

Designing for Optimal Performance in SharePoint Online

*@spmcdonough
on Twitter
(for heckling
purposes)*



Sean P. McDonough
Microsoft MVP
Chief Technology Officer
Bitstream Foundry LLC





of Women in SharePoint



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ShareGate:



Designed for Optimal

JOIN US FOR CAKE AS WE CELEBRATE 10 YEARS OF WOMEN IN SHAREPOINT WITH
A “WOMEN IN TECHNOLOGY PANEL” HEADED BY MICROSOFT’S CATHY DEW.
FRIDAY MARCH 15TH 2:50—3:50 IN TANEYCOMO B BALLROOM



**Celebrating 10 years
of Women in SharePoint**





Win a Surface Book courtesy of Microsoft!



Play Vendor Bingo, Winner drawn during closing session on Friday

Our Agenda

- SharePoint Online (SPO) Implementation
- Acknowledging the Reality of Plumbing
- SharePoint Online Diagnostics and Tools
- Design and Development Guidance
- Samples and Examples
- Questions and Answers Throughout!
- References



But first ...





An important note

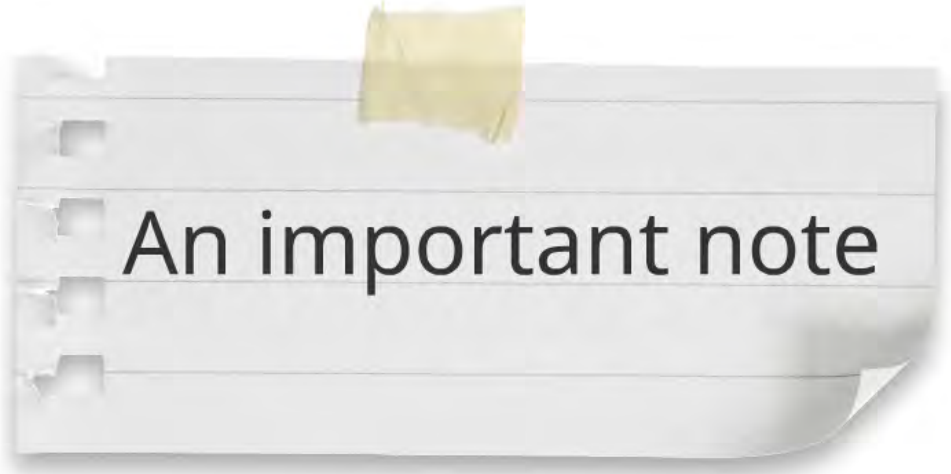


This is
Office 365



changing and updating it"

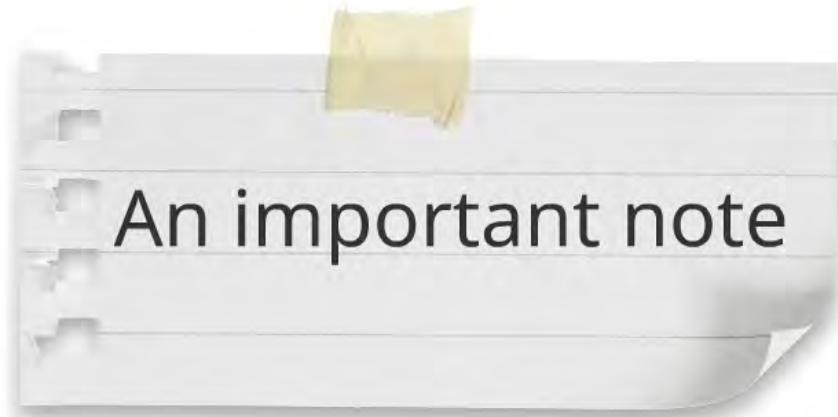
Please don



**Office 365 is an
"evergreen service"**



meaning "Microsoft is always changing and updating"



**Office 365 is an
"evergreen service"**

meaning "Microsoft is always changing and updating it"

What I show you today ...

- will probably be true tomorrow





always changing and updating

What I show you today ...

- will probably be true tomorrow
- has a good chance of being true next week
- might be true in month
- probably worth questioning and re-evaluating in a year



Please don't dig this up in five years and then send me hate mail because I presented something that is no longer accurate due to a SharePoint Online service change.



Please don't dig this up in five years and then send me hate mail because I presented something that is no longer accurate due to a SharePoint Online service change.



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





First Stop:

Some basic
SharePoint farm
architecture

(and why
that matters
with SPO)



Welcome to the farm!

You might think that SPO is simply an extension of this pattern

On-premises SharePoint farms come in all shapes and sizes

Small Farm

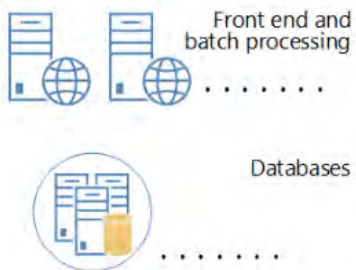
<1,000 users

Fault tolerance for simple workloads with small volumes of content

Two tiers:

- Combined front-end and batch processing servers
- Database servers

Scale the number of servers as needed.



Medium Farm

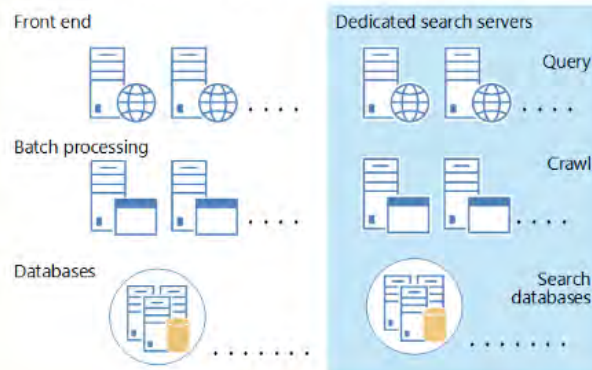
<10,000 users

Dedicated search servers for up to 10 million items.

Three tiers:

- Front-end servers
- Batch processing servers
- Database servers

Scale the number of servers as needed.

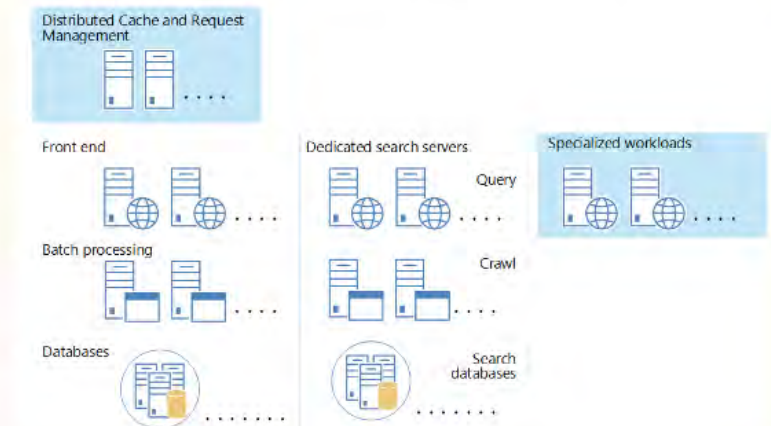


Large Farm

More than 10,000 users

Additional server types to support large farms.

This farm represents each of the server roles that are recommended. For each server role the servers are configured identically. Scale each server role independently. Large farms benefit by adding dedicated servers for Distributed Cache and by adding Request Management.



Databases



Search databases

well, not really ...

You might think that SPO is simply an extension of this pattern.

On-premises SharePoint farms come in all shapes and sizes

Small Farm

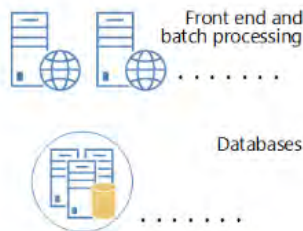
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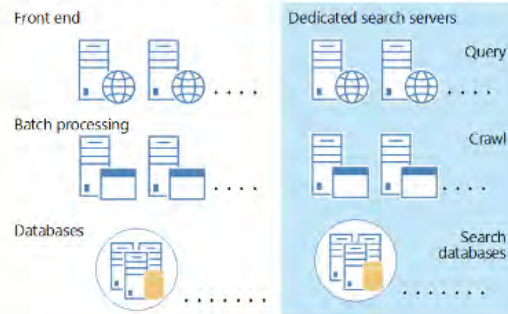
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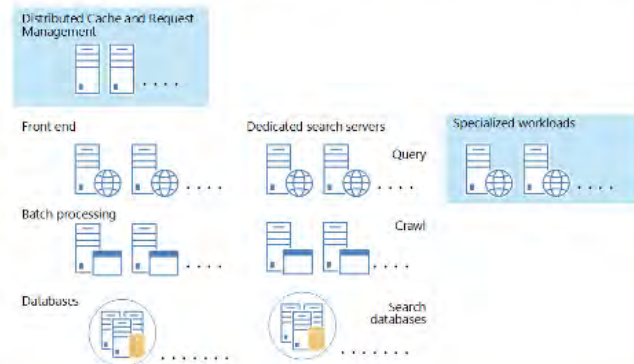


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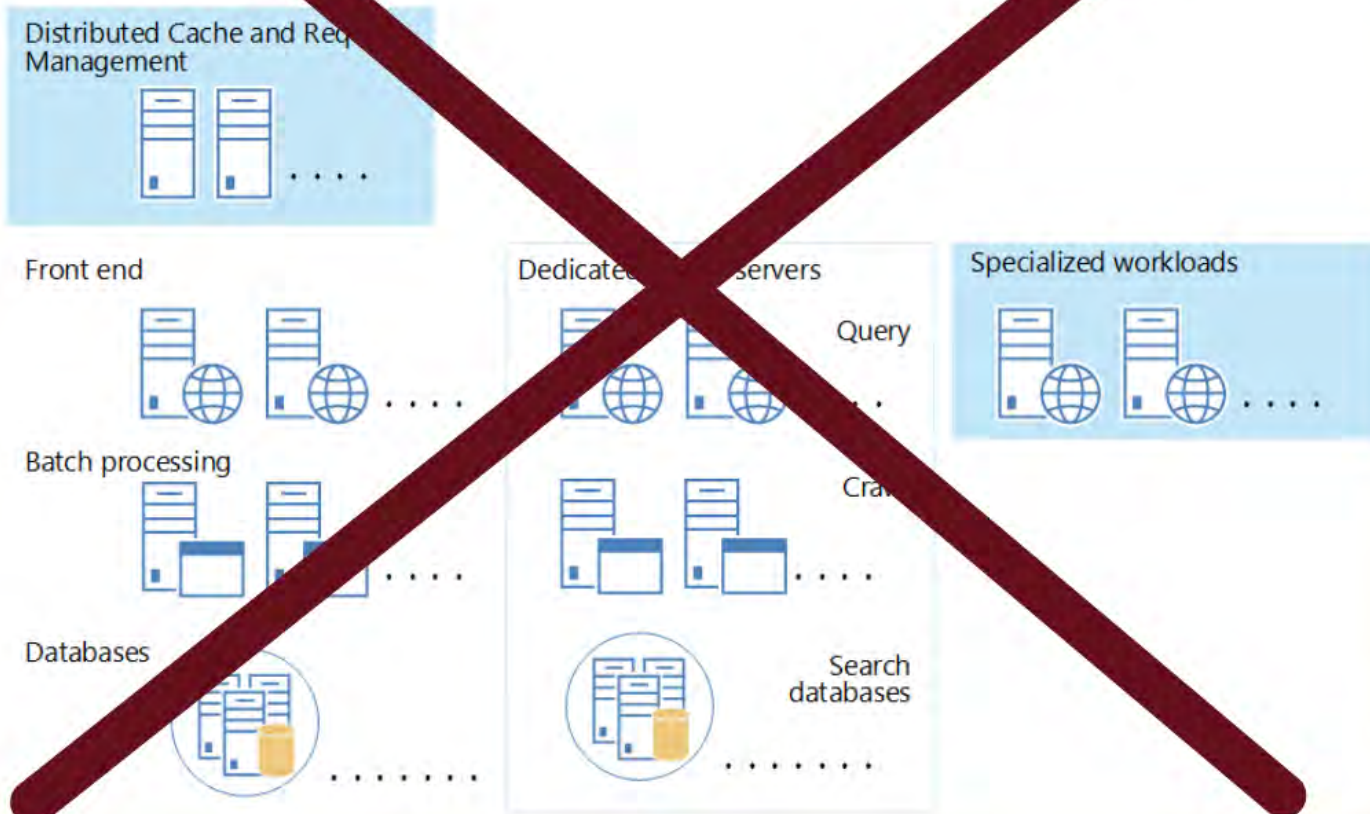
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It is
not.

well, not really ...

You might think that SPO is simply an extension of this pattern.



This is a stamp
too (well covered of them)



This is a stamp
too (well, several of them)

Datacenter 1..N:

Network 1..N:

Disaster Recovery Datacenter 1..N:

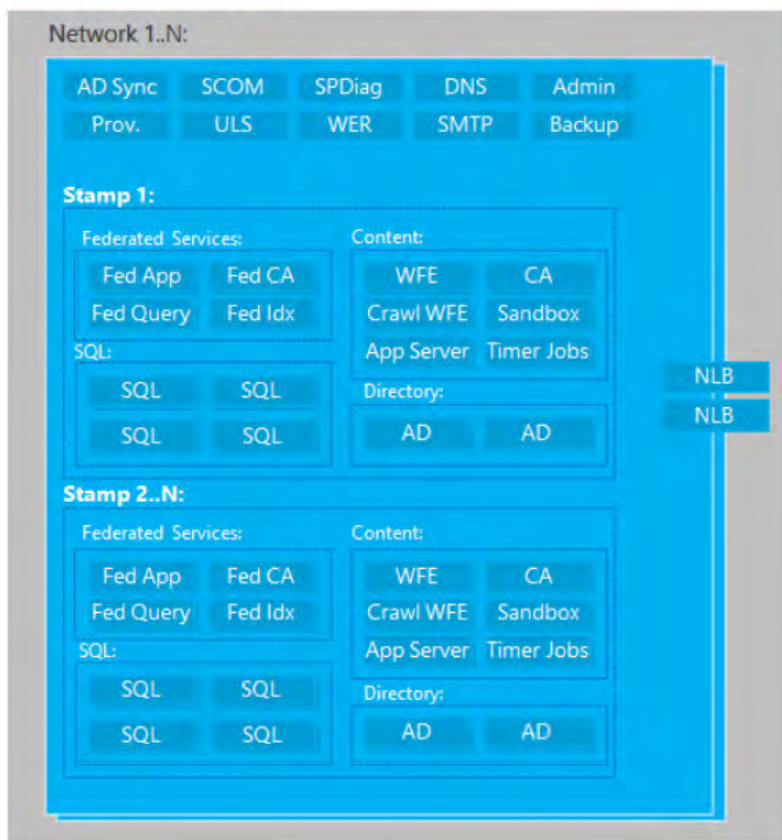
Network 1..N:

Grid Manager

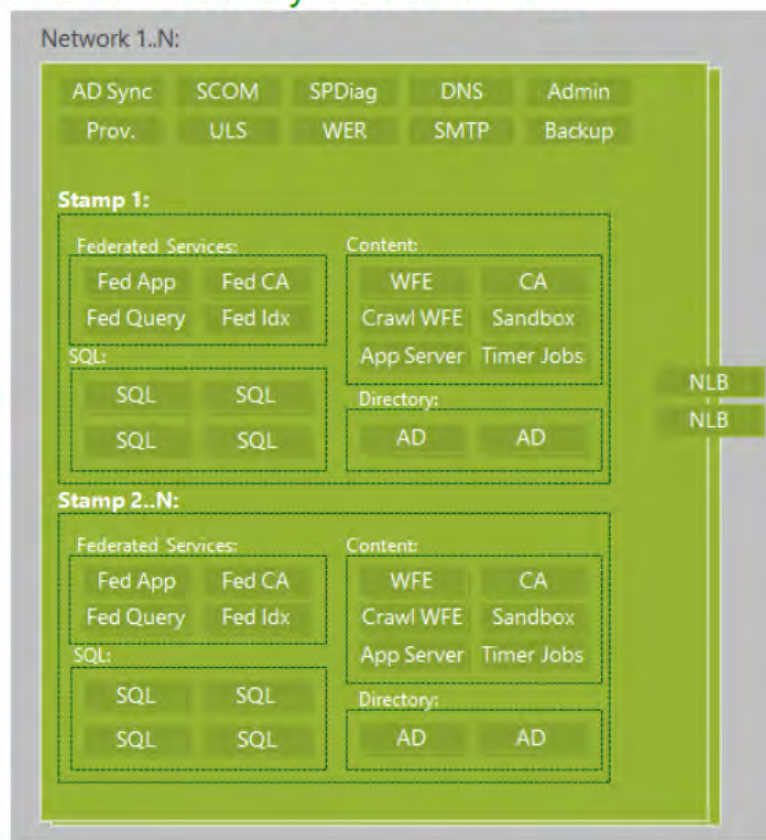


This is a stamp too (well, several of them)

Datacenter 1..N:



Disaster Recovery Datacenter 1..N:



- Grid Manager
- Global Directory
- Tenant Admin (UI)
- Commerce backend
- DNS (multiple)
- OrgID Auth, Svc.
- Incident Management
- Azure (Windows/SQL)
- CDN Services

Looking at the representation of an individual stamp, you might think it's only 16 servers.

Are you
ready for



THIS
too (well,

Each datacenter has two or more stamps per SPO environment for high-availability.

