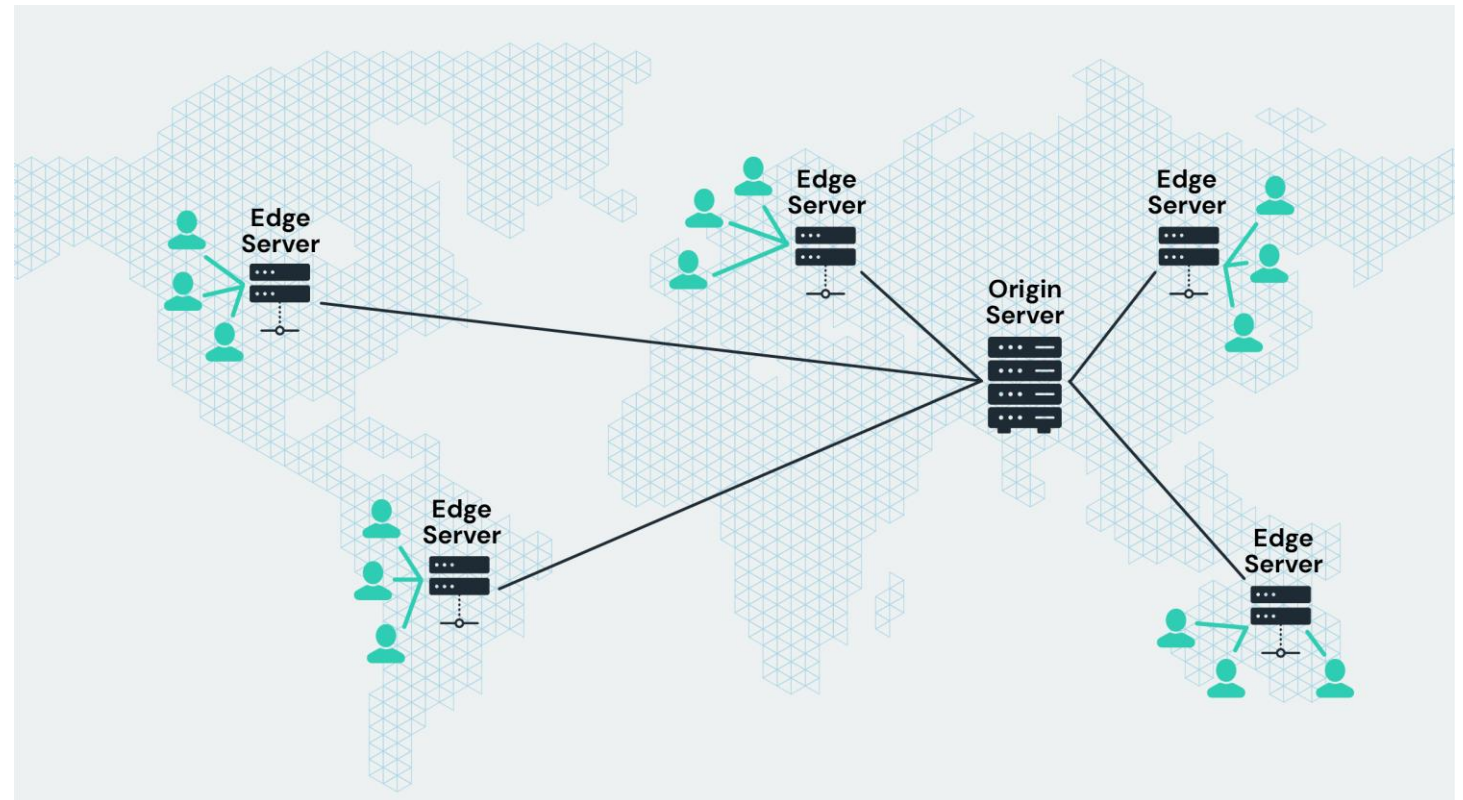


# CONTENT DELIVERY NETWORKS

What is a content delivery network (CDN)?

- A collection of geographically distributed servers
- These servers cache resources and files
- They speed up and make content more readily available to wider audiences.

How?

