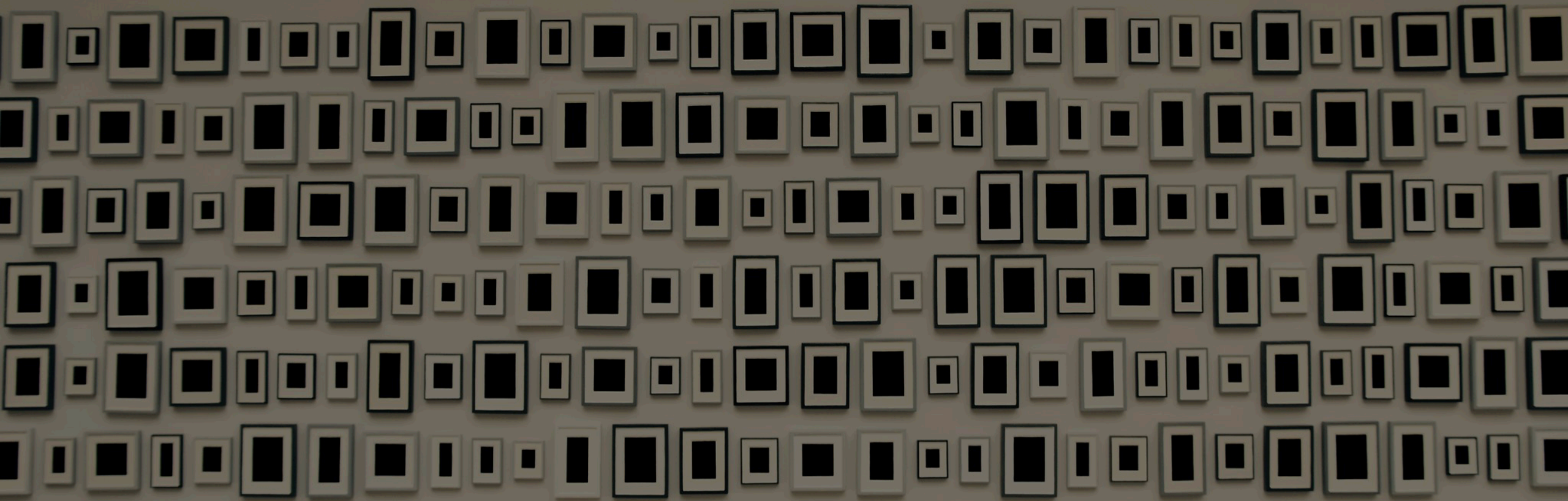EUROPE'S LEADING AEM DEVELOPER CONFERENCE
27th – 29th SEPTEMBER 2021

Image optimization at the edge
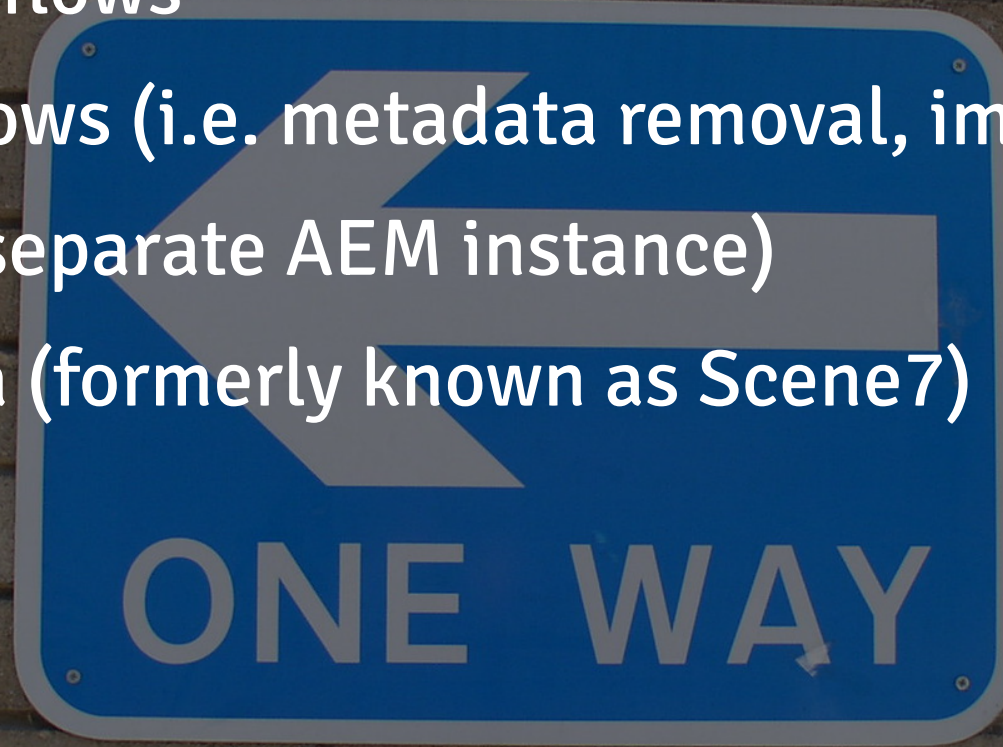
Jakub Wądołowski, diva-e (@jwadolowski)

Images are everywhere...