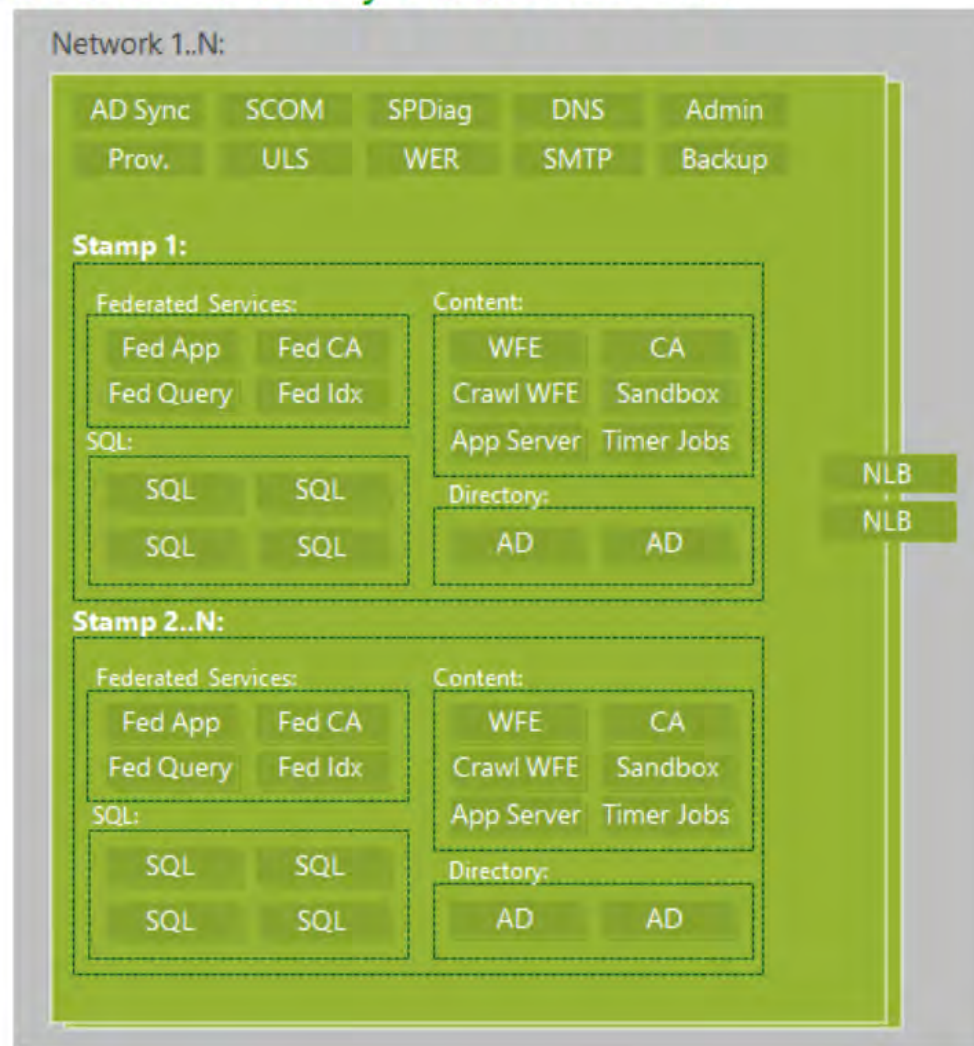
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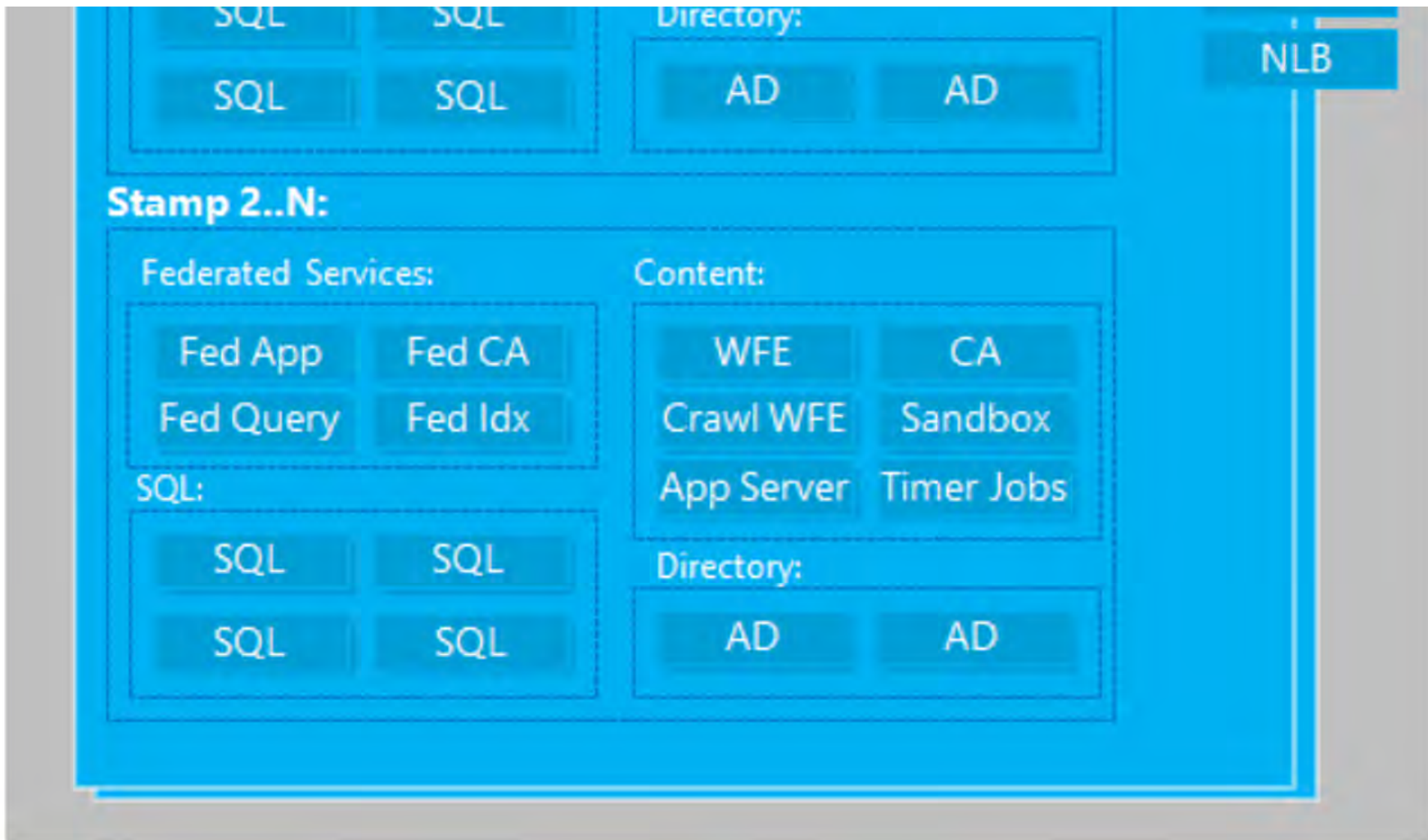


- Grid Manager
- Global Directory
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Additional stamps exist in a different region for redundancy and failover.

Are you





Looking at the representation of an individual stamp, you might think it's only 16 servers.

Are you
ready for
the kicker?





The exact number of servers in a SharePoint Online stamp is variable.

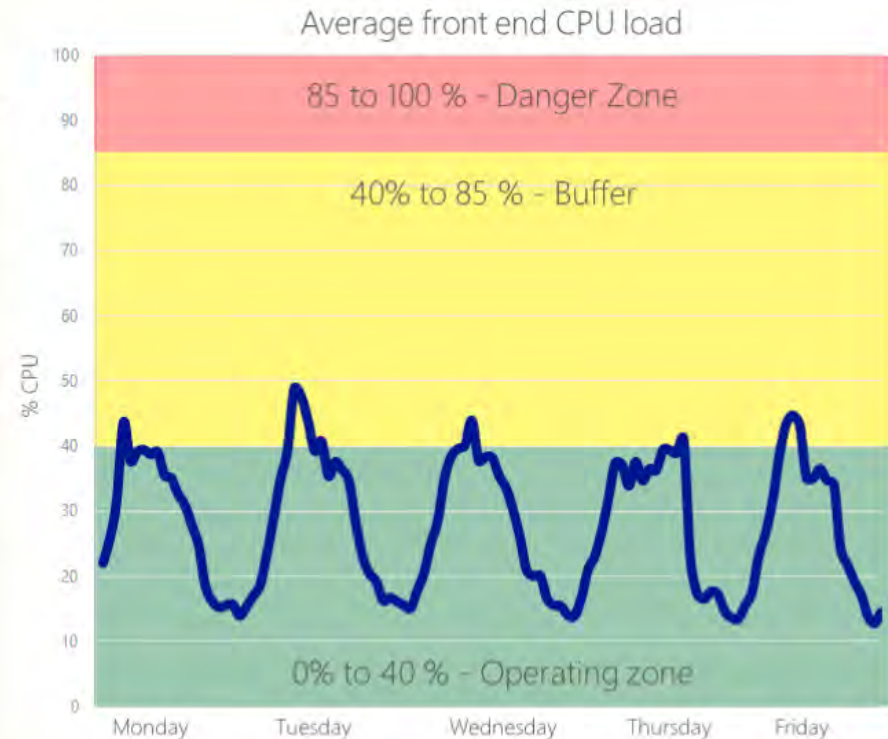
The number of servers per





The exact number of servers in a SharePoint Online stamp is variable.

The number of servers per stamp varies because the server count is adjusted based on average front-end CPU load.

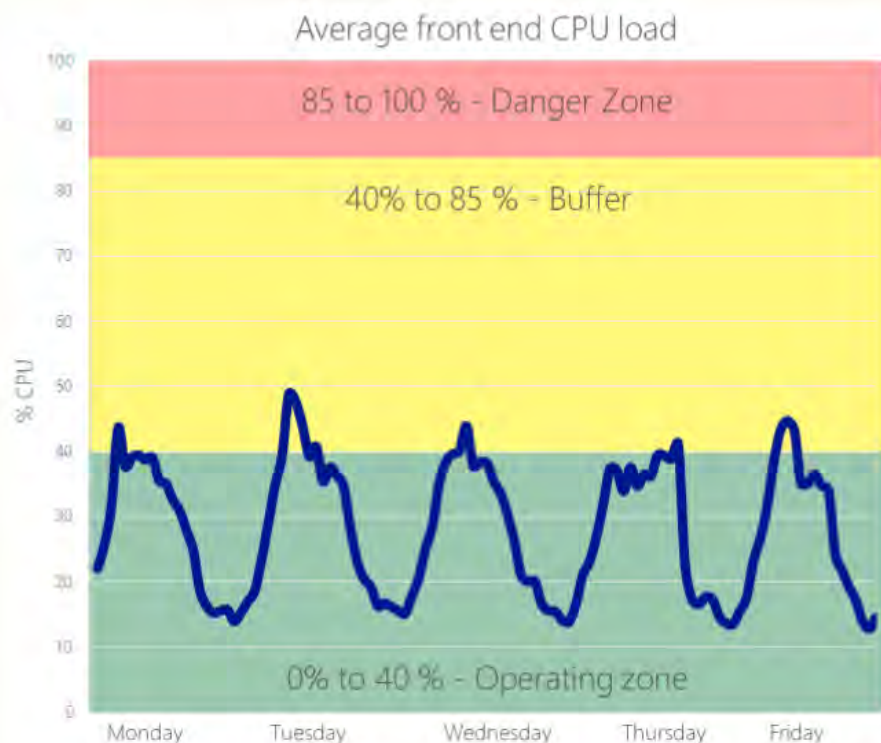


- If load rises above 40%*, additional servers are automatically provisioned and added to the stamp



SharePoint Online stamp is variable.

The number of servers per stamp varies because the server count is adjusted based on average front-end CPU load.



- If load rises above 40%*, additional servers are automatically provisioned and added to the stamp.
- If load drops, servers are decommissioned.

If you remember only one thing in this discussion of stamps and elastic capacity, please let it be this one point ...





Load
testing
is futile.

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please let it be this one point...



Load testing is futile.

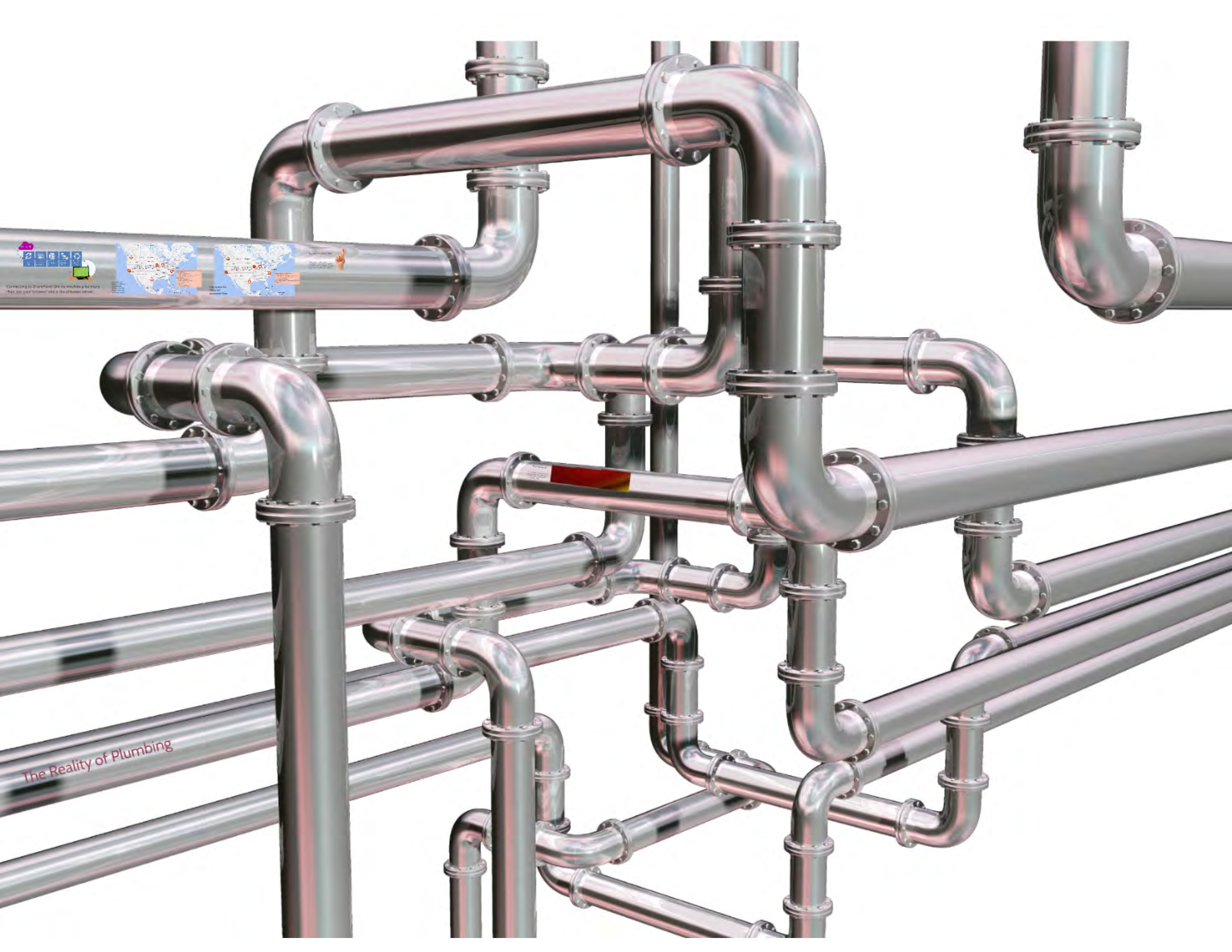
- Given the elastic nature of a stamp, there's really no way to effectively load test SPO. Any numbers you get or produce are essentially meaningless in the grand scheme of things.
- Rather than load testing, focus instead on the items we're going to cover in the rest of this presentation. They'll help you avoid poorly performing pages and sites.



Welcome to the farm!



The Reality of Plumbing



Connecting to SharePoint Online requires a lot more than just knowing the address.

The Reality of Plumbing

The Network

The Network

If we're talking about end-to-end performance, we really need to start with the plumbing that carries everything.



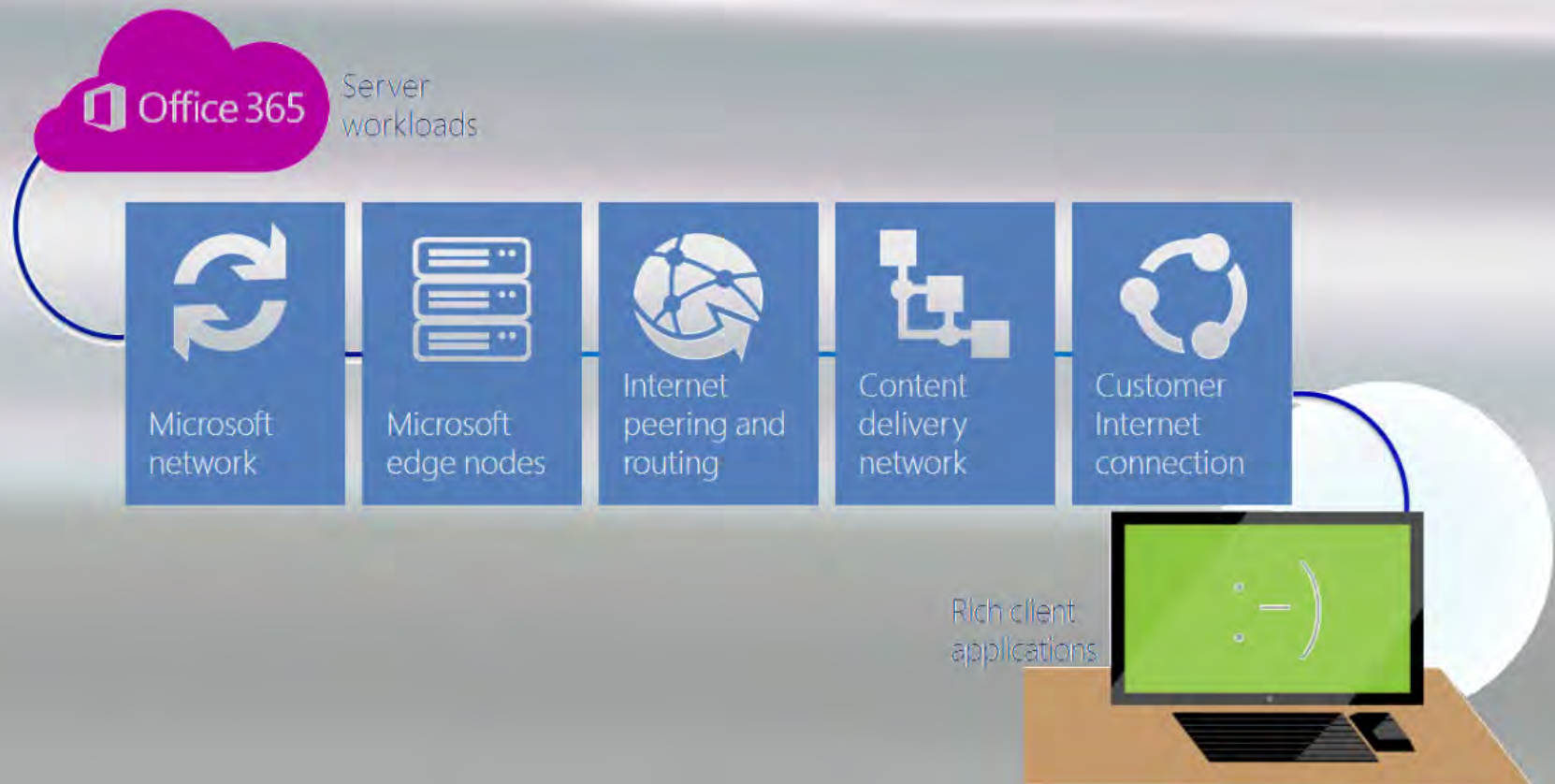
Although it's easy to abstractly refer to the transport layer as "the network" ...