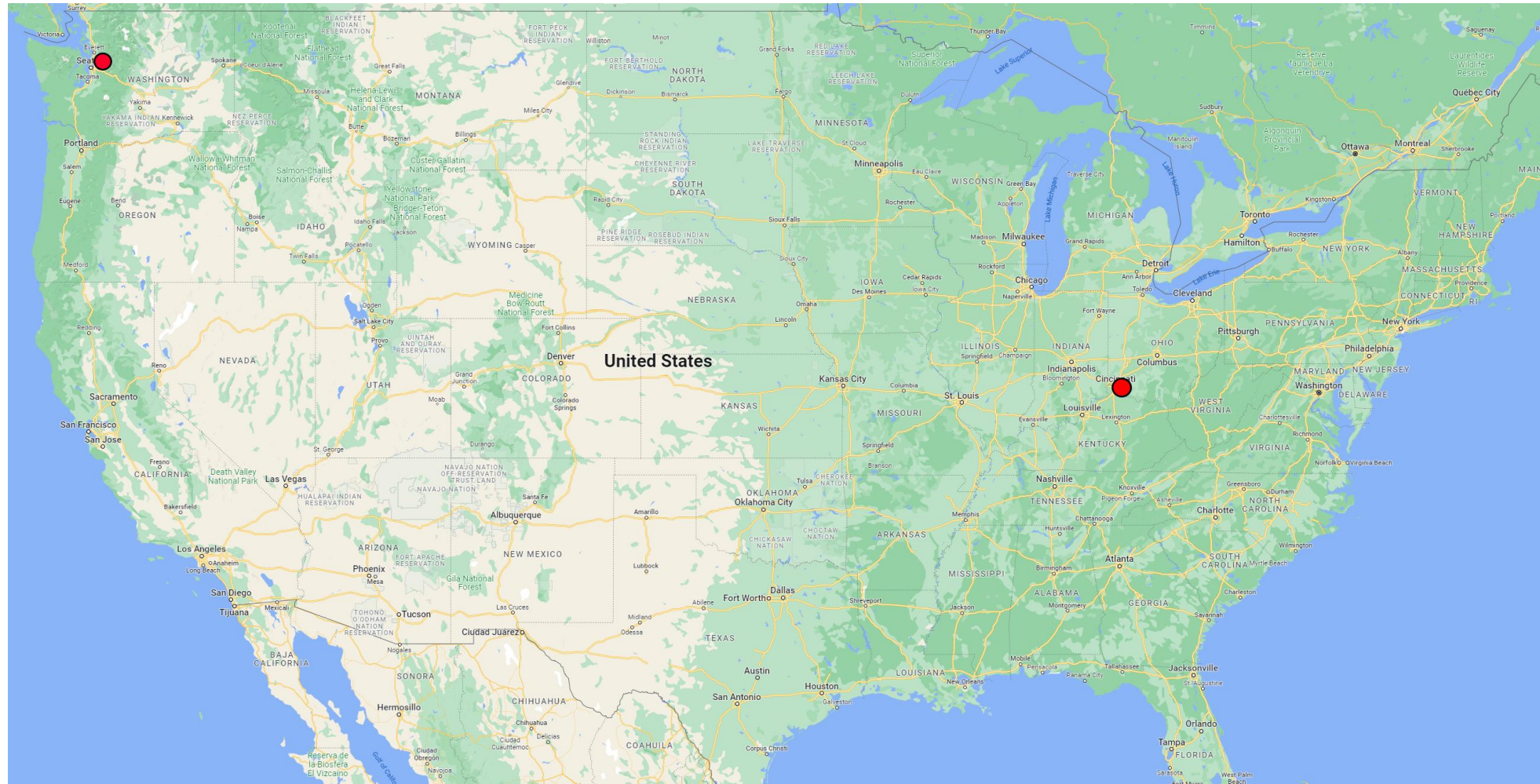


# CDN ILLUSTRATION SCENARIO



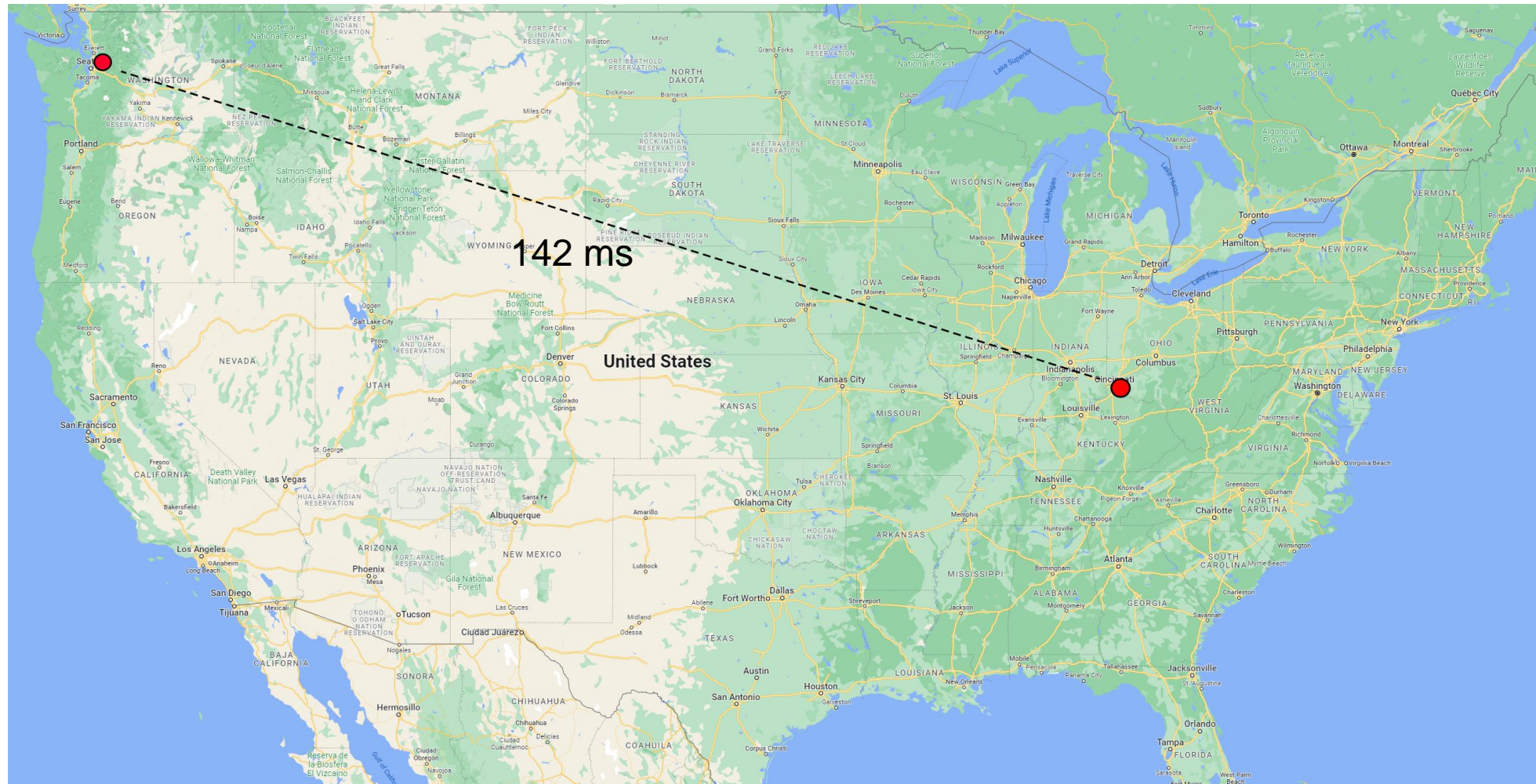


