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HOSTING SINGLE PAGE APPS IN AZURE



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#globalazure





Hosting single page apps in Azure

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01 - Hosting options in Azure PaaS

02 - Common pitfalls

03 - SPA == static resources + rewrites + custom headers

04 - Securing application secrets

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Hosting options (ARM)

- App Services
 - Windows (IIS): contains URL rewrite module out-of-the-box
 - Linux: supports also running a Docker container
- Blob storage & Static website feature
- Azure CDN + Storage account
 - Previously only Verizon Premium offered URL rewrites
 - Azure CDN Standard has been improving a lot lately: Rules Engine, WAF..
- Azure CDN + custom service handling rewrites & custom headers + Storage account
 - Custom service (eg. Azure function or Linux App Service) acts as a reverse proxy

Common pitfalls

Azure CDN Premium from Verizon & Storage account = *problem solved?*

Verizon Premium gets the job done but it doesn't offer an API for automation. Changes in the Rules Engine take several hours to take effect as the approval process is manual. **This makes it very time consuming to configure the rules and settings and it cannot be automated.**





staticwebsitewestor | Static website

Storage account

»



Save



Discard

Enabling static websites on the blob service allows you to host static content.

Static website

Disabled

Enabled

An Azure Storage container has been created to host your static website.
[\\$web](#)

Primary endpoint ⓘ

<https://staticwebsitewestor.z6.web.core.windows.net/>

Secondary endpoint ⓘ

<https://staticwebsitewestor-secondary.z6.web.core.windows.net/>

Index document name ⓘ

index.html

Error document path ⓘ

index.html

Azure Storage with Static website enabled

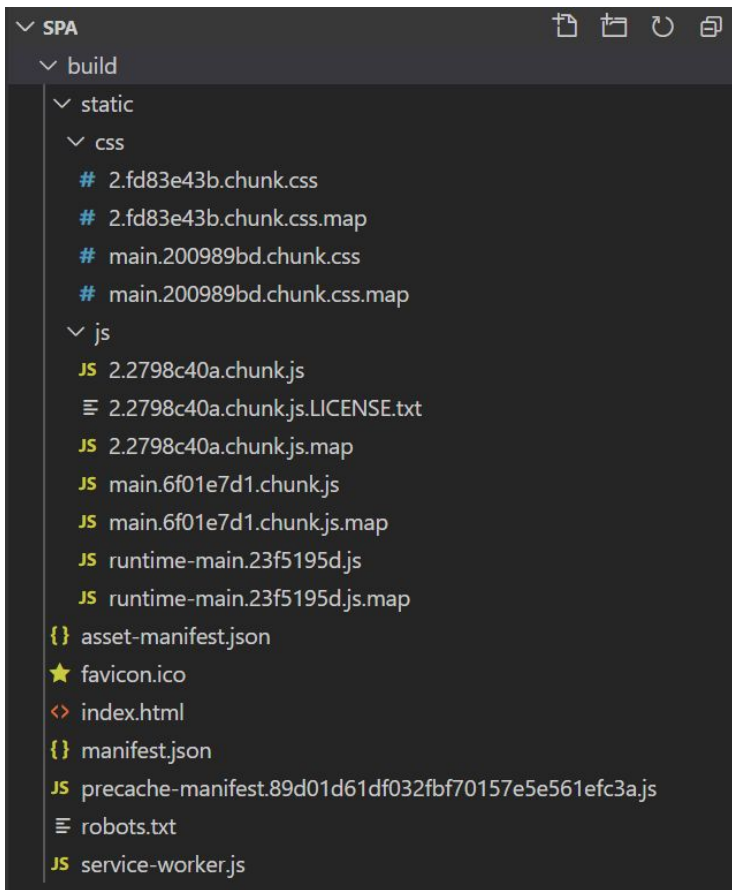
Static website hosting feature in storage account is very limited in functionality. **It can only handle simple redirects to index.html and force 404s to be redirected to specified file path and get your SPA running.** But if you have any more complex requirements (like several language versions in relative subpaths) you need at least some flavor of Azure CDN in front of it and then it might not be a good idea to have this feature messing the redirects additionally.

Windows based App Service is perfect for hosting SPA?