... the reality is that there's a lot of routing, traversal, and redirection between client workstations and SharePoint Online.



If the network is "out of whack,"
it can look like SharePoint
Online itself is the issue.



Connecting to SharePoint Online involves a lot more than just your browser and a cloud-based server.

We don't have time to cover all the plumbing in this session ...

So, remember this

If you've spent a lot of time

We don't have time to cover all the plumbing in this session ...

So, remember this:

If you've spent a lot of time troubleshooting in SharePoint Online (to little or no effect), maybe you should zoom out and consider the network.



Okay, so it really feels like there is a tangible performance problem.

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How do you prove it objectively?



The good news: the destruction of computer equipment is not necessary (although you might feel compelled to do so)!

objectively?

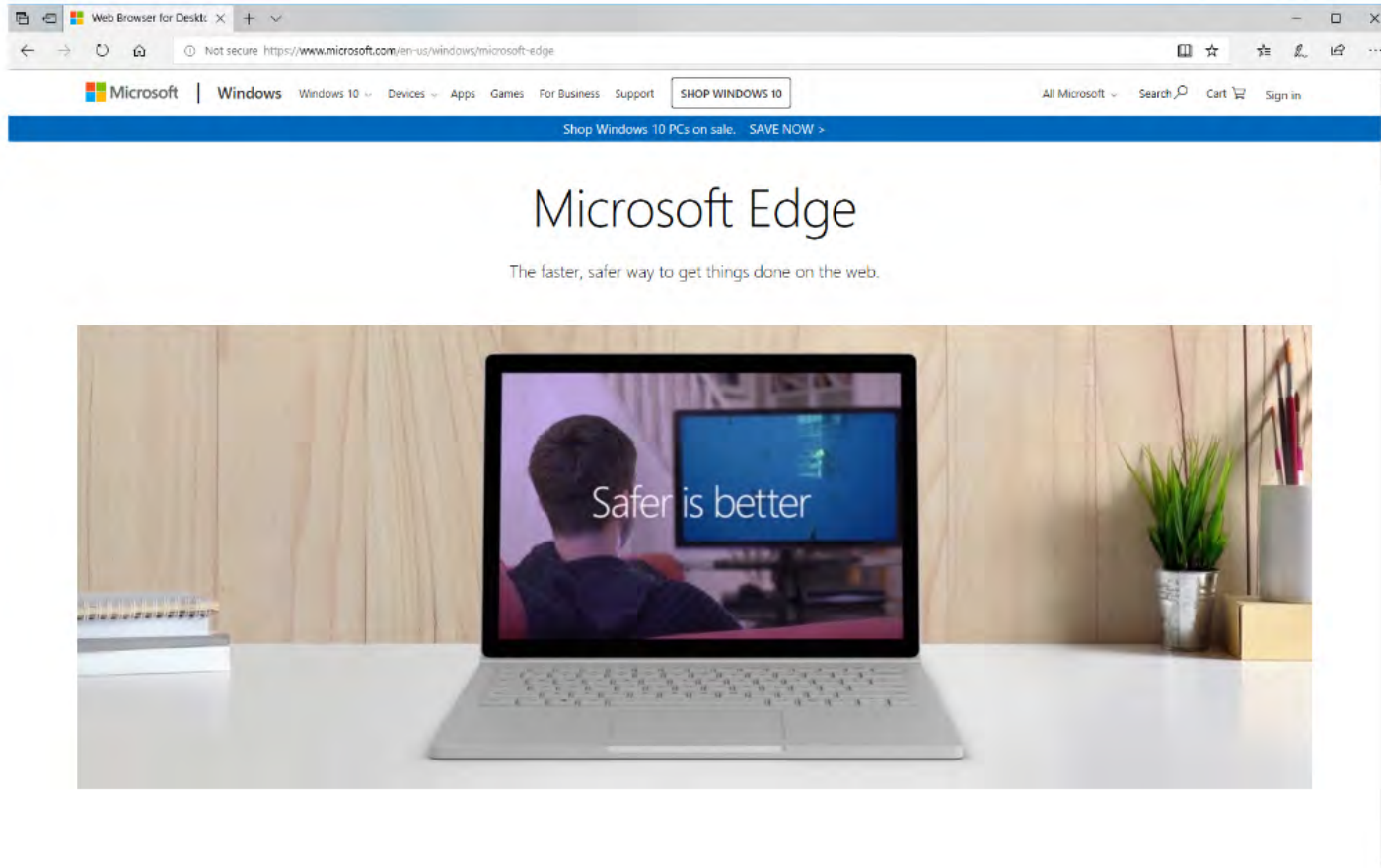
Meet your primary
diagnostic tool.



Meet your primary
diagnostic tool.



In all likelihood, you already
have it on your system.



Hello,
Edge!



like



Um ...
you're
kidding,
right?

None!



Um ...
you're
kidding,
right?

Nope!

Bitstream Foundry LLC

Bitstream Foundry LLC

☆ Not following 🗑️ Share

🔍 Search

📁 Clients

📄 Pages

🗑️ Recycle bin

✎ Edit

+ New ✎ Quick edit 📄 Export to Excel 📄 Flow 📄 Power Apps 📄 All Items 📄 🔍 ⓘ

Client Projects

Attachments Title Description Client

DEMO

[Return to classic SharePoint](#)

Feedback

- * may be due to routing issues (as in "number of hops")
- * plenty of other possibilities

Demo Takeaways

HTTP

Response

Headers

waiting on server -
generally zero or
near zero

time spent
processing on
server (in ms)
- ideally low

- SPIisLatency
- SPRequestDuration
- X-SharePointHealthScore — 0 to 10
(you want 0)

Don't see the headers?

Don't panic!

I'll be demonstrating a better way to get the performance numbers (and site assessments) a little bit later!

HTTP Response Headers

- SPIisLa

Generally speaking ...

Name / Path	Protocol	Method	Result / Description	Content type	Received	Time	Initiator / Type	0m	Headers	Body	Parameters
Home.aspx https://cardinal...	HTTPS	GET	200 OK	text/html	75.36 KB	2.01 s	document		SPIisLatency: 1		
									SPRequestDuration: 1456		

$\text{Time} - (\text{SPRequestDuration} + \text{SPIisLatency}) = \text{"time lost elsewhere"}$

- * potential network latency
- * may be due to routing issues (as in "number of hops")
- * plenty of other possibilities

Demo Takeaways

HTTP

Response

waiting on server -
generally zero or

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processing on

So, you've concluded that your pages are slow and you have the data to prove it!

SPIisLatency is low, and
X-SharePointHealthScore is low,

but ...

So, you've concluded that your pages are slow and you have the data to prove it!

SPIisLatency is low, and
X-SharePointHealthScore is low,

but ...

SPRequestDuration is crazy high (e.g., 9000 ms)!



Repeat after me ...

"The problem probably isn't

Repeat after me ...

"The problem probably isn't
SharePoint Online. It's my site."



Okay, one more time:

Repe

"The pro
SharePoir

Repeat after me ...

"The problem probably isn't
SharePoint Online. It's my site."

So, who's to blame?

In all likelihood

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In all likelihood:
blame the
lousy* devs.



***Note: not all devs are lousy devs. Just the ones who create performance problems and knee-jerk into blaming Microsoft and SharePoint Online.**

So, who's to blame?

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***Note: not all devs are lousy devs. Just the ones who create performance problems and knee-jerk into blaming Microsoft and SharePoint Online.**

- Compare processing and response times for a SharePoint site or page. ← (may



- In the majority of poor performance scenarios, a combination of UI/UX , client-side code additions, and questionable customization/deployment mechanisms are to blame.
- Microsoft has indicated that the slowest 1% of pages in SPO take more than 5,000ms to load - again, usually due to customizations.

...nes who create performance
...t and SharePoint Online.

- Compare processing and response times to your problematic SharePoint site or page.  (may not be valid approach much longer ...)

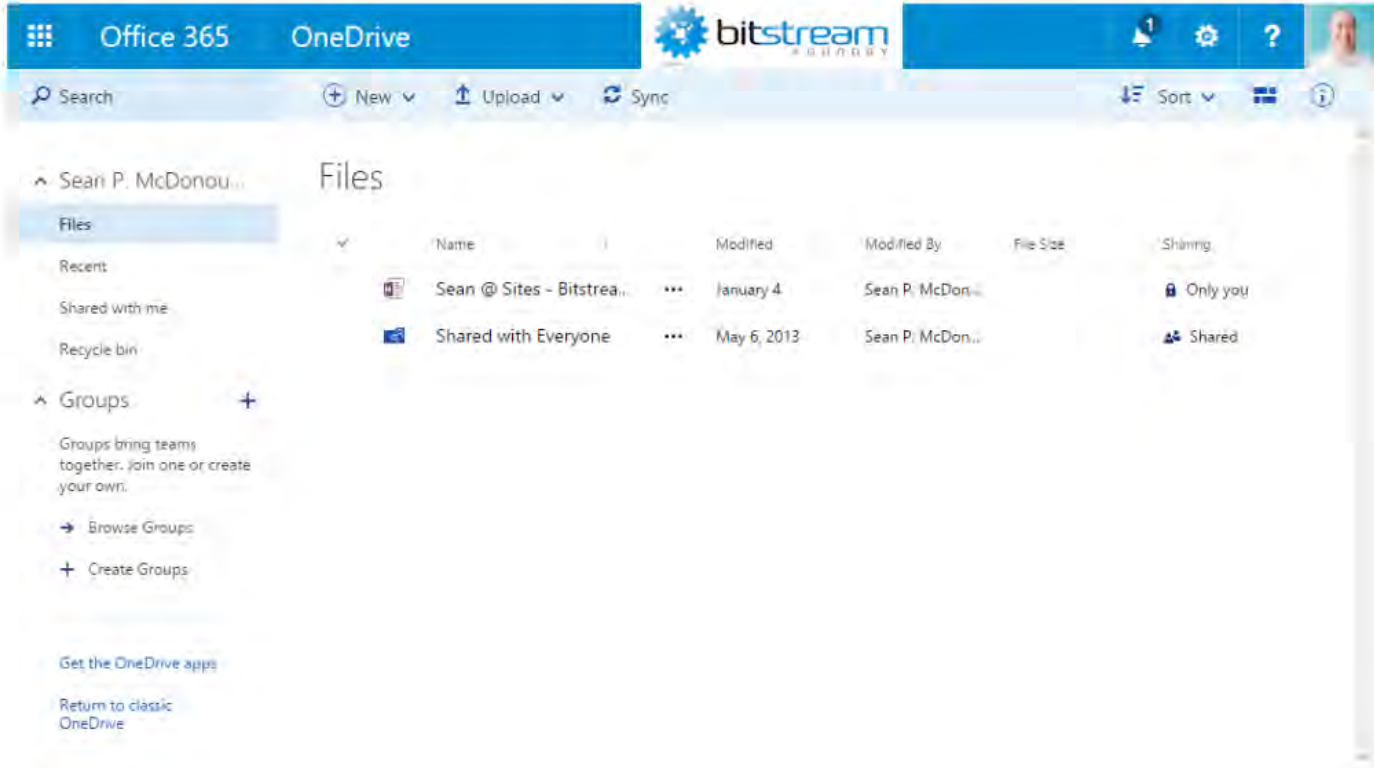
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- Microsoft has indicated that the slowest 1% of pages in SPO take more than 5,000ms to load - again, usually due to customizations.

Don't believe me?



Collect the data and validate for yourself!



- Profile your OneDrive for Business page (it's in your MySite).
- Compare processing and response times to your problematic SharePoint site or page. *(may not be valid approach much longer ...)*

• In the majority of poor performance scenarios a

Don't believe me?

"Okay, yeah - my OneDrive for Business page is really fast ... but my SharePoint pages are completely choking."

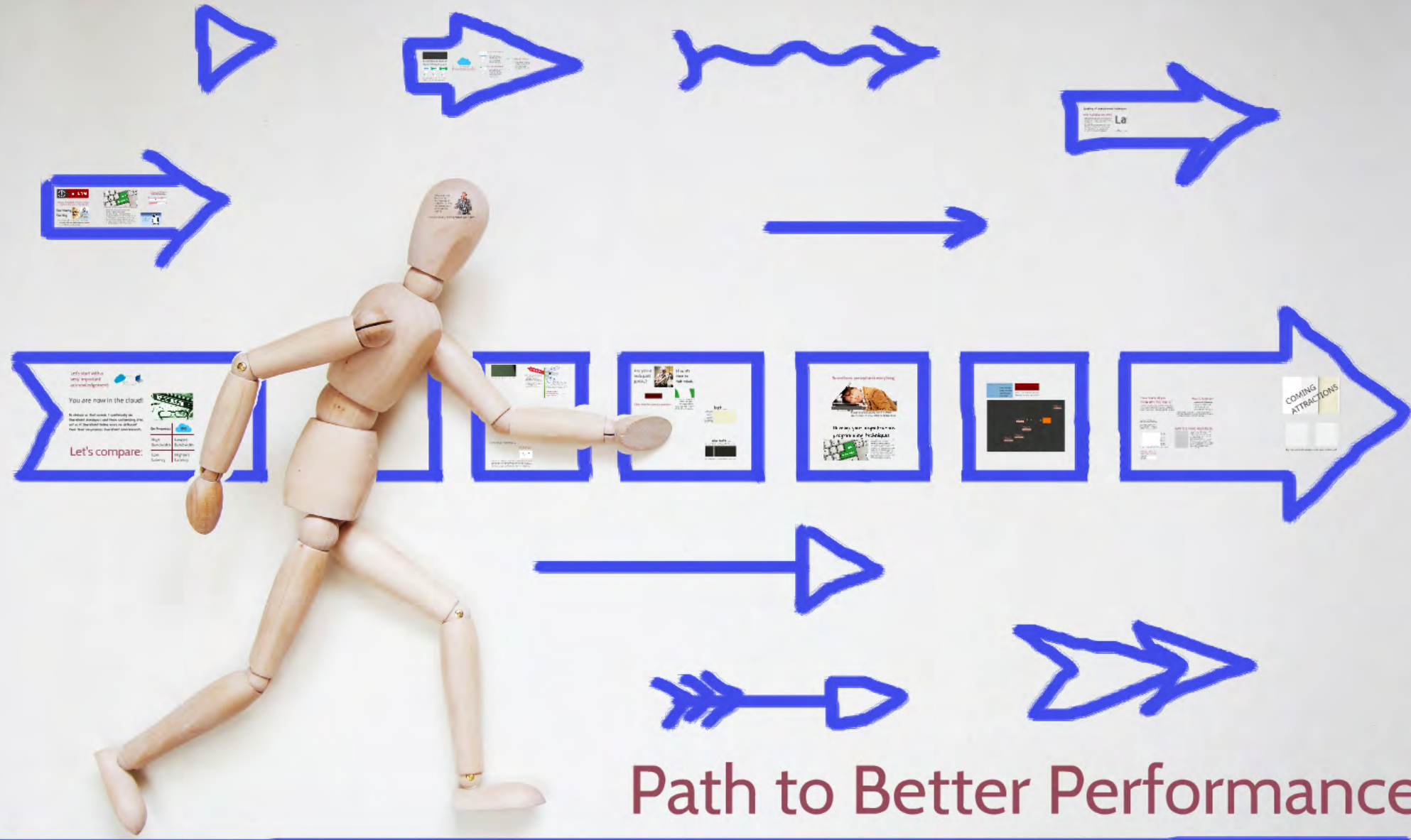


're probably thinking "What can I do

"Okay, yeah - my OneDrive for Business page is really fast ... but my SharePoint pages are completely choking."



You're probably thinking **"What can I do?"**



Path to Better Performance

Let's start with a
very important
acknowledgement:

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very important
acknowledgement:



You are now in the cloud!

As obvious as that sounds, I continually see

acknowledgement:

You are now in the cloud!

As obvious as that sounds, I continually see SharePoint developers and those customizing sites act as if SharePoint Online were no different than their on-premises SharePoint environments.

very important
acknowledgement:




You are now in the cloud!

As obvious as that sounds, I continually see SharePoint developers and those customizing sites act as if SharePoint Online were no different than their on-premises SharePoint environments.

Let's compare:



On-Premises	 SPO
High Bandwidth	Low(er) Bandwidth
Low Latency	High(er) Latency



Failing to acknowledge the "we're in the cloud now" reality leads to a problem I simply call ...



Failing to acknowledge the "we're in the cloud now" reality leads to a problem I simply call ...

Too Many,
Too Big



- Too many calls are made to the server.

now" reality leads to a problem I simply call ...

Too Many, Too Big



- Too many calls are made to the server.
- Too many files are referenced on pages.
- The files in-use are too large.