# CDN ILLUSTRATION SCENARIO



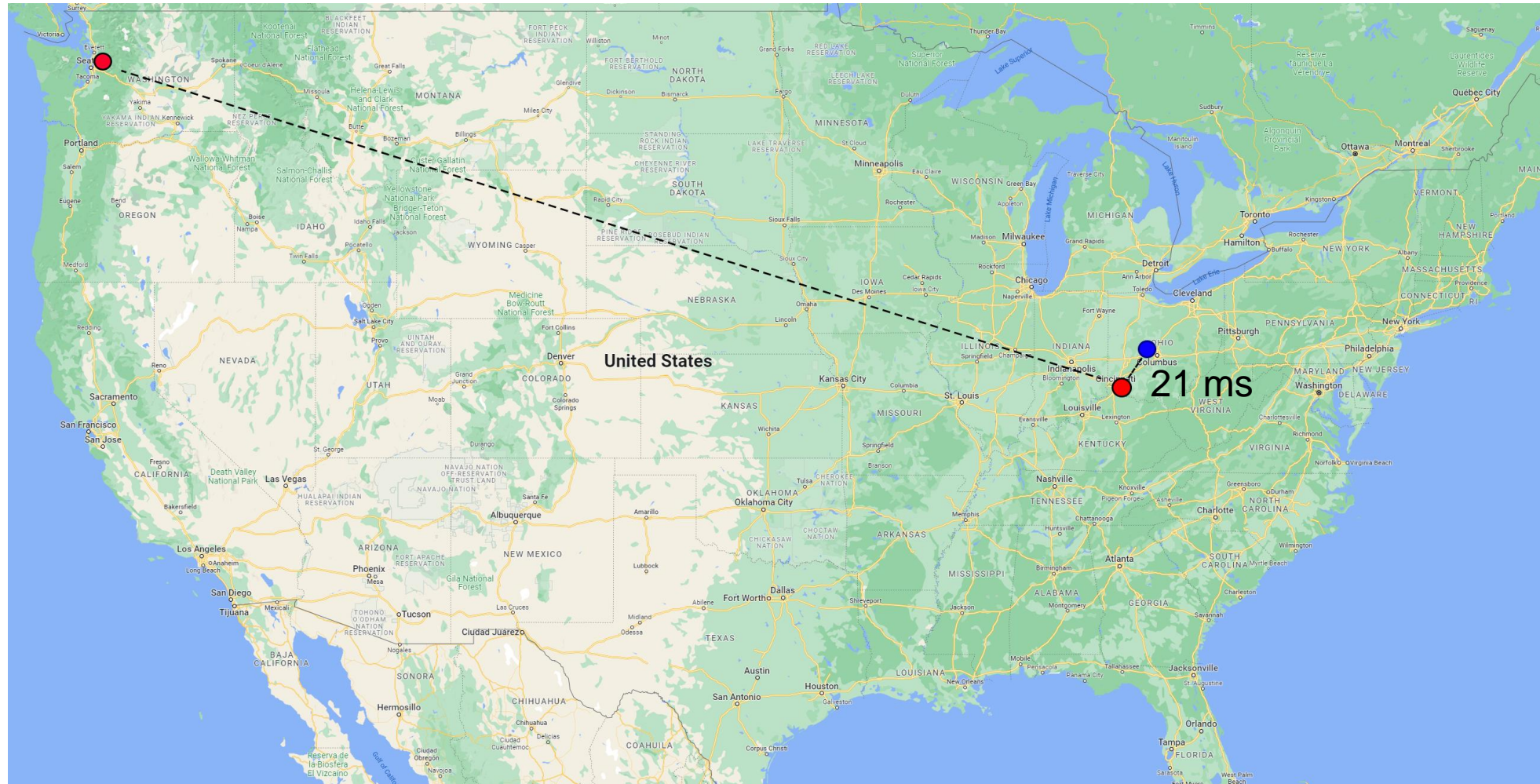