While the App Services are probably one of the most mature PaaS services in Azure and suitable for hosting SPAs, they're definitely not the most cost-efficient approach. Blob storage outweighs App Service in performance and Azure CDN in latency. **App Services are meant for hosting server side apps securely and offer a myriad of deployment options but will become very expensive for hosting your SPA.**



SPA =
static resources +
rewrites +
custom headers



<http://spa.url.com> → https://spa.url.com

+

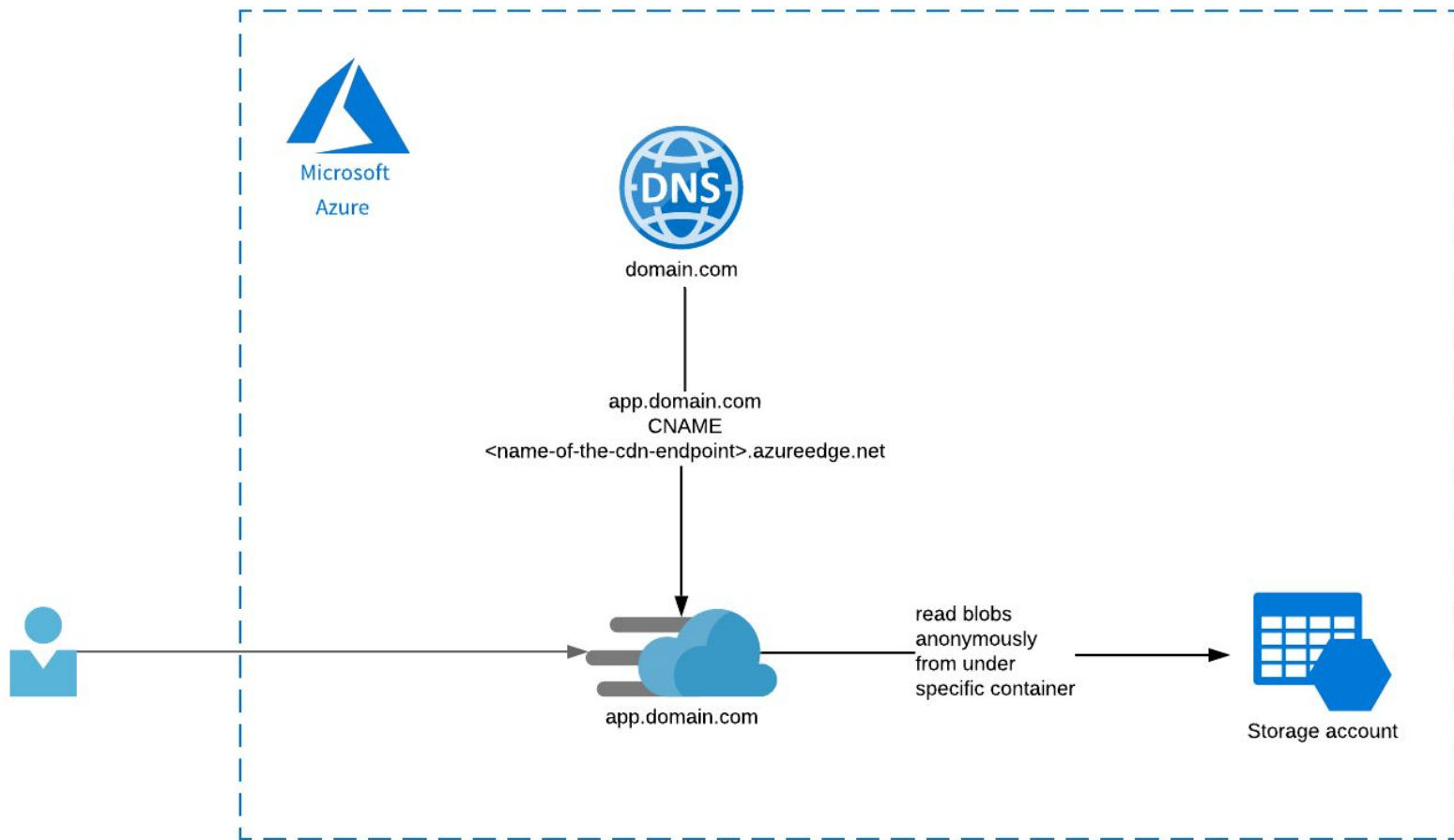
<https://spa.url.com> → https://spa.url.com/index.html