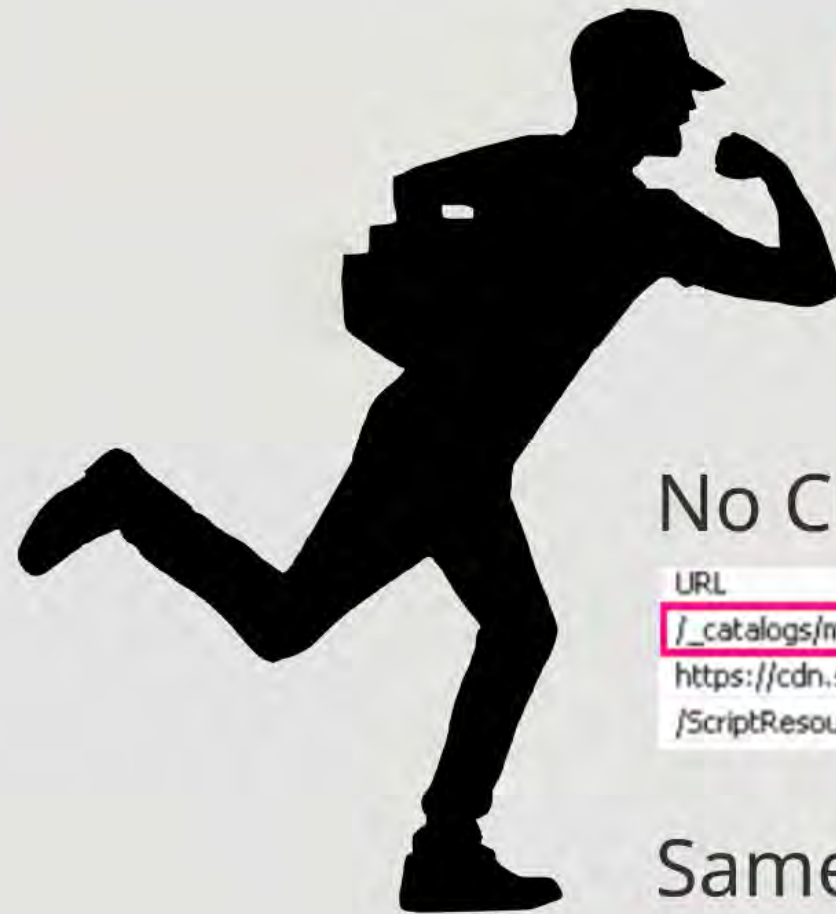


Consider one or more of the following:

- Minify files, especially JavaScript files.
- Resize images to usage sizes.
- Compress images (more) aggressively.
- Use sprite sheets to reduce the actual number of HTTP requests needed to retrieve images.
- Use SharePoint's Image Rendition service.
- Leverage a toolkit like Font Awesome in place of individual icons and associated files.

And the big
kahuna ...





Use a CDN!!!

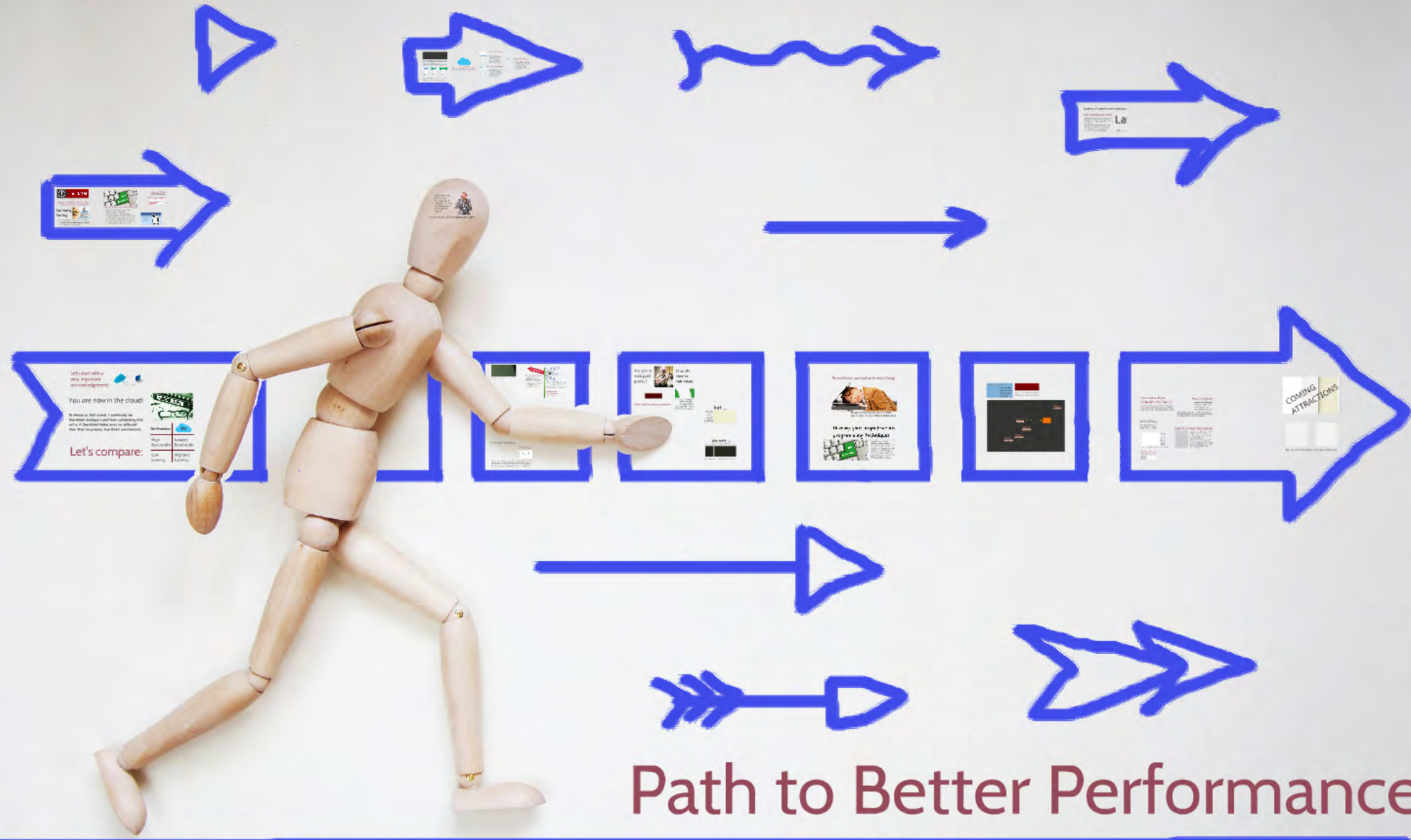
(Content Delivery Network)

No CDN in use (i.e., SPO library direct)

URL	Received	Taken	Initiator
/_catalogs/masterpage/javascript/jquery-2.1.1.min.js	82.98 KB	1.51 s	<script>
https://cdn.sharepointonline.com/12413/_layouts/15/16	18.98 KB	156 ms	<script>
/ScriptResource.axd?d=M1vNi_a6A2vtkOenP45i9-peGfx	100.80 KB	2.04 s	<script>

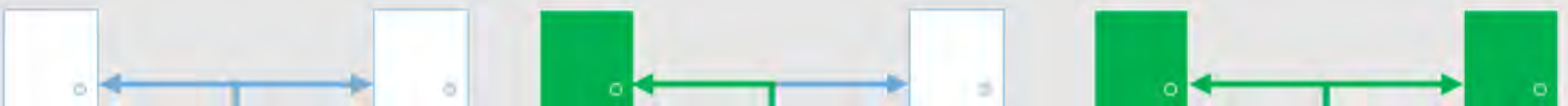
Same resource from a CDN

URL	Received	Taken
https://ajax.aspnetcdn.com/ajax/jQuery/jquery-2.1.1.min.js	82.74 KB	469 ms
/WebResource.axd?d=r3Mv/y4JFCBwmUs1-gLXCgVJy4RMAH/qCj2oIh3D5kbMXzSdwm5KlpDx9vM6MKjztZon...	22.33 KB	0.84 s
/_layouts/15/images/spcommon.png?rev=38	20.56 KB	1.15 s

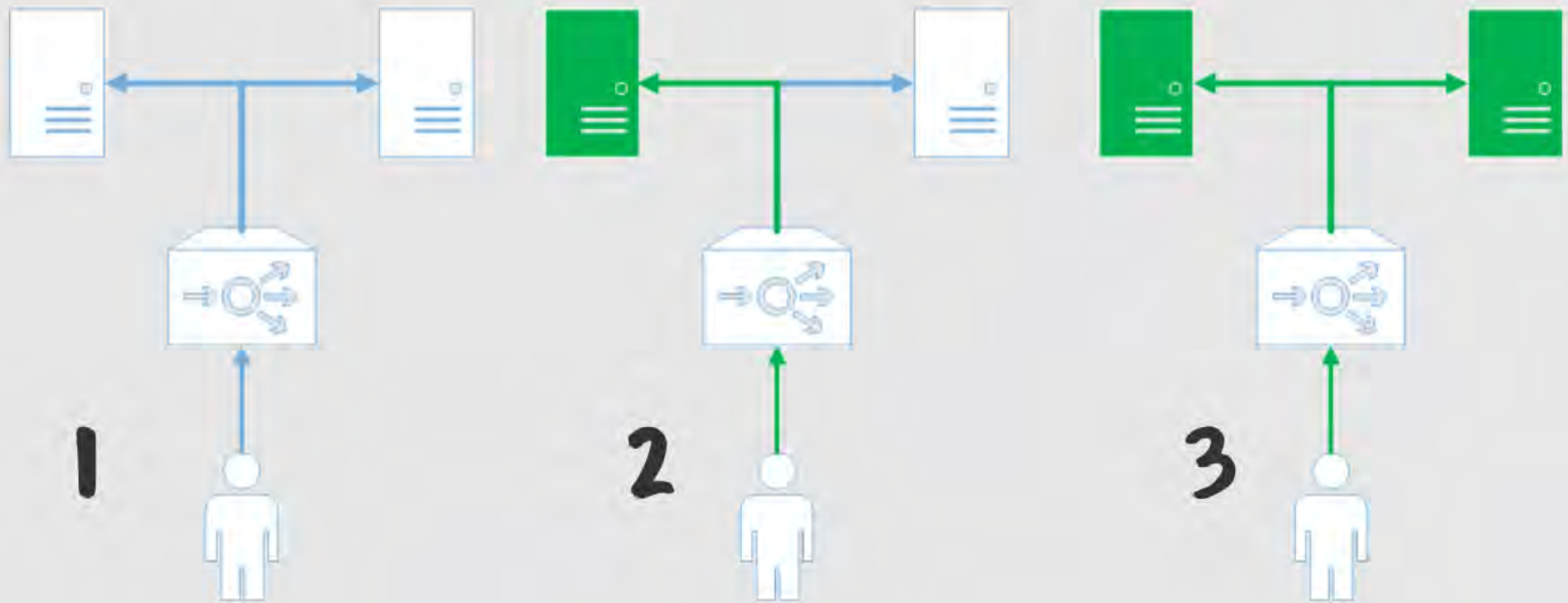




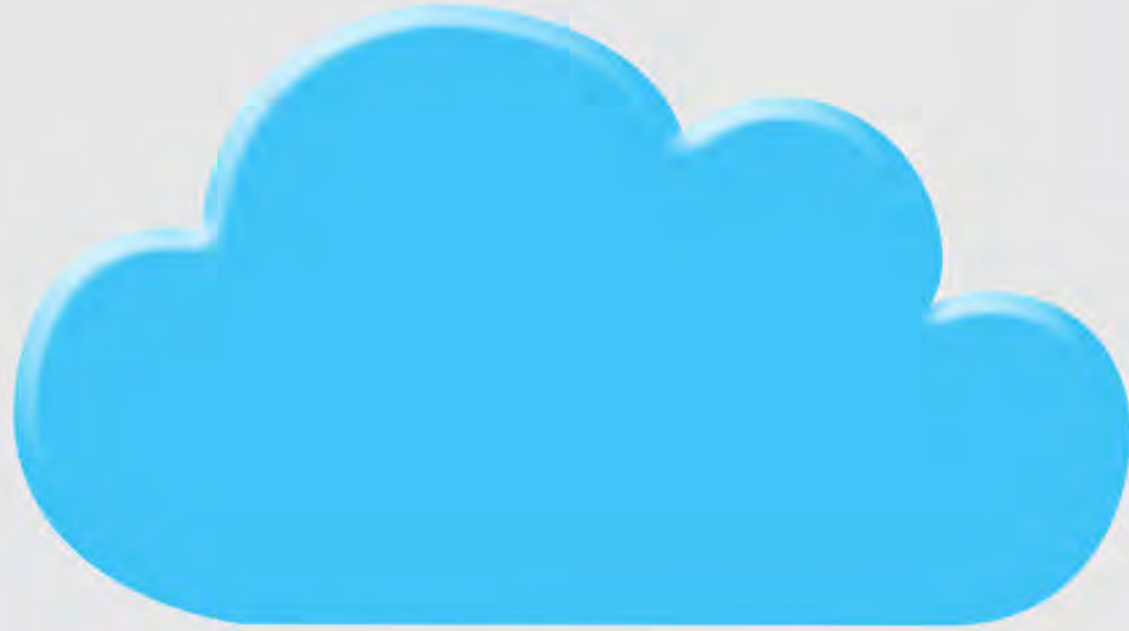
Conventional wisdom
says caching is good.



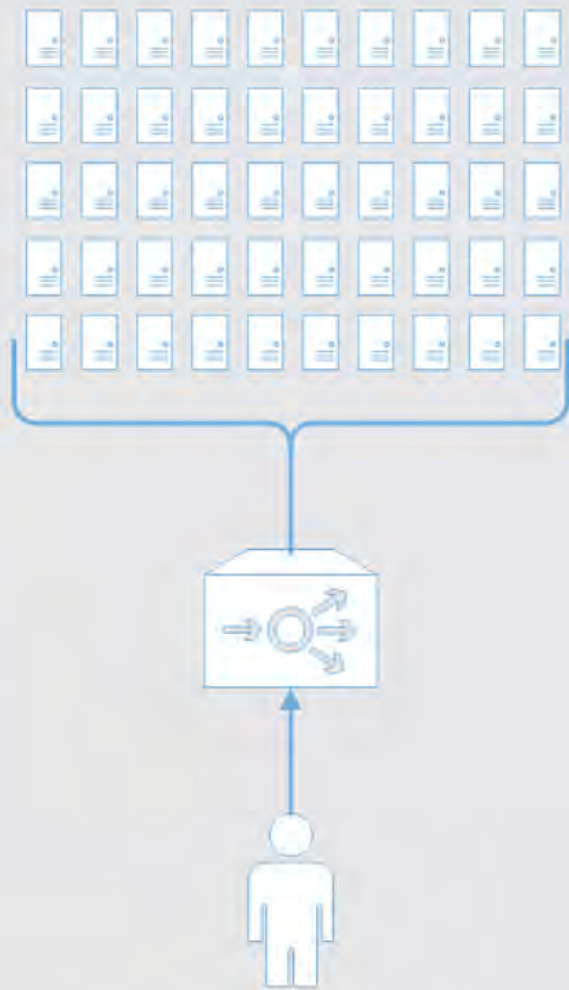
says caching is good.



After just a few requests, the on-premises Object Cache can be "ready for action."



In the cloud, the caching equation (for per-server memory-based caches like the Object Cache) works out a bit differently.



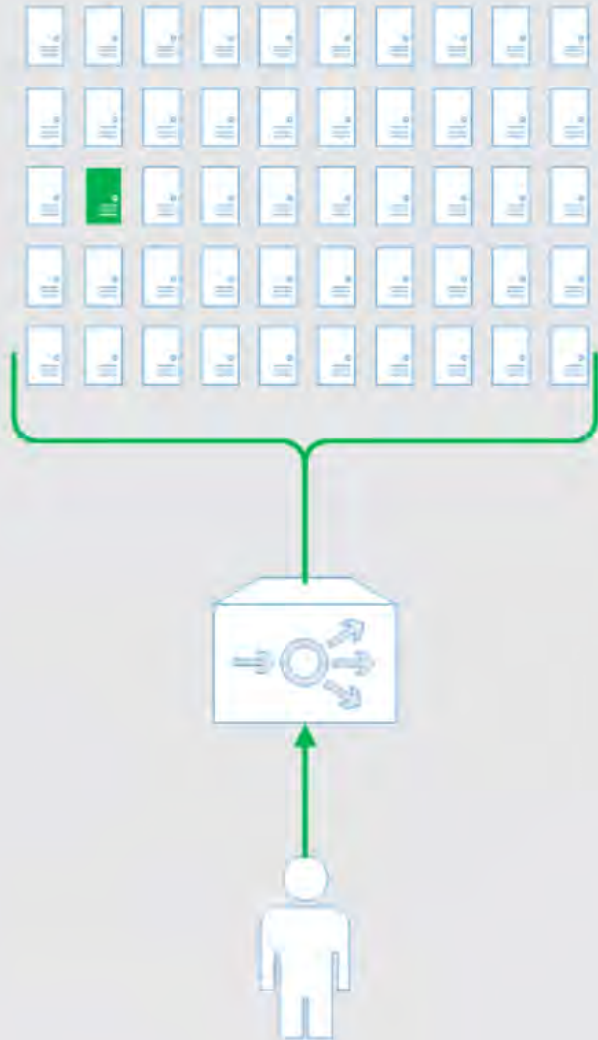
User's Initial Request

- First thing to note: the number of WFEs tends to be *much* higher in the cloud versus on-premises.