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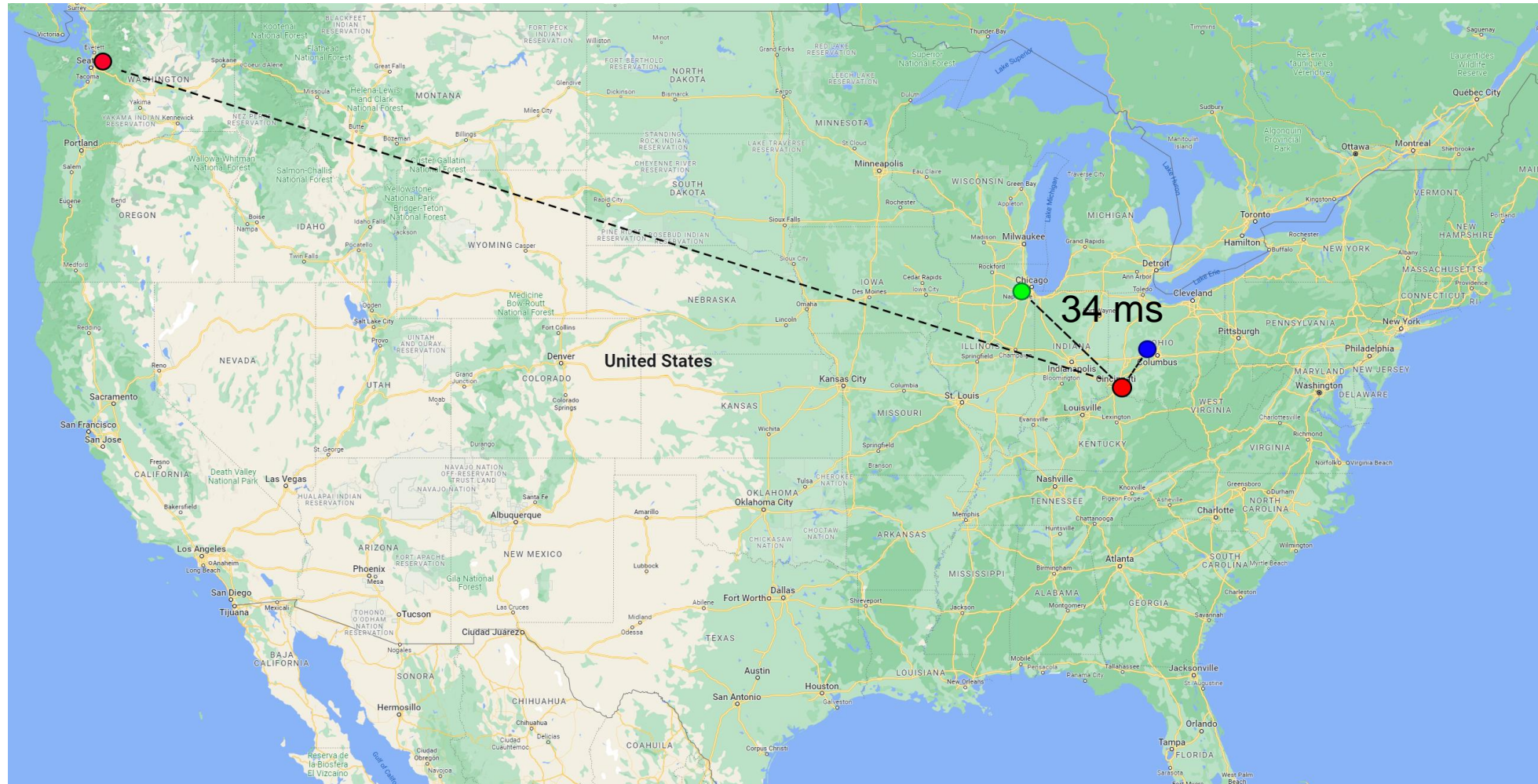