<https://spa.url.com/subpath/page> → https://spa.url.com/index.html

+

Header	Value
Strict-Transport-Security	max-age=31536000; includeSubDomains
X-Content-Type-Options	nosniff
X-XSS-Protection	1; mode=block
x-frame-options	SAMEORIGIN
Content-Security-Policy	default-src 'self'; script-src 'self' 'unsafe-eval'; style-src 'self' 'unsafe-inline';
Referrer-Policy	same-origin
Feature-Policy	payment 'self'; geolocation 'self';

Security headers recommended by securityheaders.com



Origin settings in Azure CDN endpoint



spa-demo-fe-we-cdn-ep (spa-demo-fe-we-cdn/spa-demo-fe-we-cdn-ep) | Origin

Endpoint

Search (Ctrl+/) «

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Settings

Origin

Custom domains

Compression

Caching rules

Geo-filtering

Save Discard

Origin type *

Storage

Origin hostname * ⓘ

spademofewestor.blob.core.windows.net

Origin host header ⓘ

spademofewestor.blob.core.windows.net

Origin path ⓘ

/spa

Protocol ⓘ

☒ HTTP

☒ HTTPS




Origin port ⓘ

80

443





Container access level in storage account

Home > Resource groups > spa-demo-we-rg > spademofewestor | Containers

 **spademofewestor | Containers**  

Storage account

Search (Ctrl+/) <<

 Container  Change access level  Refresh |  Delete


Search containers by prefix

	Name	Last modified	Public access level	Lease state	
<input type="checkbox"/>	spa	4/23/2020, 11:10:46 ...	Blob	Available	...

Overview
Activity log
Access control (IAM)
Tags
Diagnose and solve problems
Data transfer
Events
Storage Explorer (preview)

Azure CDN Standard rules

[Home](#) > [Resource groups](#) > [spa-demo-we-rg](#) > [spa-demo-fe-we-cdn-ep \(spa-demo-fe-we-cdn/spa-demo-fe-we-cdn-ep\)](#) | Rules engine

 **spa-demo-fe-we-cdn-ep (spa-demo-fe-we-cdn/spa-demo-fe-we-cdn-ep)** | Rules engine ×

Search (Ctrl+ /)

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Settings

Origin

Custom domains

Compression

Caching rules

Geo-filtering

Optimization

Rules engine

Locks

Export template

Monitoring

Diagnostics logs

Support + troubleshooting

New support request

Save + Add rule Export

Name Global + Add action

Use the global rule to configure actions that will always trigger. For example, cache TTL settings. Later rules with scoped match conditions will take priority.

Always

Cache expiration

Cache behavior * Set if missing

Days 7

Hours 0

Minutes 0

Seconds 0

Name * RedirectToHTTPS + Add condition + Add action | ↑ ↑ ↓ ↓ |

If

Request protocol

Operator * Equals

Value * HTTP

Then

URL redirect

Type * Permanent redirect (308)