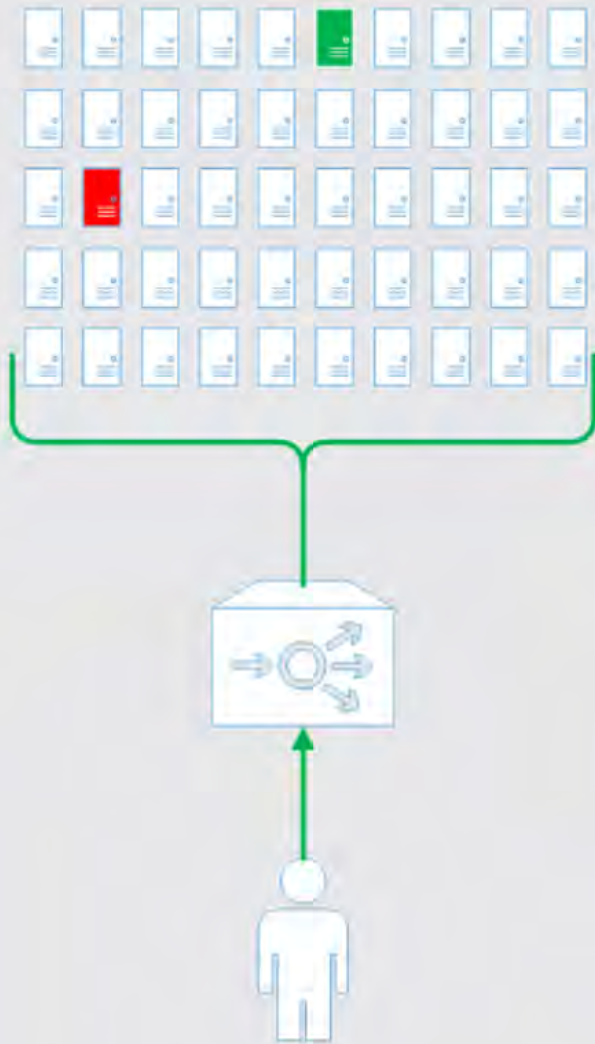


User's Second Request

User's Second Request

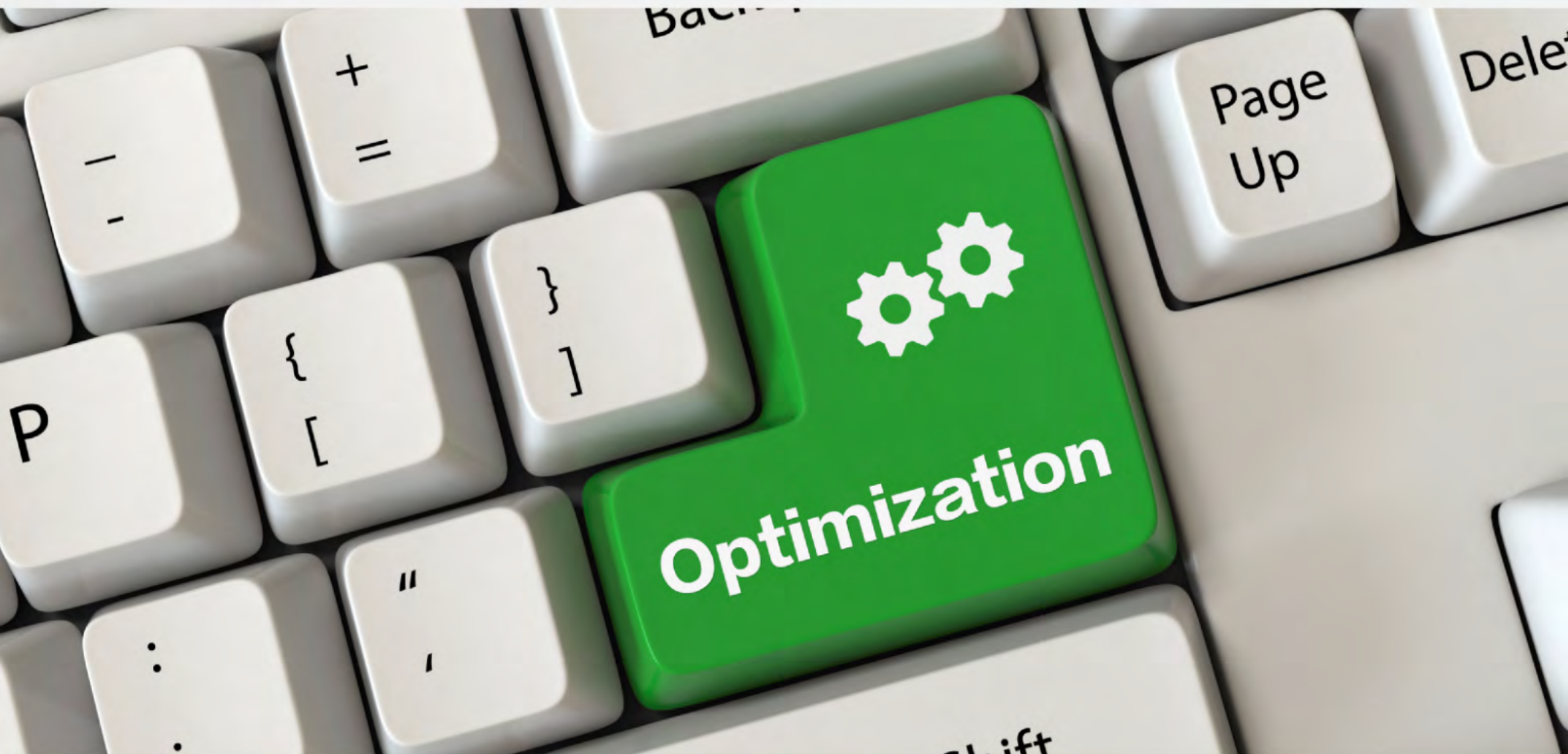


- No affinity is in use, so the chance of a user hitting the same server again is dramatically less than the on-premises scenario.



Subsequent Requests

- Same reduced chance of hitting the WFE last visited
- Memory pressure causes much more frequent cache ejections versus on-premises.



Two significant adjustments can be made.

* These sitemaps are then stored in the Object

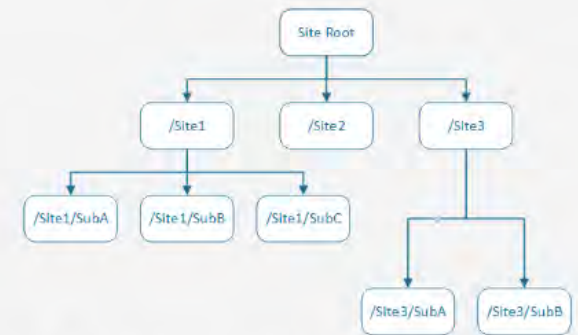
Navigation style
has a huge impact
on performance.

CHOOSE

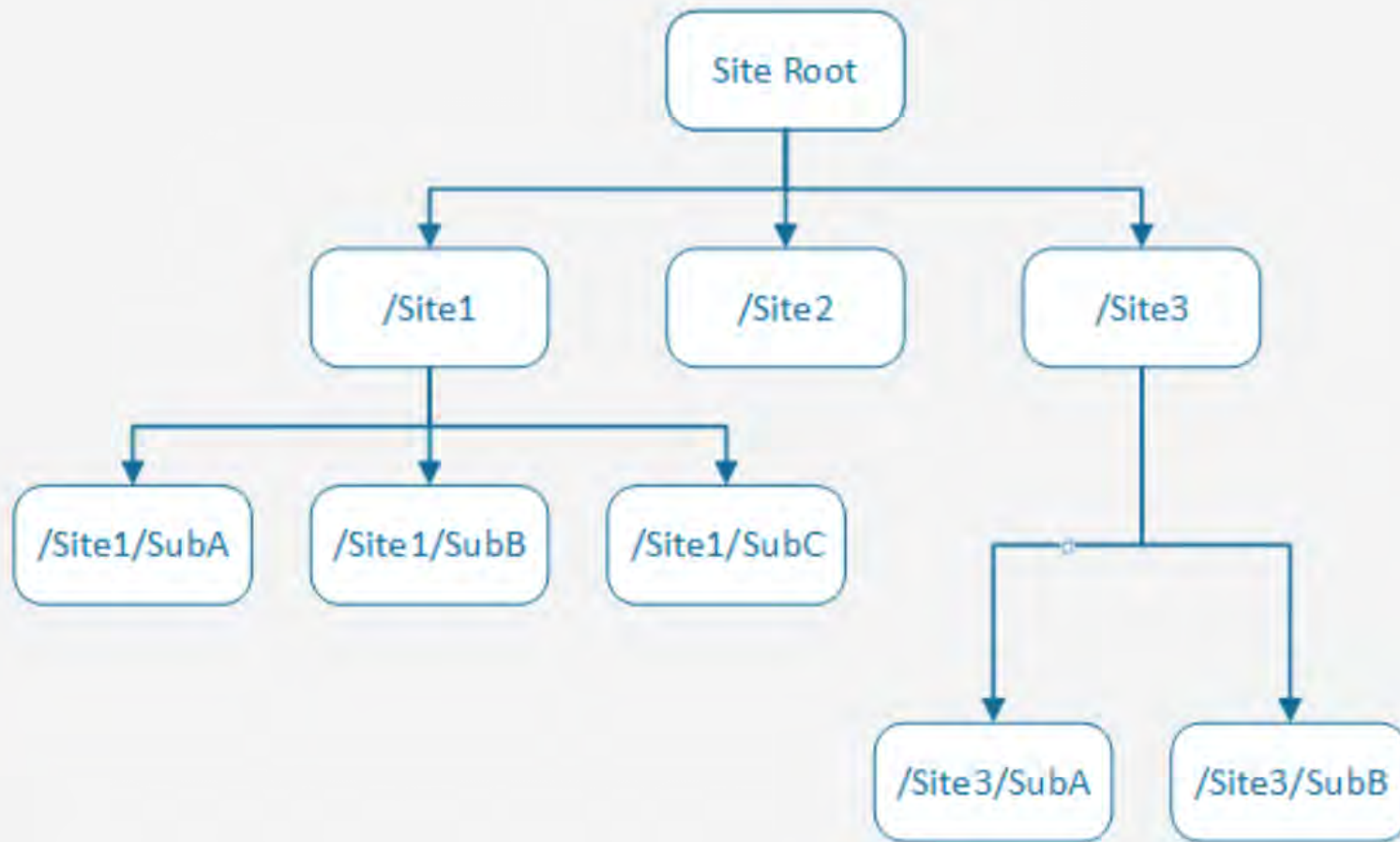
Using structural navigation is the default (but poor) choice for complex site hierarchies in the cloud.

- * building each site node generates roughly 8 SQL Server round trips
- * These sitemaps are then stored in the Object Cache on WFEs

Navigation style
has a huge impact
on performance.



8 site nodes/~64 SQL calls



8 site nodes/~64 SQL calls



Better Options for Navigation

- Managed Navigation (i.e., using a term set to drive navigational structures) can significantly improve page performance.
note: the SharePoint Server Publishing Infrastructure site collection Feature must be enabled to use Managed Navigation
- Search-driven navigation leverages SharePoint's Search index and the process of client-side navigational rendering to dramatically speed things up.
note: implementation is non-trivial and less customizable

Using structural navigation is the default (but poor) choice for complex site hierarchies in the cloud.

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Navigation style



As was pointed-out in the navigational scenario,
Search can be used to boost performance significantly.

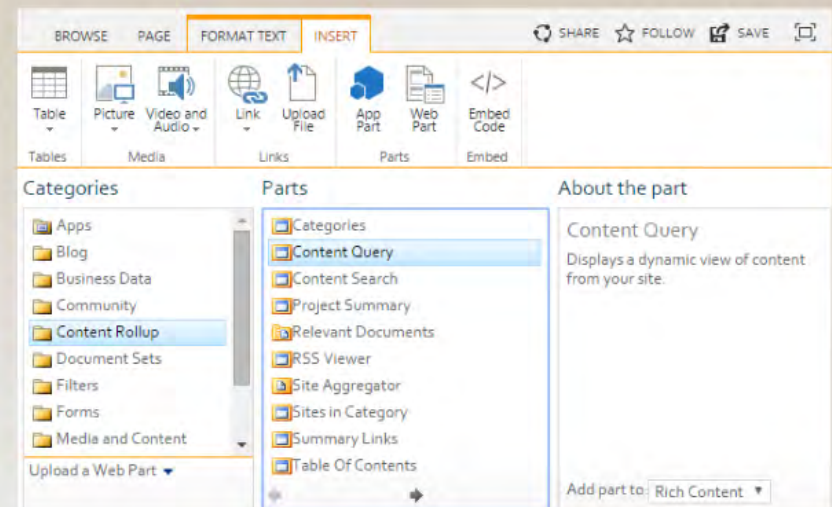


In the cloud, the CQWP can cause some signifi

ut in the navigational scenario,
ed to boost performance significantly.



Do you like the Content Query Web Part (CQWP)?

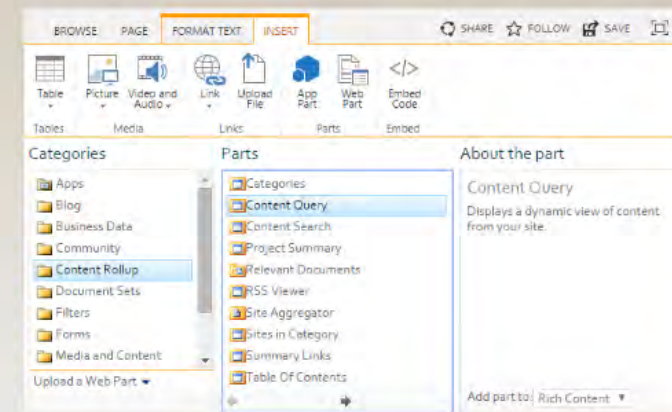


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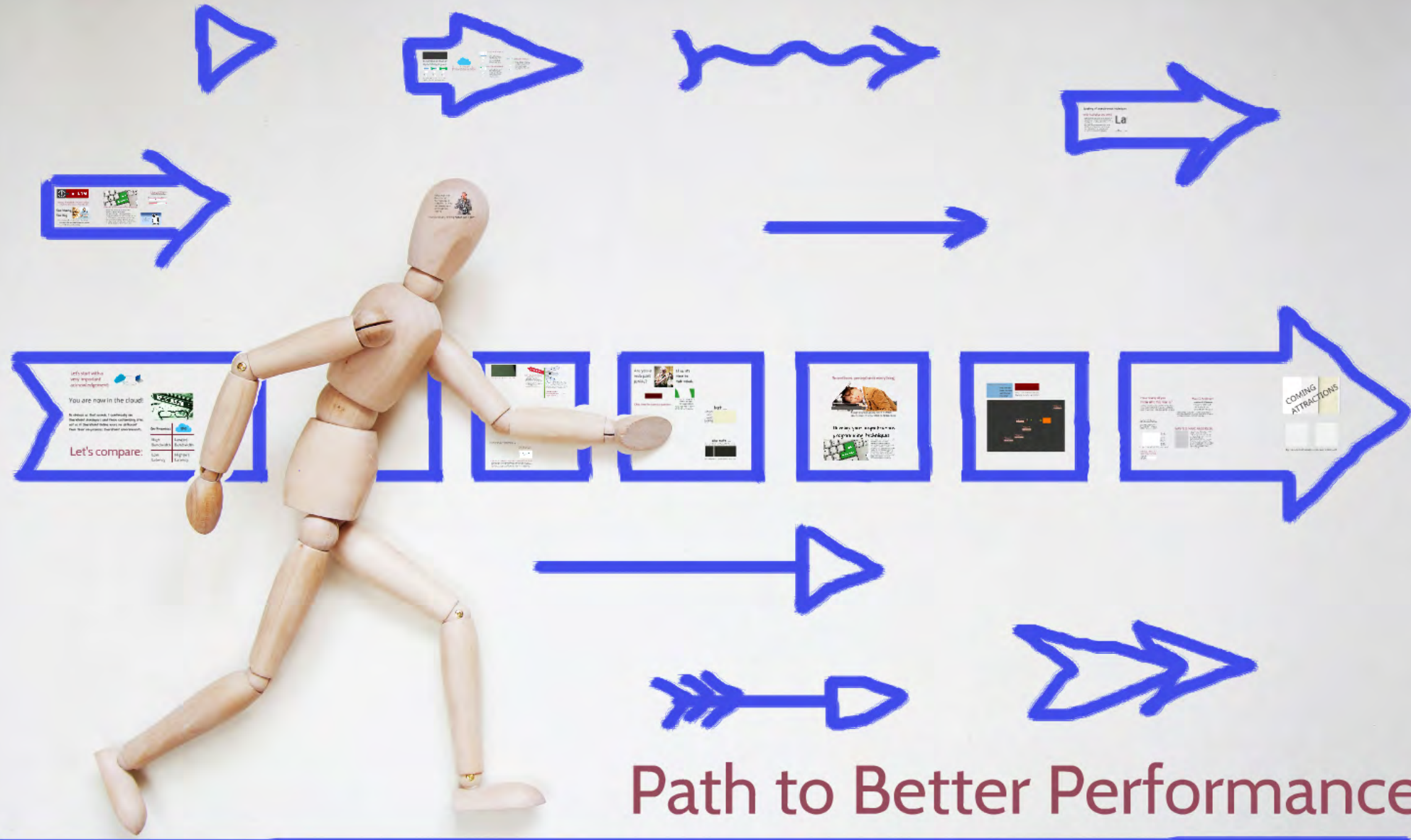


Do you like the Content
Query Web Part (CQWP)?



In the cloud, the CQWP can cause some significant performance hits.

- The CQWP performs expensive cross-list and cross-site queries at run-time.
- The CQWP relies on the Object Cache to store results for acceptable performance.
- The Content Search Web Part (CSWP) provides options that are similar to the CQWP (and in a number of ways, more powerful) and uses Search so it's FAST!

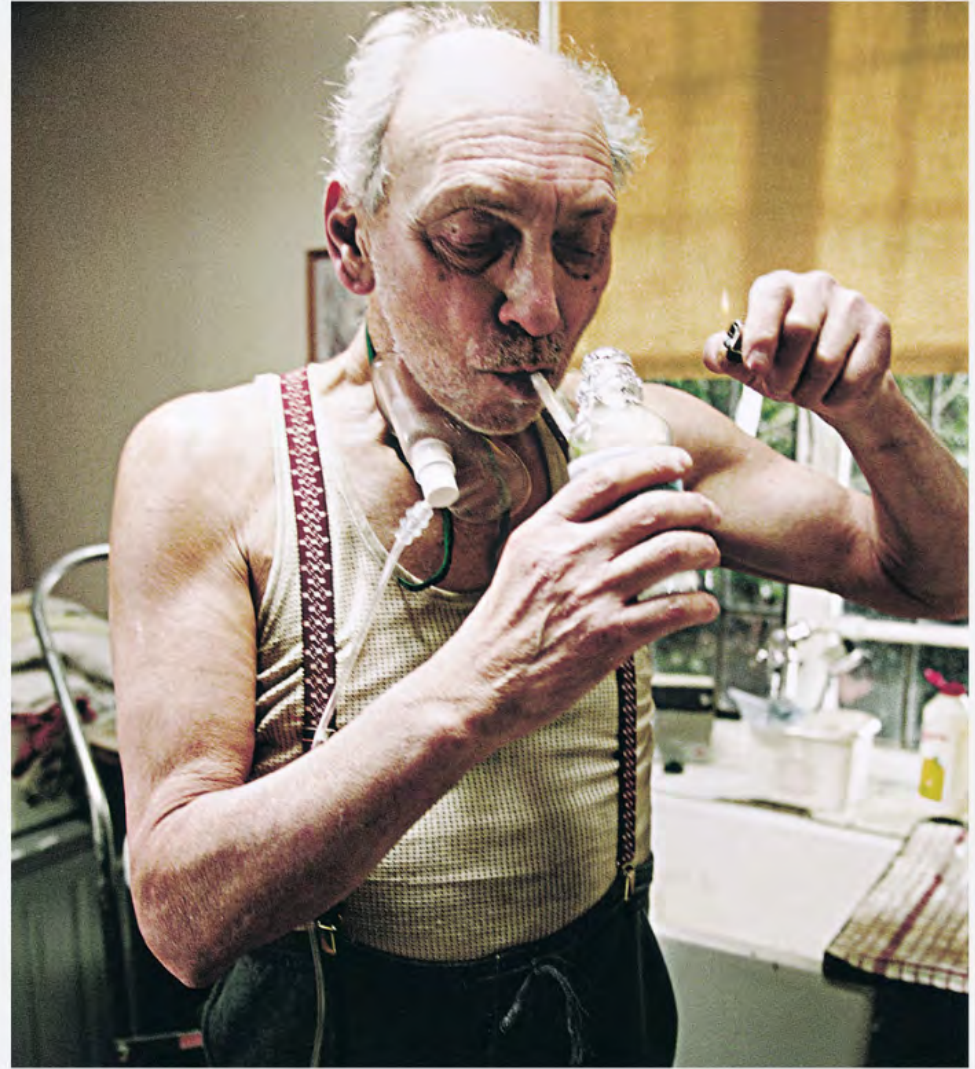


Path to Better Performance



Okay, time for a serious question ...