# CDN ILLUSTRATION SCENARIO



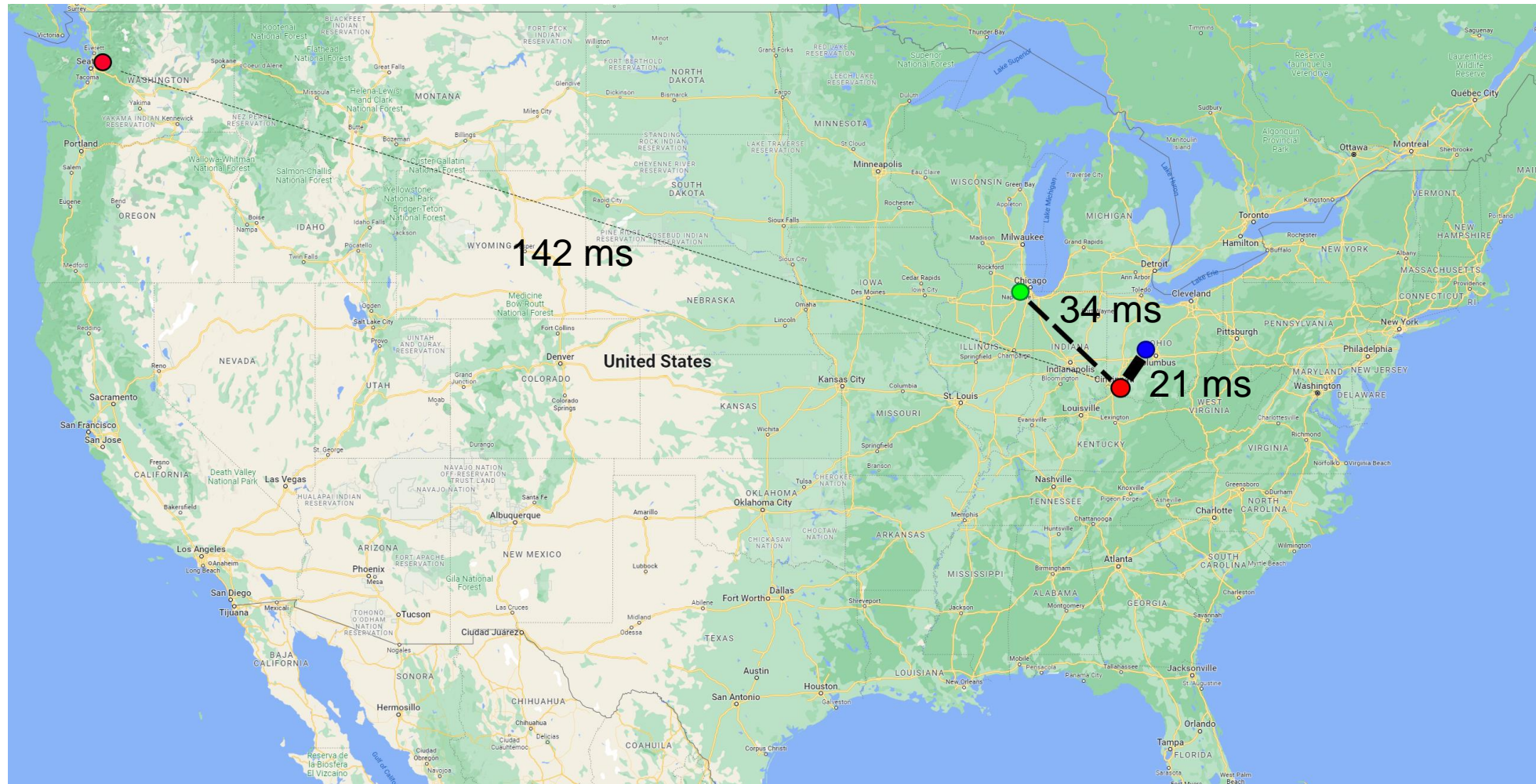


# CDN ILLUSTRATION SCENARIO





# 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

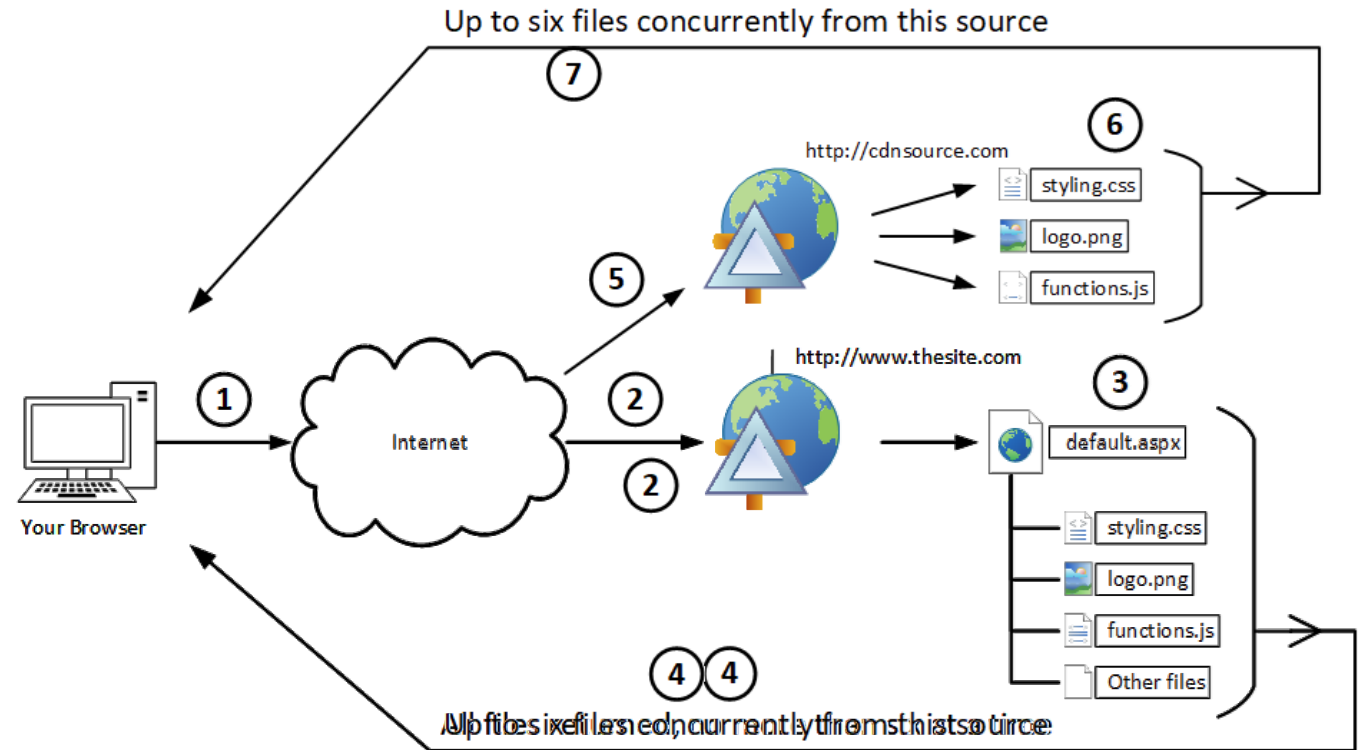
# SOME ADDITIONAL CDN NOTES

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

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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>**



# 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

Learn / SharePoint / SharePoint and OneDrive / Performance /



## Creating and launching a healthy SharePoint portal

Article • 01/24/2023 • 2 minutes to read • 13 contributors

[Feedback](#)

A **portal** is a Microsoft SharePoint site on your intranet with many site viewers who consume the content. In large organizations, you could have several, such as a company portal and an HR portal.

Typically portals have relatively few people who create and author the site and its content. Most visitors to the portal only read and consume the content. We don't recommend using SharePoint portals to host a town hall or live event.

### Tip

Are you wanting to host a live event or town hall? Here are the options we recommend:

- [Learn about Microsoft Teams live events](#)
- [Learn about hosting events with Yammer](#)
- [Link directly to the live event you are streaming \(not through your portal\)](#)

## What type of site should I use as my portal?

SharePoint Online has several types of sites and page types. For portals, we highly recommend using a **communication site with a site page for the home page**, the default configuration when you create a communication site. Site pages allow you to use out-of-the-box web parts, custom web parts, and extensions.

# 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



# 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

# 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



# 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-siteswap?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](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.