Protocol HTTPS

Hostname

Path

Query string

Fragment

Name * DefaultUrlRewrite + Add condition + Add action | ↑ ↑ ↓ ↓ |

If

URL file extension

Operator * Not greater than

Extension * 0

Case transform No transform

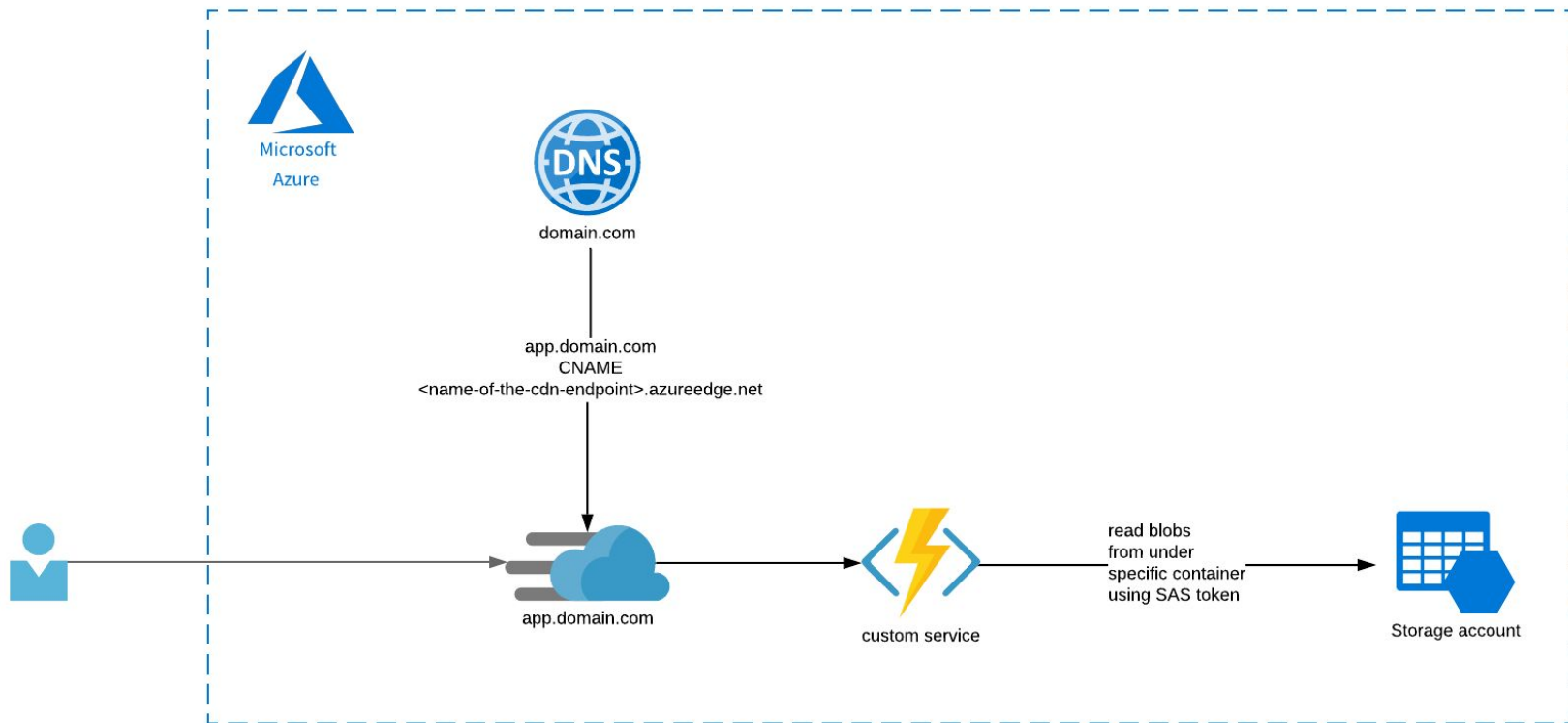
Then

URL rewrite


Source pattern * /


Destination * /index.html

Preserve unmatched path No








Origin settings in Azure CDN endpoint with custom service






 **spa-demo-fe-we-cdn-ep (spa-demo-fe-we-cdn/spa-demo-fe-we-cdn-ep) | Origin**
Endpoint

 Search (Ctrl+/) <<

 Save  Discard

-  Overview
-  Activity log
-  Access control (IAM)
-  Tags
-  Diagnose and solve problems