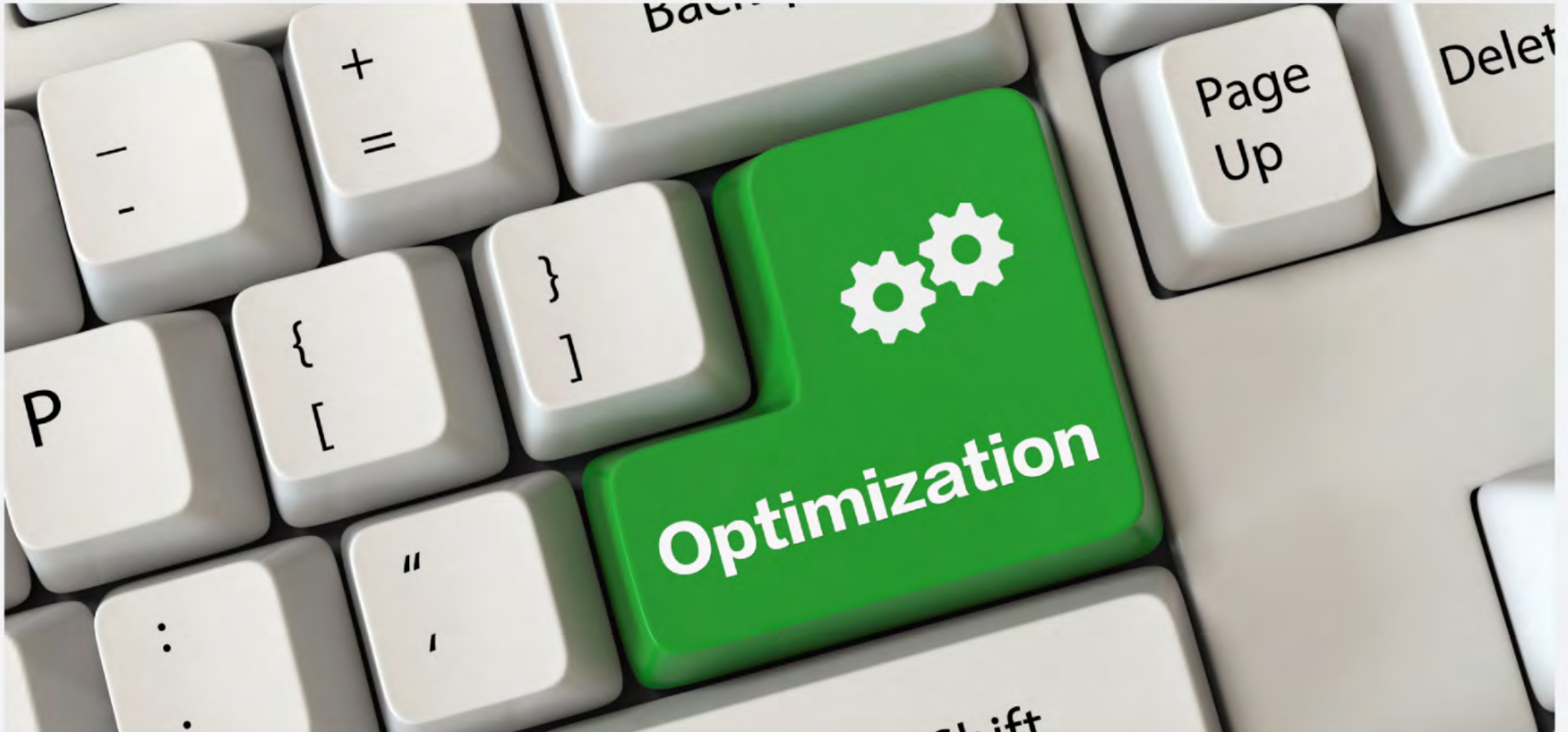
Are you a
web part
junkie?





If so, it's
time to
talk rehab.

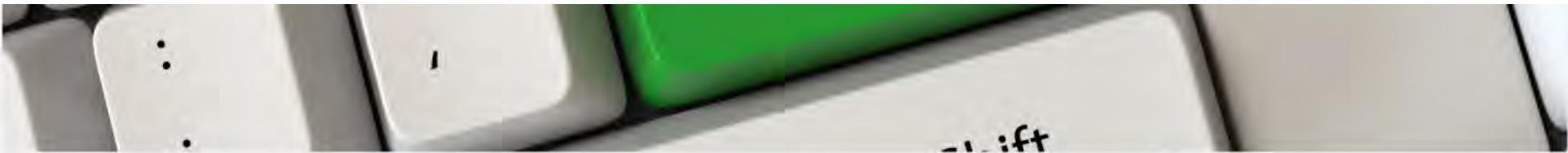




What's the alternative to freebasing web parts?



There's no single



What's the alternative to freebasing web parts?



**There's no single
(or simple) answer.**

Generally speaking, consider leveraging client-side code (JavaScript) and asynchronous techniques - both of which we'll discuss soon.

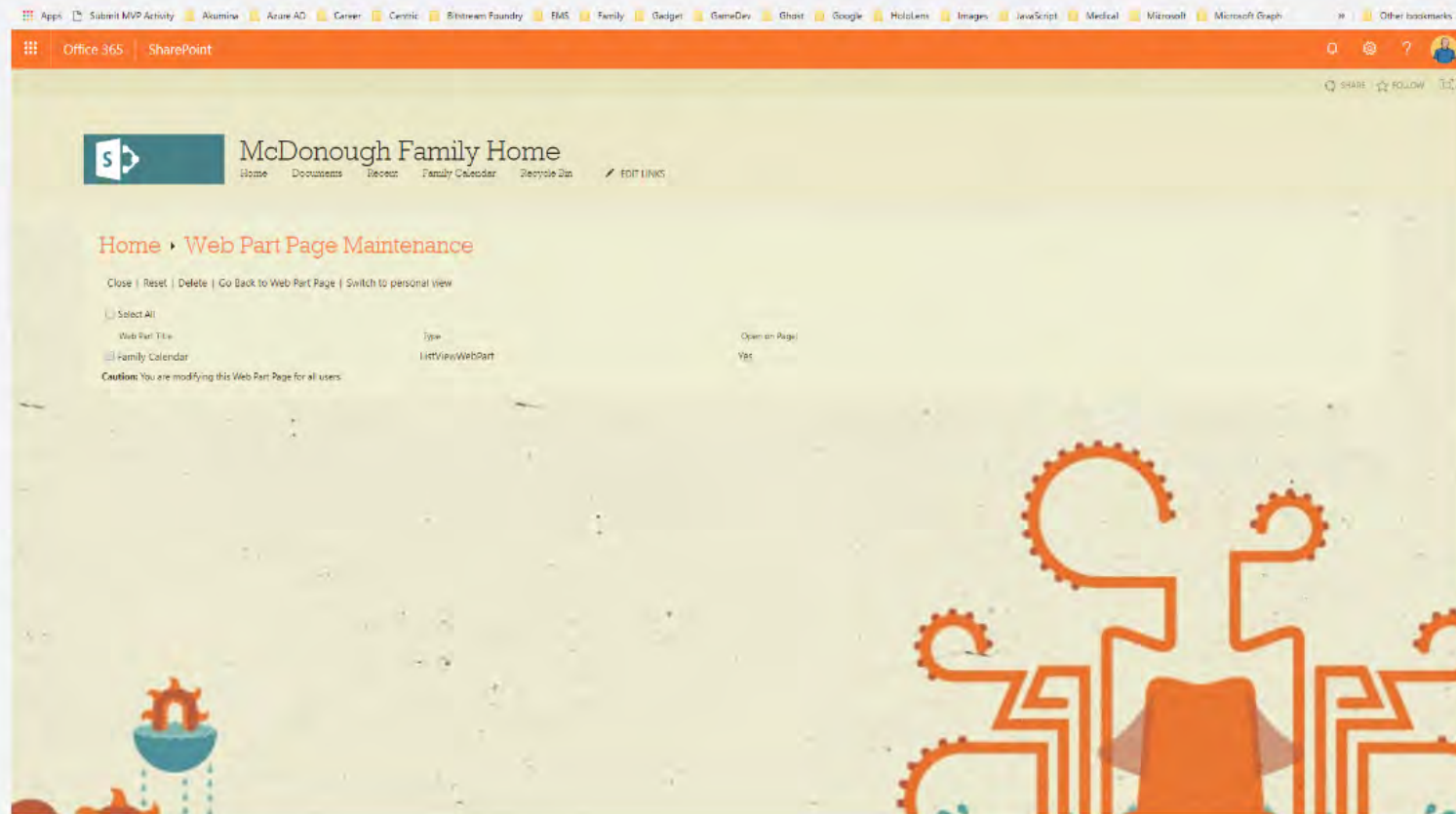
but ...

Be sure to put
problem pages

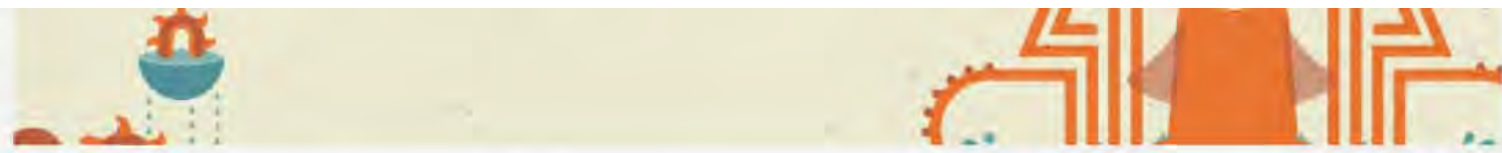


but ...

Be sure to put
problem pages
in web part
maintenance
view with
?contents=1
to find web parts
which are closed
but not deleted!



which are closed
but not deleted!



also note ...

When I say "web part," I'm talking about traditional (server-side) web parts. Everything is different, and all bets are off with SPFx/client-side web parts.

also note ...

When I say "web part," I'm talking about traditional (server-side) web parts. Everything is different, and all bets are off with SPFx/client-side web parts.

```
HELLOWORD-WEBPART
├── .vscode
├── config
├── dist
├── lib
├── node_modules
├── src
├── temp
├── .editorconfig
├── .gitignore
├── .yo-rc.json
├── gulpfile.js
├── package-lock.json
├── package.json
├── README.md
├── tsconfig.json
└── tslint.json
```

```
yo @microsoft/sharepoint

Welcome to the
SharePoint Client-side
Solution Generator

Let's create a new SharePoint solution.
? What is your solution name? helloworld-webpart
? Which baseline packages do you want to target for your component(s)? SharePoint Online only (latest)
? Where do you want to place the files? Use the current folder
? Do you want to allow the tenant admin the choice of being able to deploy the solution to all sites immediately
ny feature deployment or adding apps in sites? No
? Which type of client-side component to create? WebPart
? What is your Web part name? HelloWorld
? What is your Web part description? HelloWorld description
? Which framework would you like to use? (Use arrow keys)
> No JavaScript framework
  React
  Knockout
```

And a friendly reminder: use a CDN with those SPFx web parts!

also note ...

When I say "web part," I'm talking about traditional (server-side) web parts. Everything is different, and all bets are off with SPFx/client-side web parts.

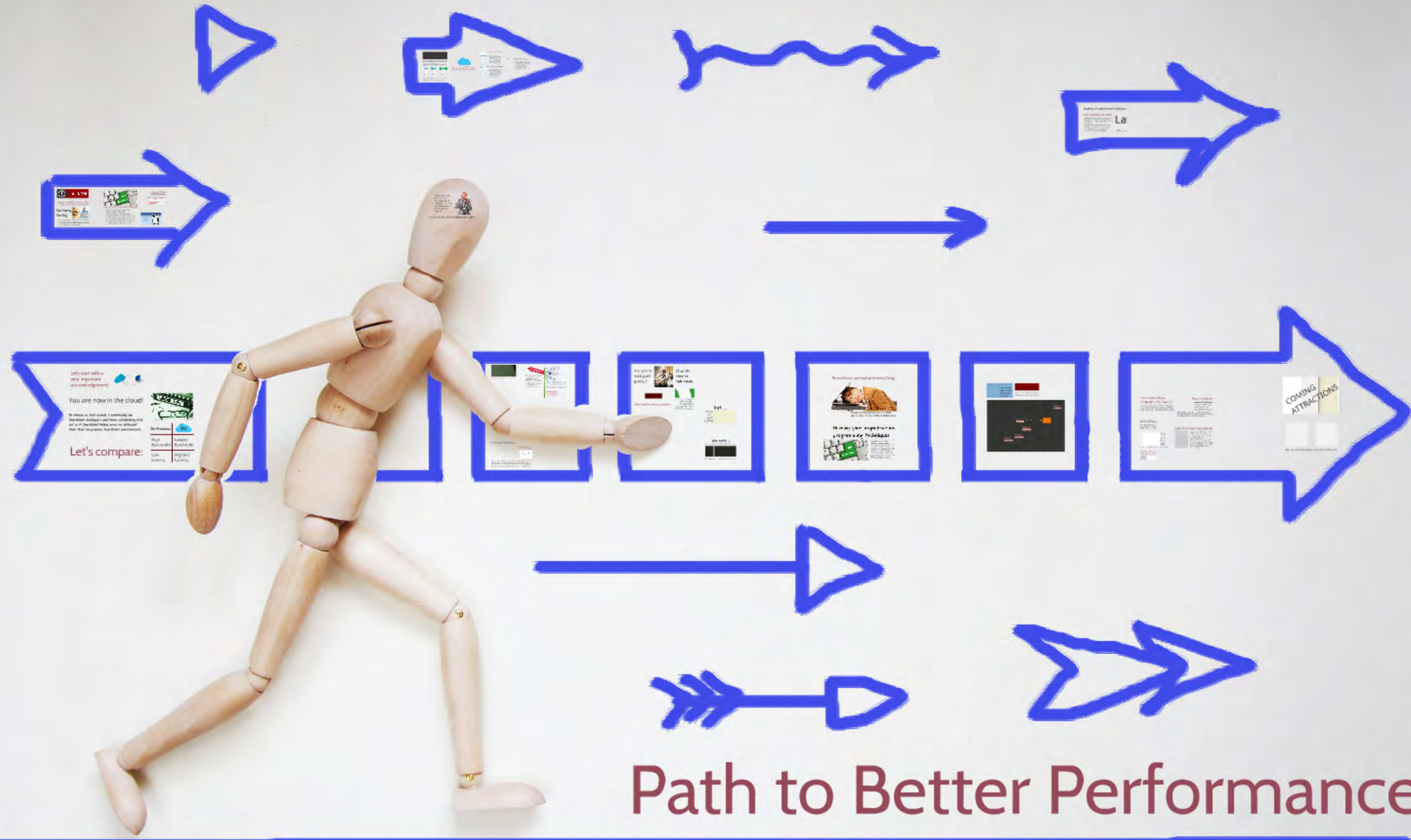
```
HELLOWORD-WEBPART
├── .vscode
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├── src
├── temp
├── .editorconfig
├── .gitignore
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├── gulpfile.js
├── package-lock.json
├── package.json
├── README.md
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```
yo @microsoft/sharepoint

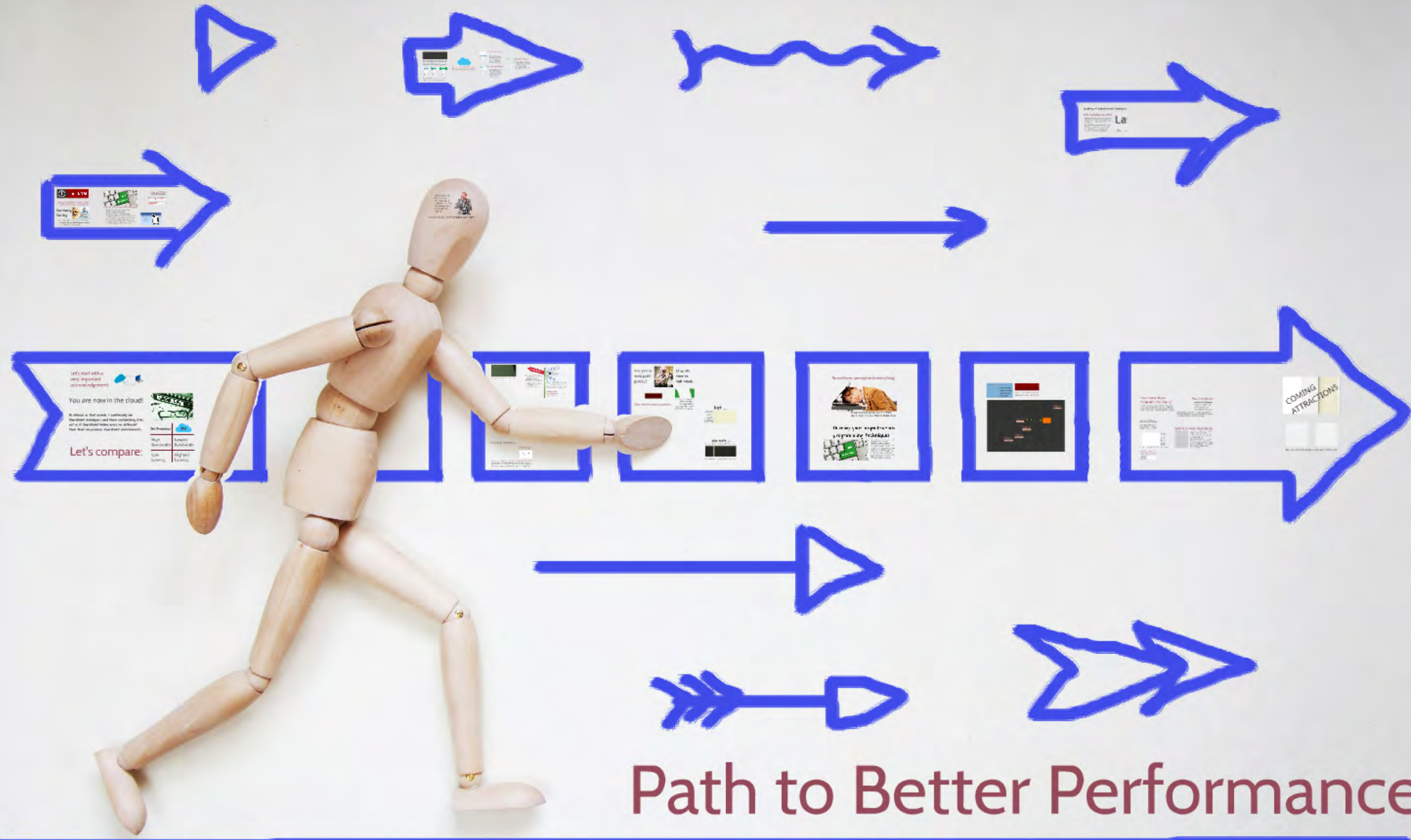
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SharePoint Client-side
Solution Generator

Let's create a new SharePoint solution.
? What is your solution name? helloworld-webpart
? Which baseline packages do you want to target for your component(s)? SharePoint Online only (latest)
? Where do you want to place the files? Use the current folder
? Do you want to allow the tenant admin the choice of being able to deploy the solution to all sites immediately by feature deployment or adding apps in sites? No
? Which type of client-side component to create? WebPart
? What is your Web part name? HelloWorld
? What is your Web part description? HelloWorld description
? Which framework would you like to use? (Use arrow keys)
> No JavaScript framework
  React
  Knockout
```

And a friendly reminder: use a CDN with those SPFx web parts!