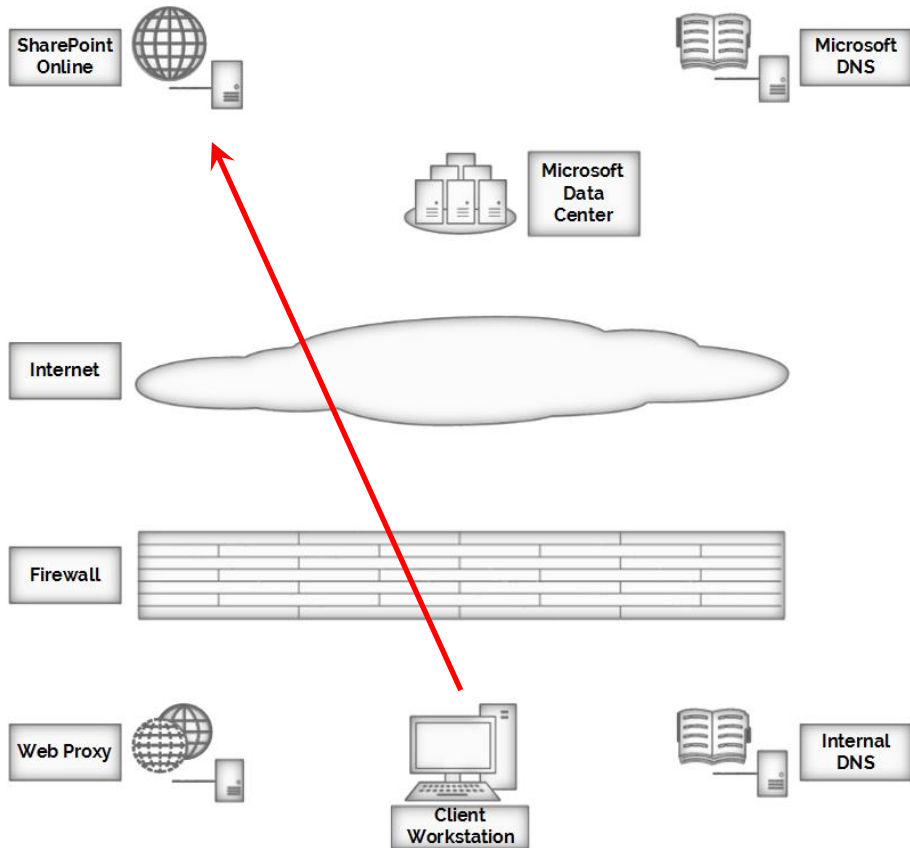


# WHAT IF YOUR SITE IS STILL SLOW?



- 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

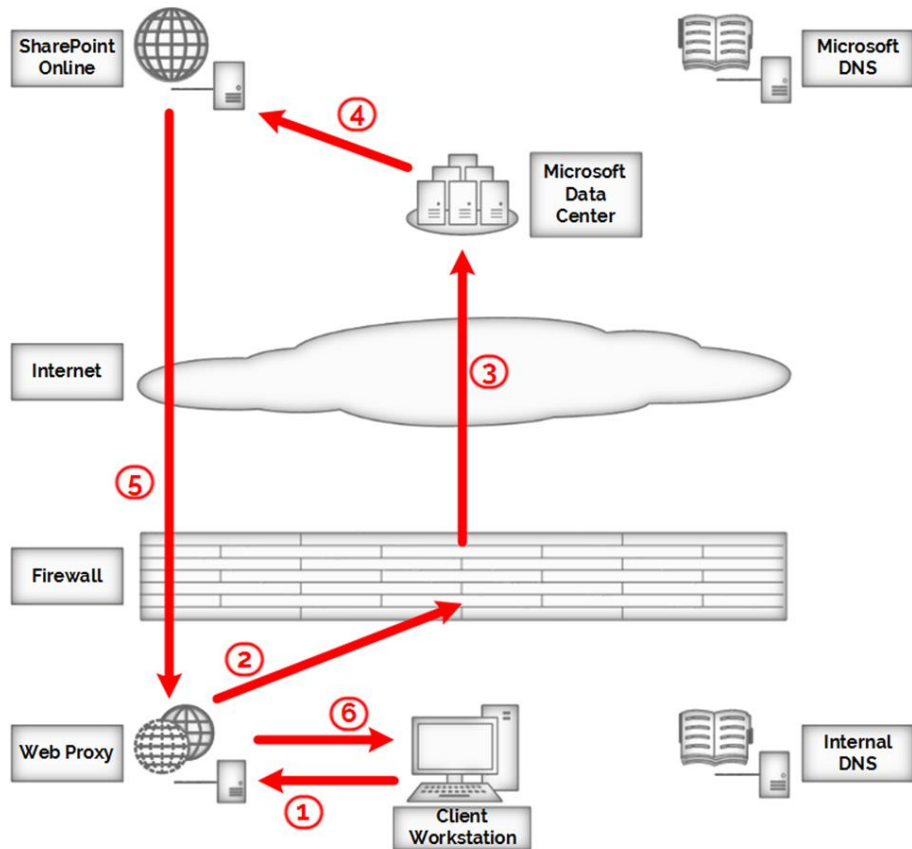
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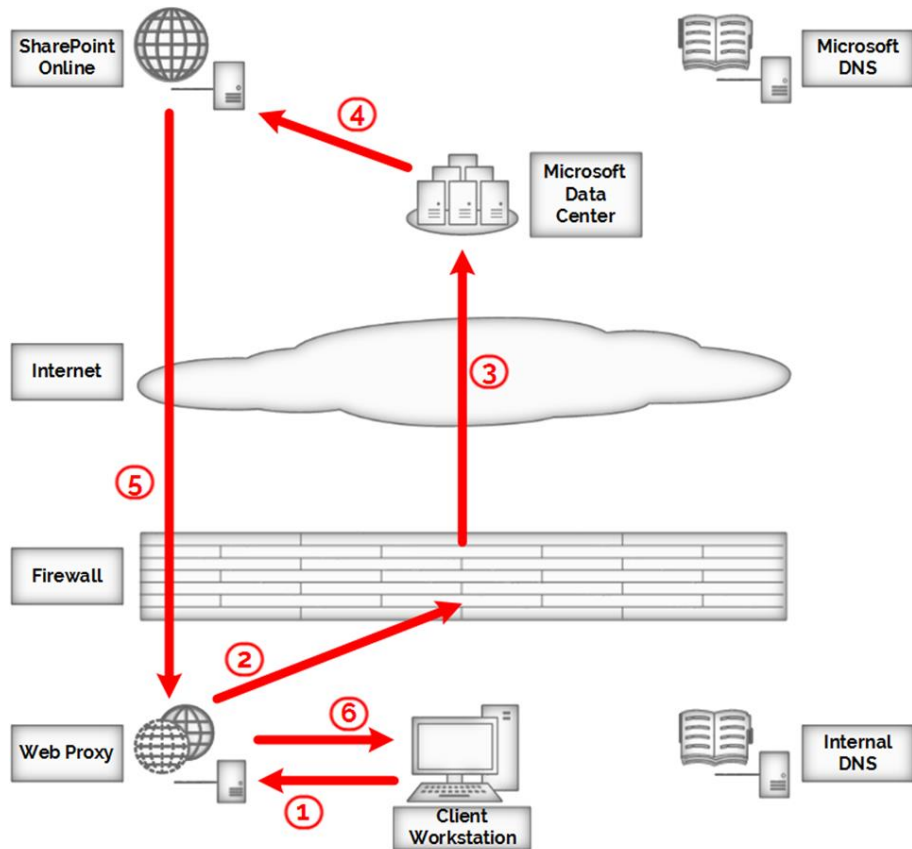
- Remember: we were looking at a simplified page request cycle
- Reality: a lot of networking gear sits between your browser and SPO
- You may think your SPO request is doing this ...