Settings

-  **Origin**
-  Custom domains
-  Compression
-  Caching rules
-  Geo-filtering

Origin type *

Custom origin

Origin hostname * ⓘ

spa-demo-be-we-app.azurewebsites.net ✓

Origin host header ⓘ

spa-demo-be-we-app.azurewebsites.net ✓

Origin path ⓘ

/Path ✓

Protocol ⓘ

☒ HTTP

☒ HTTPS

Origin port ⓘ

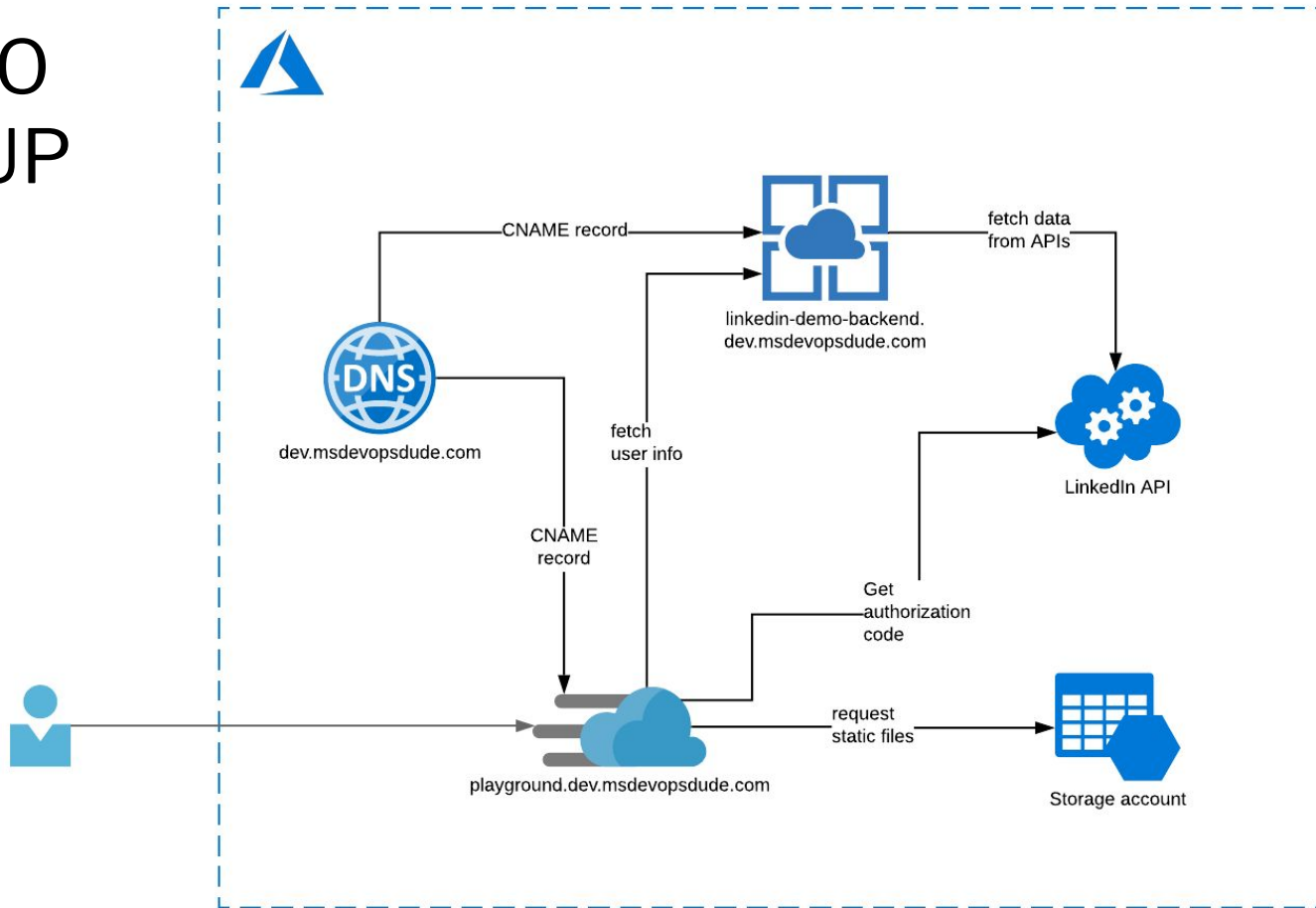
80

443

Securing application secrets

- Never put secrets in source control!
- In Azure PaaS world, secrets are stored to Key Vault
 - Use KV references from app settings in App Services and Functions
 - Make sure to apply least privilege in KV's access policies
- When possible, avoid credentials altogether and use Managed Identities instead
 - Even storage accounts supported nowadays
- Mounting secret volumes also an option
 - Helpful with containerized workloads when you have more secrets to handle

DEMO SETUP



DEMO



Links to resources and examples

- [Static Content Hosting pattern](#)
- [Configure Azure CDN in front of storage account](#)
note: this example depends on storage account's static website feature
- [Azure Key Vault references for App Service and Azure Functions](#)
- [Azure CDN Standard Rules Engine](#)
- [Create React App Deployment](#)
- [Hosting an Angular App as a static website with Azure Function Proxies](#)
- [Demo source code](#)

QA