Path to Better Performance



Path to Better Performance

COMING
ATTRACTORS

Sometimes, perception is everything.



ALARM

A page may load quickly, but if it FEELS slow to users, it is the SAME AS BEING SLOW.

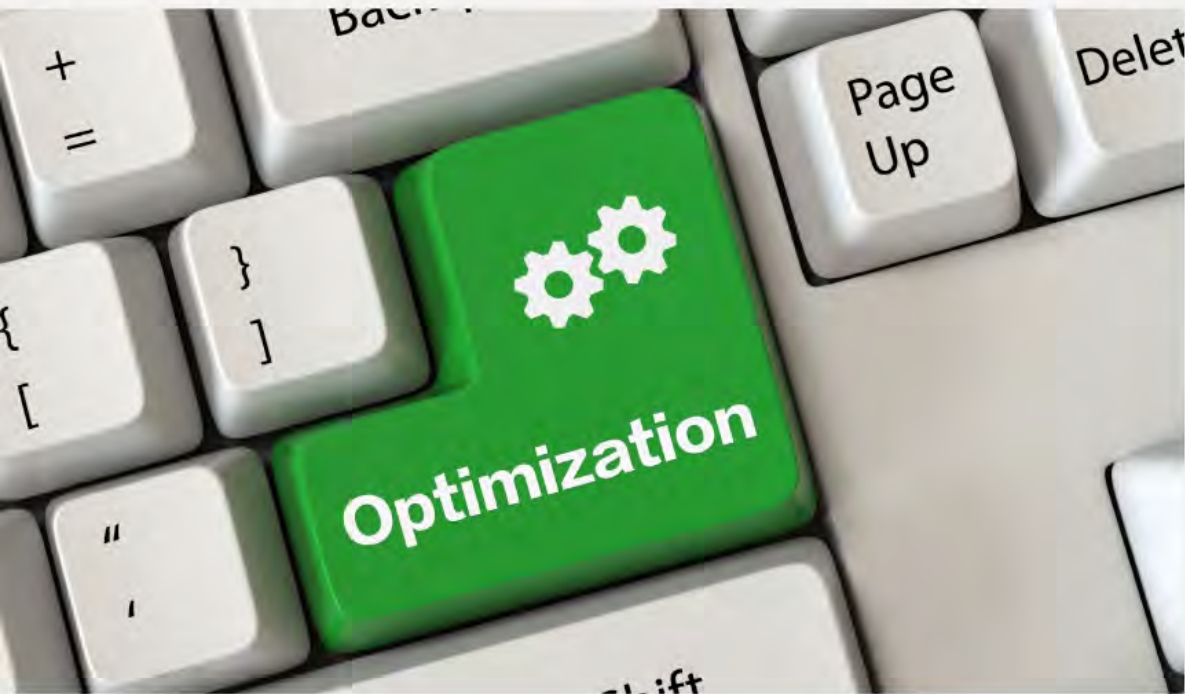
Sometimes, perception is everything.



ALARM

A page may load quickly, but if it **FEELS** slow to users, it is the **SAME AS BEING SLOW.**

Develop your asynchronous programming techniques



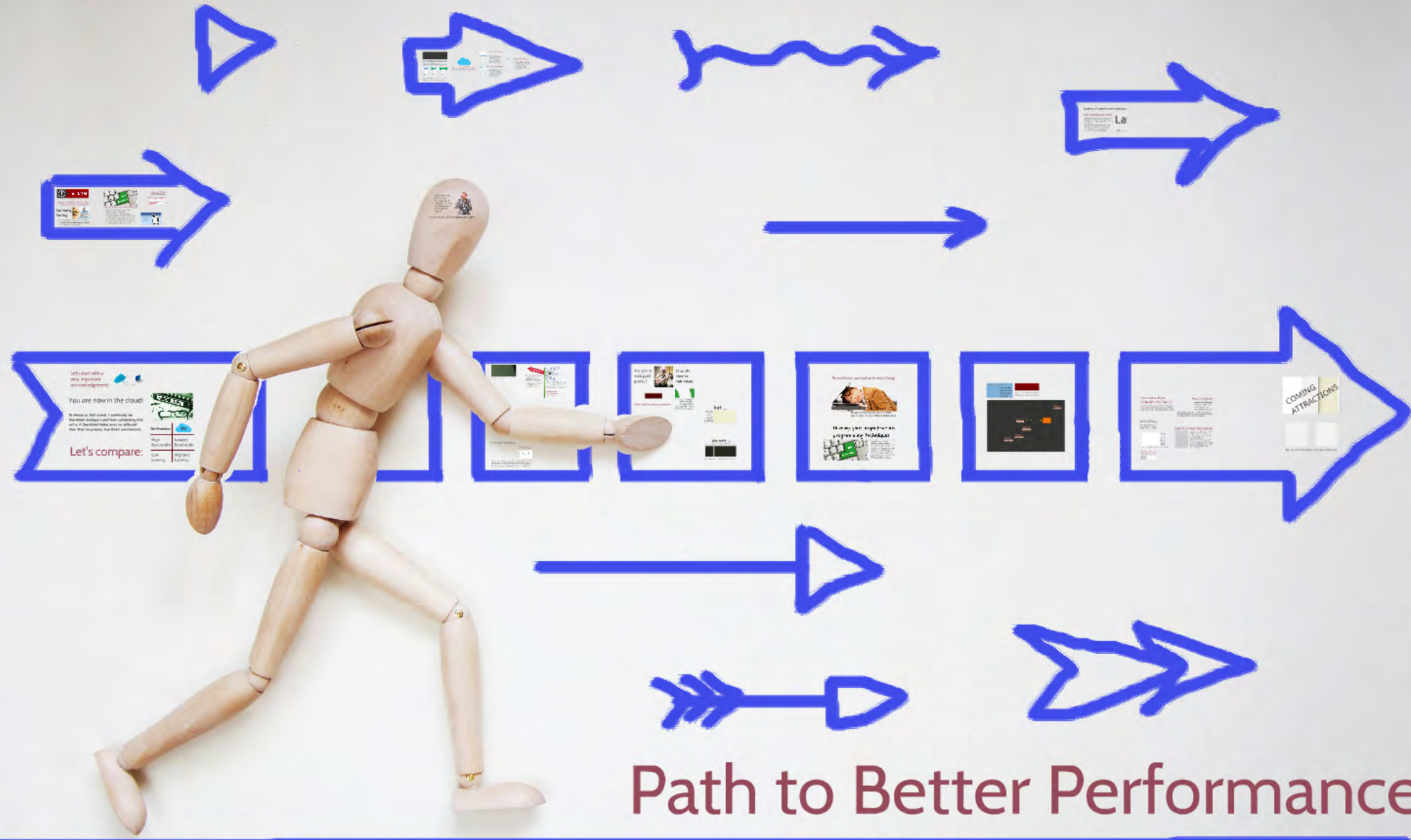
- You can't block a browser's main thread of execution, so leveraging async development patterns is essential.
- Async programming is made much easier in jQuery using promises. Promises approximate a synchronous programming model under asynchronous conditions.
- Certain web parts (e.g., the CSWP) also allow you to set their (a)sync behavior.
- Good use of async techniques make pages **appear** to load faster ... and as we discussed, perception is everything.

Speaking of asynchronous techniques:

Only load what you need.

- Instead of fetching everything at once within the context of the initial page load, retrieve the page with only the payload that's needed immediately.
- (Lazy) load images and other items "below the fold" only if users start scrolling down and will see them (e.g., Facebook and LinkedIn's "forever-scrolling" pages).





Path to Better Performance

Ask yourself this question:



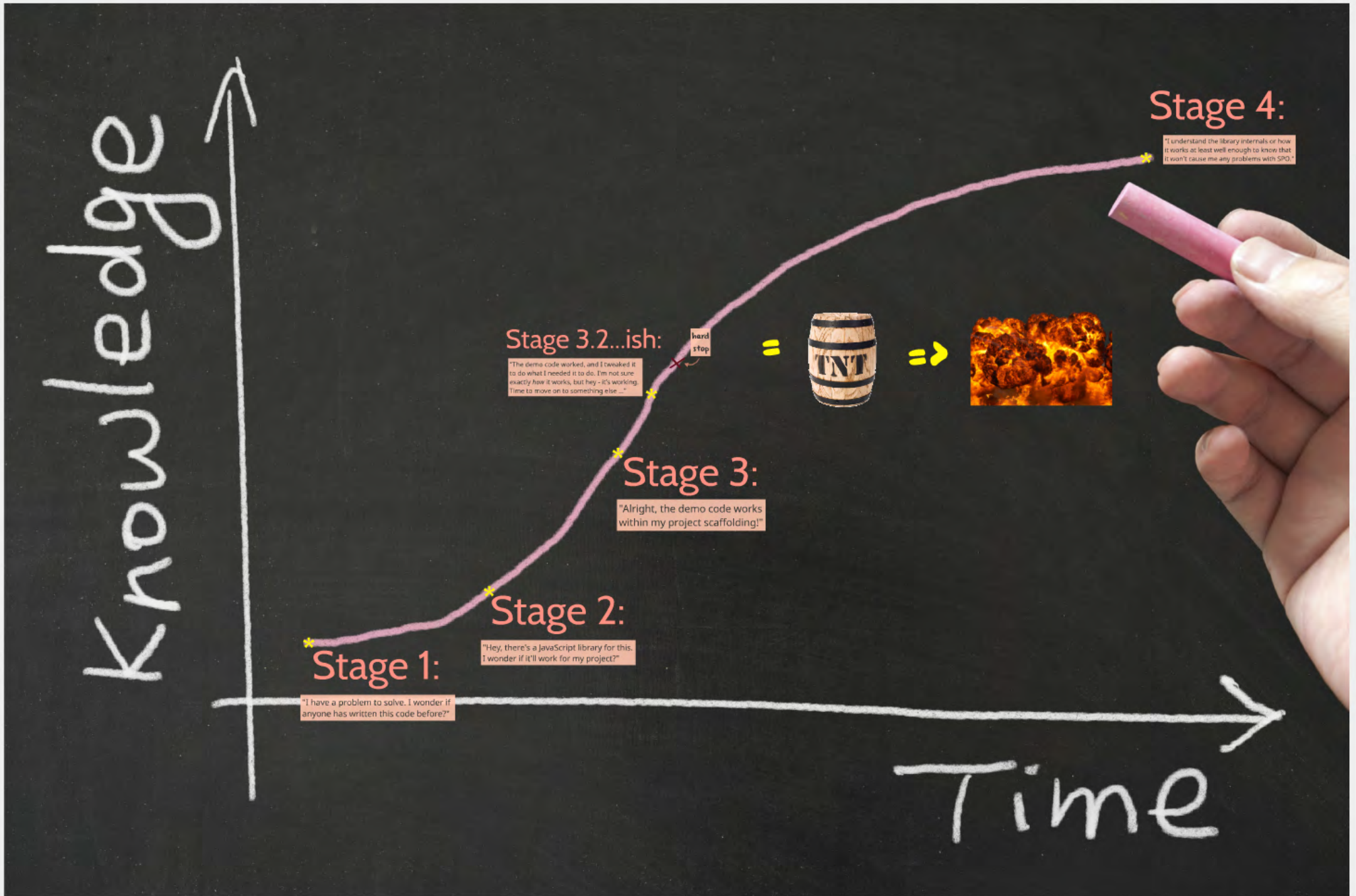
How well do I
know the code
and libraries
I'm using?



Reason I ask: when troubleshooting performance issues, I commonly encounter a pattern that can be illustrated with the following diagram of stages:

I'm using?

be illustrated with the following diagram of stages:



"Alright,
within m



*
Stage 1:

"I have a problem to solve. I wonder if anyone has written this code before?"

*
Stage 2:

"Hey, there's a JavaScript library for this. I wonder if it'll work for my project?"



Stage 3:

"Alright, the demo code works within my project scaffolding!"

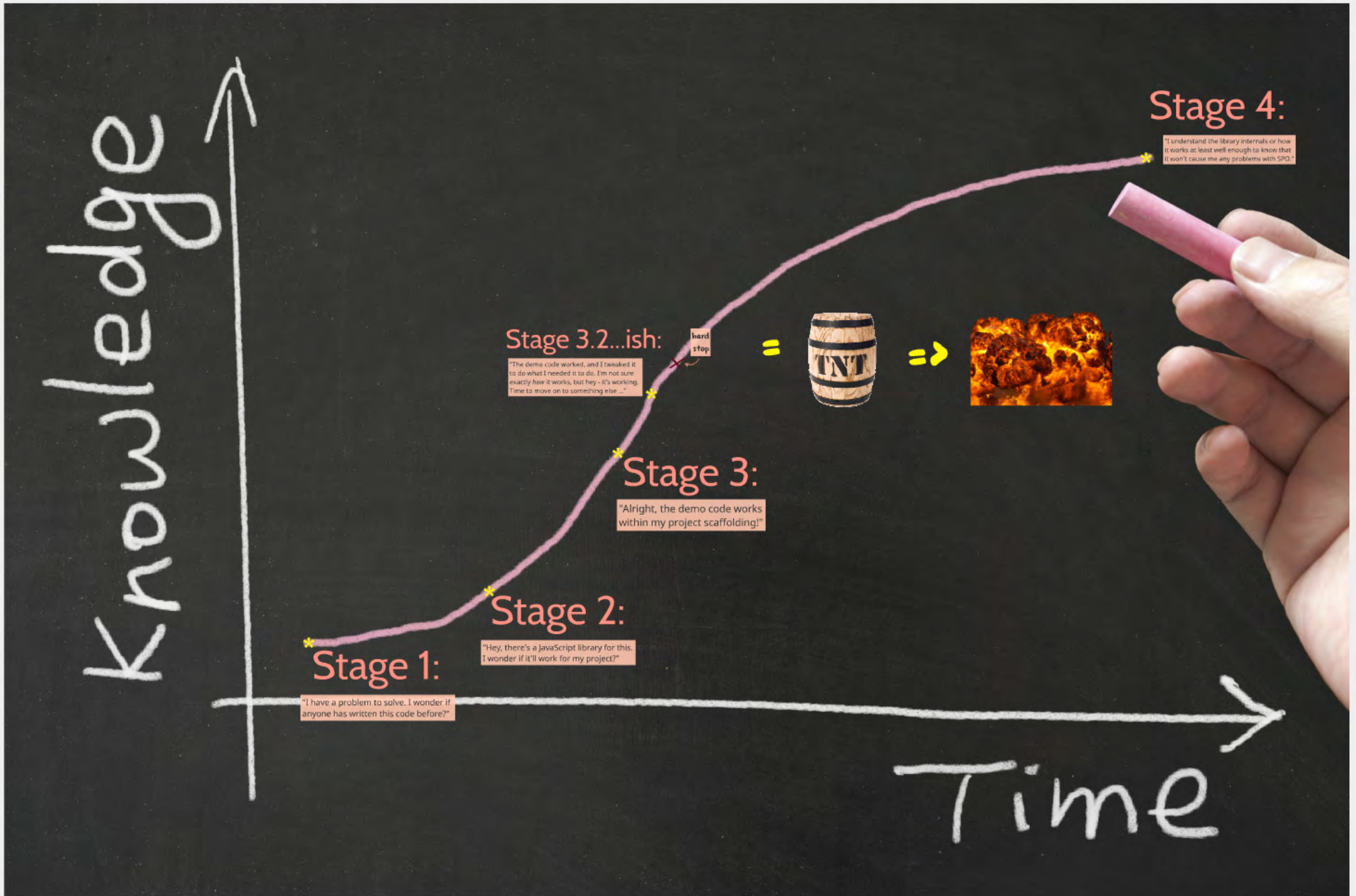
Stage 4:

"I understand the library internals or how it works at least well enough to know that it won't cause me any problems with SPO."