# WHAT IF YOUR SITE IS STILL SLOW?

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... 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
- 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

Decorative graphic elements in the top-left corner consisting of a magenta shape and an orange triangle.A teal line graphic in the bottom-right corner that forms a partial frame or corner shape.

# WRAP-UP AND CONTACT INFO



# Sean P. McDonough

[sean@SharePointInterface.com](mailto:sean@SharePointInterface.com)

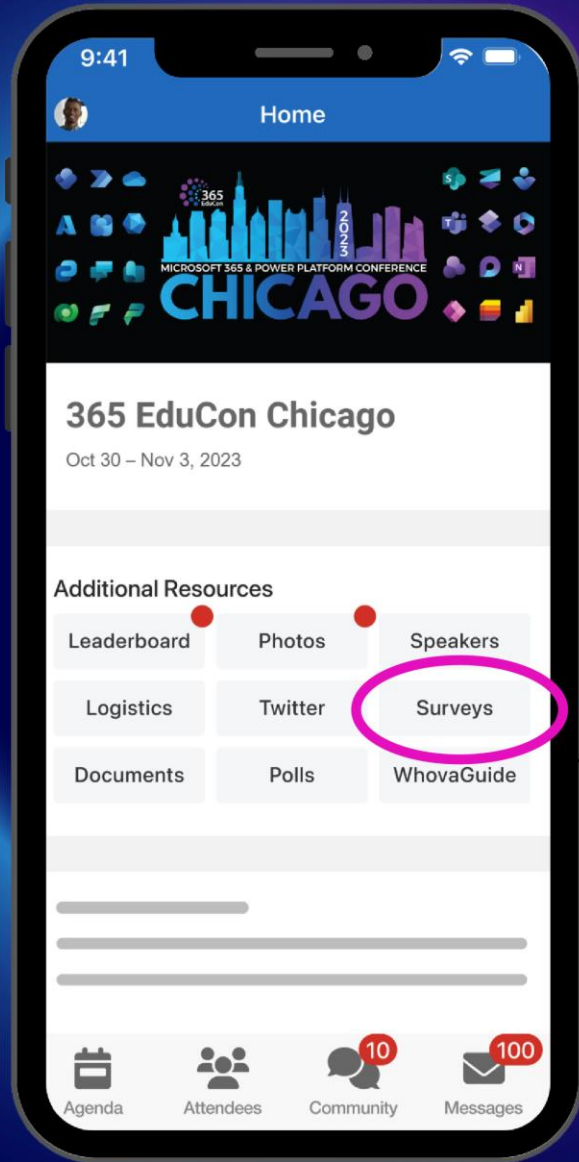
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