I'm using?

be illustrated with the following diagram of stages:



Stage 3.2...ish:

"The demo code worked, and I tweaked it to do what I needed it to do. I'm not sure exactly *how* it works, but hey - it's working. Time to move on to something else ..."

hard
stop

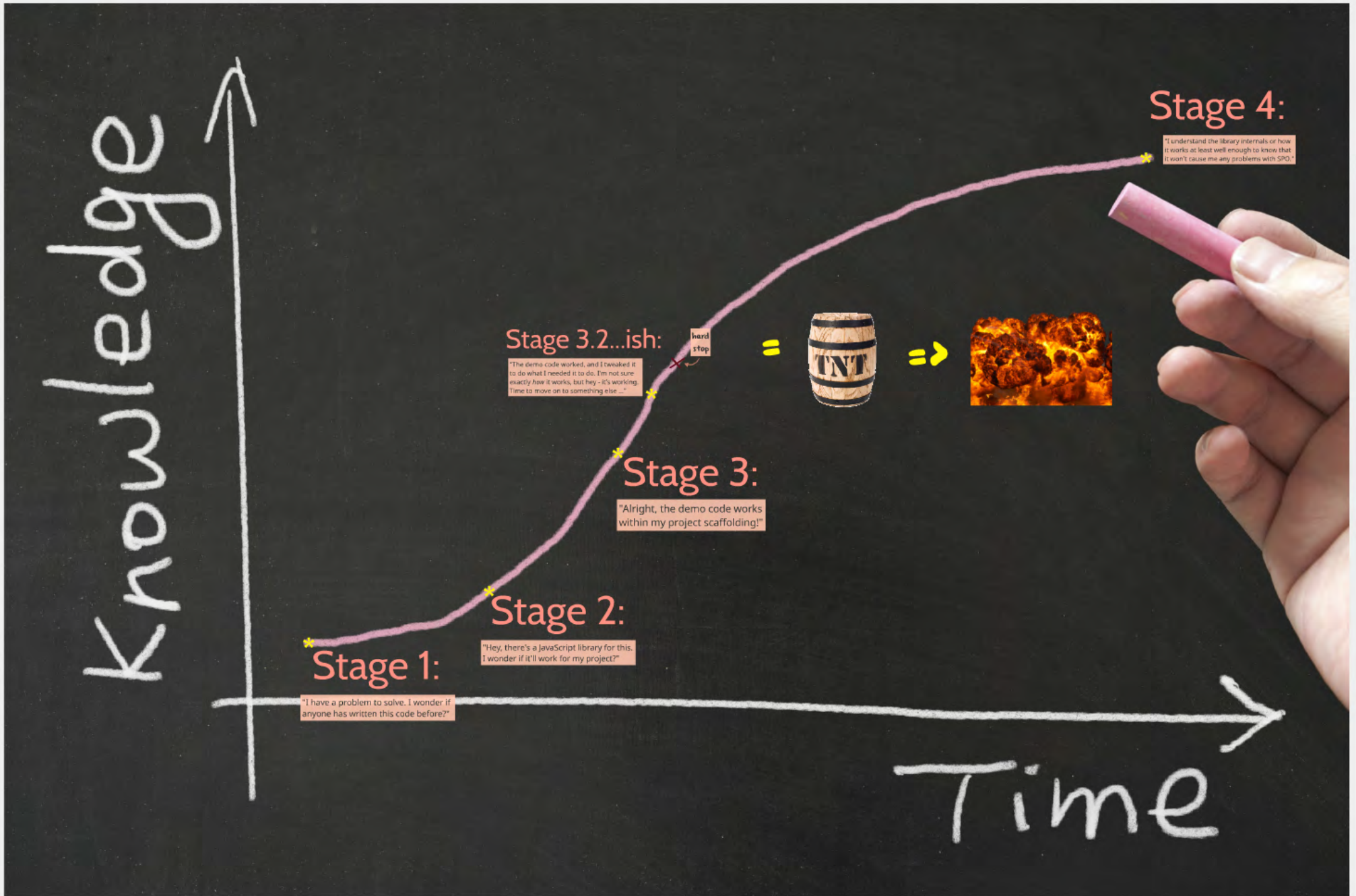


Stage 3:

What is the next stage?

I'm using?

be illustrated with the following diagram of stages:



example

How many of you



example

How many of you know who this man is?

Chances are at least one or two of you have used code that he has created to get things done in your client-side development projects ...



Before CSOM/JSOM and REST
Marc's library simplified access
for developers everywhere. It



Marc D. Anderson

- **creator of SPServices**
- master of client-side development and associated techniques

Before CSOM/JSOM and REST APIs - and before WCF SVC endpoints - Marc's library simplified access to the older ASMX web service endpoints for developers everywhere. It's still used heavily today.

So, getting back to "know your code/libraries" and how they work ...

As Marc will tell you, SPServices works just

So, getting back to "know your code/libraries" and how they work ...

As Marc will tell you, SPServices works just fine with SharePoint Online. But even Marc will tell you that you probably shouldn't use all of SPServices' methods when accessing SPO.

```
1 //Pre-populate all "Contact" fields with current user
2 var thisUserName = $().SPServices.SPGetCurrentUser({
3     fieldName: "Title",
4     debug: false
5 });
6 $().SPServices.SPFindPeoplePicker({
7     peoplePickerDisplayName: "Contact",
8     valueToSet: thisUserName,
9     checkNames: true
10 });
11 $().SPServices.SPFindPeoplePicker({
12     peoplePickerDisplayName: "Author/Contact",
13     valueToSet: thisUserName,
14     checkNames: true
15 });
16 $().SPServices.SPFindPeoplePicker({
17     peoplePickerDisplayName: "Organizer/Contact",
18     valueToSet: thisUserName,
19     checkNames: true
20 });
```

Consider
this code.

It works just
fine and does
exactly what
the comment
indicates.

**But it has a
big problem.**

Anyone ever used the SPServices.SPGetCurrentUser() method

```
1 //Pre-populate all "Contact" fields with current user
2 var thisUserName = $().SPServices.SPGetCurrentUser({
3     fieldName: "Title",
4     debug: false
5 });
6 $().SPServices.SPFindPeoplePicker({
7     peoplePickerDisplayName: "Contact",
8     valueToSet: thisUserName,
9     checkNames: true
10 });
11 $().SPServices.SPFindPeoplePicker({
12     peoplePickerDisplayName: "Author/Contact",
13     valueToSet: thisUserName,
14     checkNames: true
15 });
16 $().SPServices.SPFindPeoplePicker({
17     peoplePickerDisplayName: "Organizer/Contact",
18     valueToSet: thisUserName,
19     checkNames: true
20 });
```

Consider
this code.

It works just
fine and does
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the comment
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**But it has a
big problem.**

Has anyone ever used the SPServices.SPGetCurrentUser() method?

Switching over to REST-based calls

WANTED: MARC ANDERSON



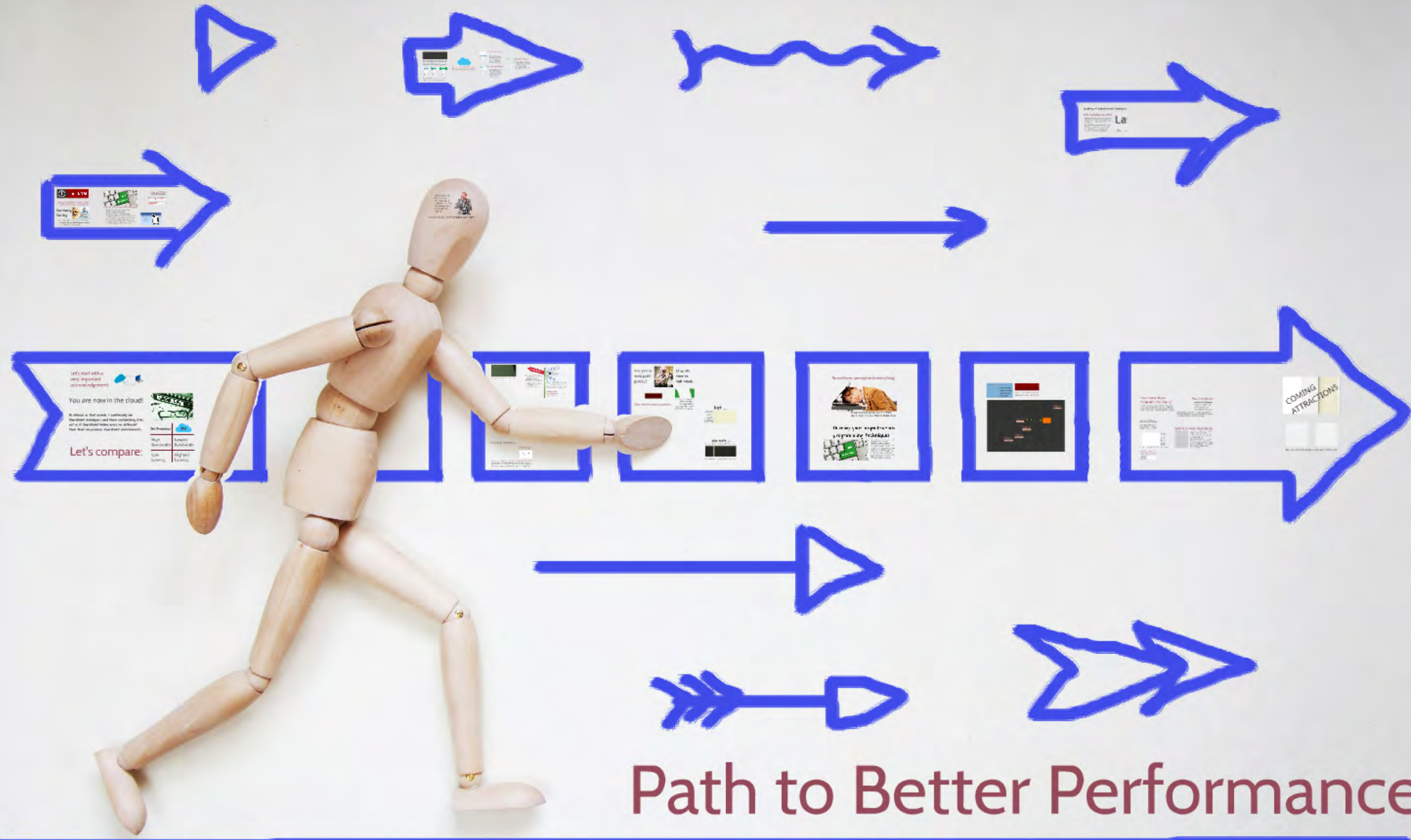
- Under the hood, SPGetCurrentUser() is generating an additional call to `/_layouts/userdisp.aspx` to “scrape” the contents of the page that is returned.
- If you (innocently) use SPGetCurrentUser() in your JavaScript files (especially multiple times in the context of a single page), you're creating all sorts of additional load on SPO and delaying the final results of your executing scripts.

Switching over to REST-based calls to get current user information can dramatically reduce execution time.

We had a script where `SPGetCurrentUser()` was being called several times. The results from swapping-in REST-based calls for the `SPGetCurrentUser()` calls:

I also performed some basic tests to capture the speed differences. I performed each test 10 times and here are the results:

- * Without the fix or browser caching - avg. 14.47 seconds
- * With the fix without browser caching - avg. 7.17 seconds
- * With the fix and browser caching - avg. 5.84 seconds



Path to Better Performance



McDonough Family Home

Home Documents Recent Family Calendar Recycle Bin

Home

Family Calendar

August 2018

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
29	30	31	1	2	3	4
	9:00 am Ariel's last...	7:30 am Curry Electric (Chuck)	4:00 pm - 10:00 pm	9:30 pm D		
	11:30 am Ariel's dentist	9:00 am Hyundai getting oil c	Ariel working	7:30 pm T		
		12:00 pm Sean's appointment				
		- 1 more item				
5	6	7	8	9	10	11
	Sean's horizon Global (Plymouth, MI)		Wake "Day" (20	1:15 pm		
4:00 pm - 10:00 pm	9:00 am Ariel working	9:00 am Ariel	12:00 pm Ariel's own appt w	6:00 pm A		
Ariel working	10:30 am Tracy getting 1st kn	9:00 am Hyundai h	5:00 pm Ariel worki	6:00 pm Meet new Wilson Pri		
		- 1 more item				
12	13	14	15	16	17	18
5:00 pm - 10:00 pm	9:00 am - 3:00 pm	9:00 am Ariel working	9:00 am Ariel working	11:00 am Art lesson w/Dana	9:00 am Ariel working	
Ariel working	Ariel working	3:30 pm Sabrina & Megan's	4:00 pm Sean back in court	6:30 pm Dinner w/Campbells	9:50 am Tracy getting 3rd kne	
		6:00 pm Tracy speaki				
		- 1 more item				
19	20	21	22	23	24	25
3:00 pm Call with Jim						SPTechCon (confirmed) (B
5:00 pm Ariel working	Rachel with kids	9:00 am Tracy on campus (Col	Rachel with kids	Rachel with kids	8:00 am Turpin Senior Schedu	10:00 am Ariel working
	Tracy on campus (Col	10:00 am Ariel working	9:00 am Tracy on campus (Col	Copy: Weekly "The Linker" Pro	9:00 am Tracy meeting with in	2:00 pm Sabrina at Megan
	- 1 more item		- 1 more item	- 2 more items	- 1 more item	
26	27	28	29	30	31	1
						SPTechCon (confirmed) (Boston, MA)
					9:00 am - 2:00 pm	11:00 am - 12:00 pm

Page diagnostics for SharePoint

About

CorrelationId: 4505889e-e08f-6000-387b-395bcc7b5bff
SPRequestDuration: N/A
SPIISLatency: N/A
Page load time: 984ms
Url: https://mcdonoughfamilyonline.sharepoint.com/SitePages/Home.aspx

Stop

Diagnostic Network trace

- Check Running as Standard User
- Check Requests To SharePoint
- Check using CDN
- Check for Large Image Sizes

COMING ATTRACTIONS

Page diagnostics for SharePoint

About

CorrelationId: 4505889e-e08f-6000-387b-395bcc7b5bff
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Page diagnostics for SharePoint

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CorrelationId: 4505889e-e08f-6000-387b-395bcc7b5bff
SPRequestDuration: N/A
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Url: https://mcdonoughfamilyonline.sharepoint.com/SitePages/Home.aspx

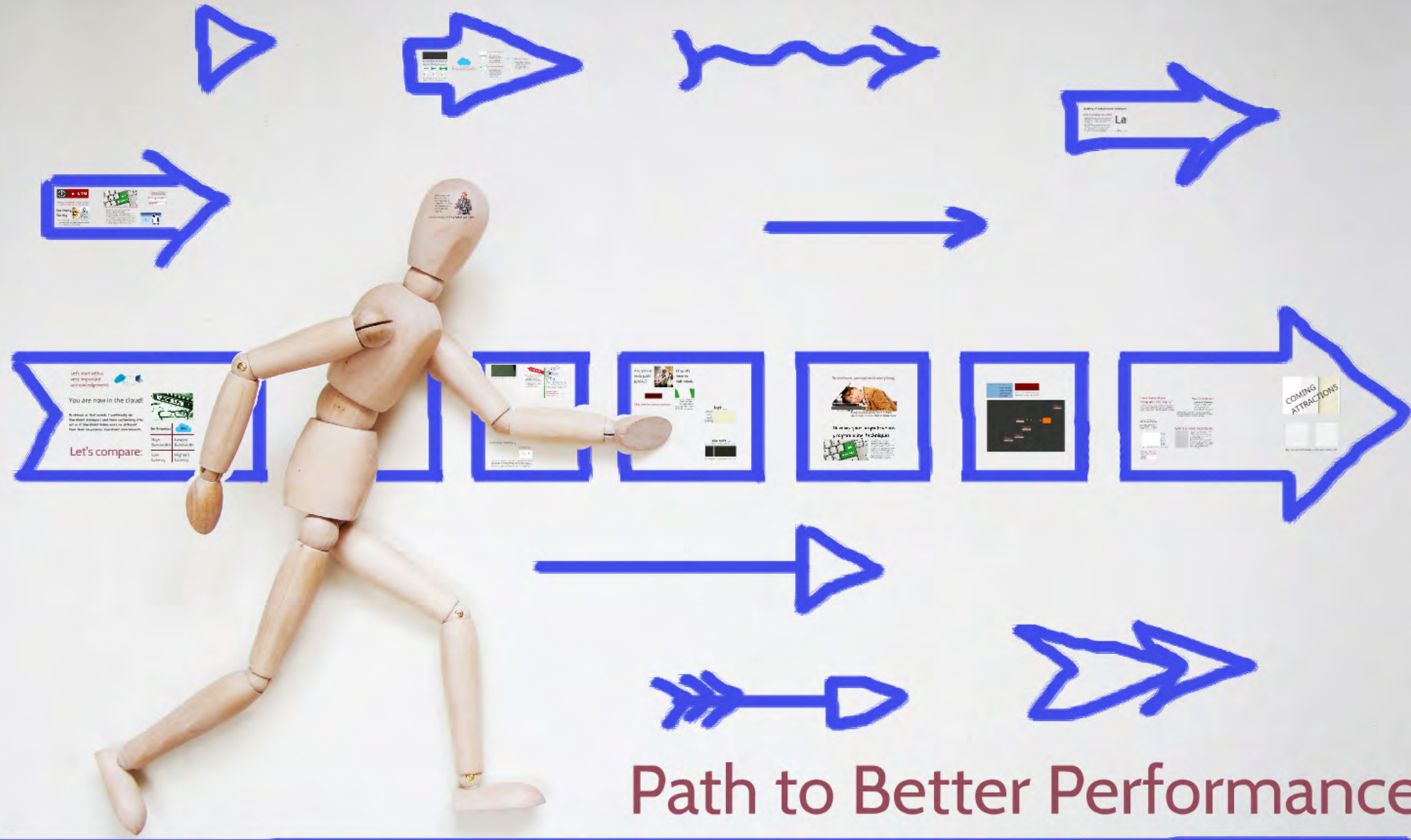
Stop

Diagnostic Network trace

Export to JSON

- .../WsaUpload.ashx 77.50ms
- .../Home.aspx 984.00ms
- .../ 31.30ms
- .../oslo.css 5.50ms

Big thanks to Scott Stewart and his team at Microsoft!



Path to Better Performance

The Quick Summary



- Don't treat SPO like your on-premises SharePoint farm. The two operate differently.
- Server-based caching isn't your friend (generally speaking) in SPO.
- Your browser can be your best friend when trying to troubleshoot SPO performance issues.
- Know the code you implement - or at least profile it before release.

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Thank you



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