Standard image manipulation strategies

- Rendition workflows

- Custom workflows (i.e. metadata removal, imagemagick, etc)

- Offloading (to separate AEM instance)

- Dynamic Media (formerly known as Scene7)

\<picture\> tag

```html
<picture>
    <source srcset="/content/dam/k.jpg.rendition.451.1353.jpg" media="(max-width: 480px)" />
    <source srcset="/content/dam/k.jpg.rendition.902.2706.jpg" media="(min-width: 481px) and (max-width: 640px)" />
    <source srcset="/content/dam/k.jpg.rendition.902.2706.jpg" media="(min-width: 641px) and (max-width: 767px)" />
    <source srcset="/content/dam/k.jpg.rendition.1570.4710.jpg" media="(min-width: 768px) and (max-width: 991px)" />
    <source srcset="/content/dam/k.jpg.rendition.1570.4710.jpg" media="(min-width: 992px) and (max-width: 1199px)" />
    <source srcset="/content/dam/k.jpg.rendition.1570.4710.jpg" media="(min-width: 1200px) and (max-width: 1399px)" />
    <source srcset="/content/dam/k.jpg.rendition.1570.4710.jpg" media="(min-width: 1400px)" />
    <img src="/content/dam/k.jpg.rendition.451.1353.jpg" alt="Women's New In" title="Women's New In" />
</picture>
```

Reality check

- New image formats (WebP, HEIC, AVIF)

- EXIF metadata removal

- "It takes ages to generate renditions out of 300 MB TIF file!"

- "Can you reduce image quality from 85% to 78% for all our assets?"

- "Is it possible to blur out-of-stock products?"

- "Can you render a small '20% off' overlay for all on sale dresses?"

- "Would it be possible to dynamically reduce image quality for low-speed clients?"

- ...

https://flic.kr/p/2evhaRd

The use case

- E-commerce site

- 2 image sources

  - AEM (marketing assets)

  - External system (products)

- Image-heavy website (product listings)
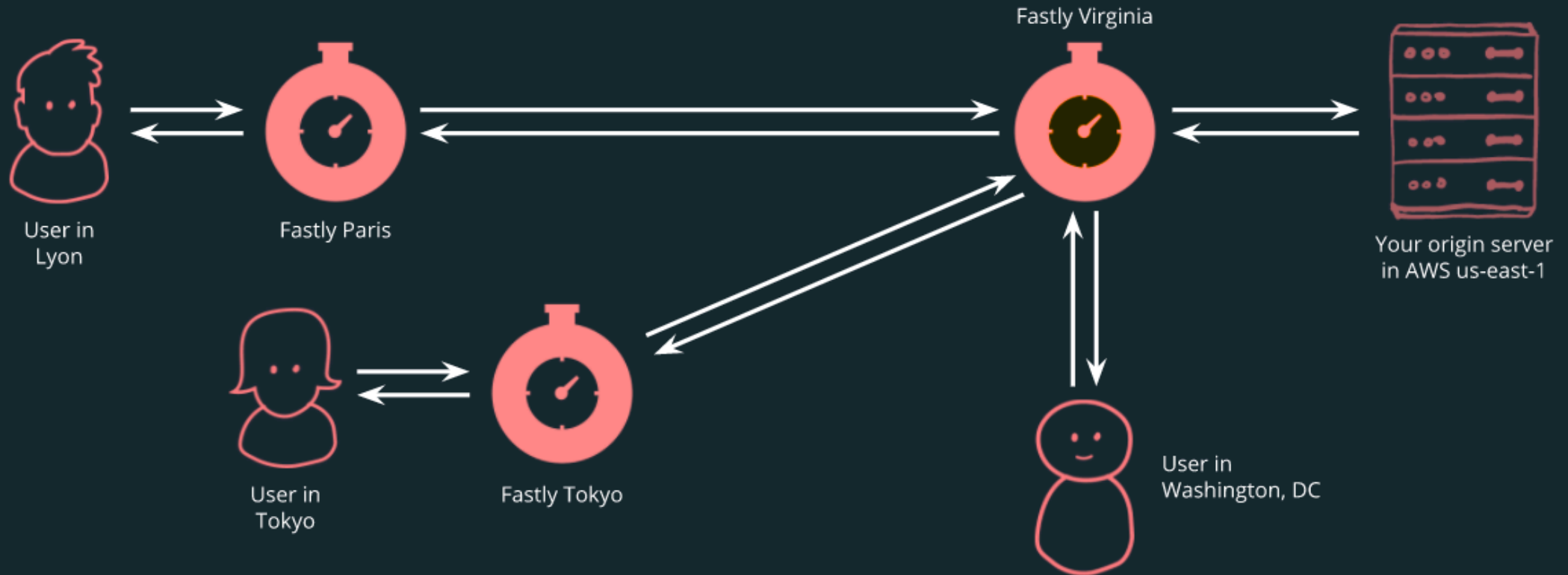
Image Optimizer by Fastly

- Image transformations (trim, crop, width, overlay, blur, etc)

- On-the-fly format changes (i.e. auto WebP)

- Quality level adjustments
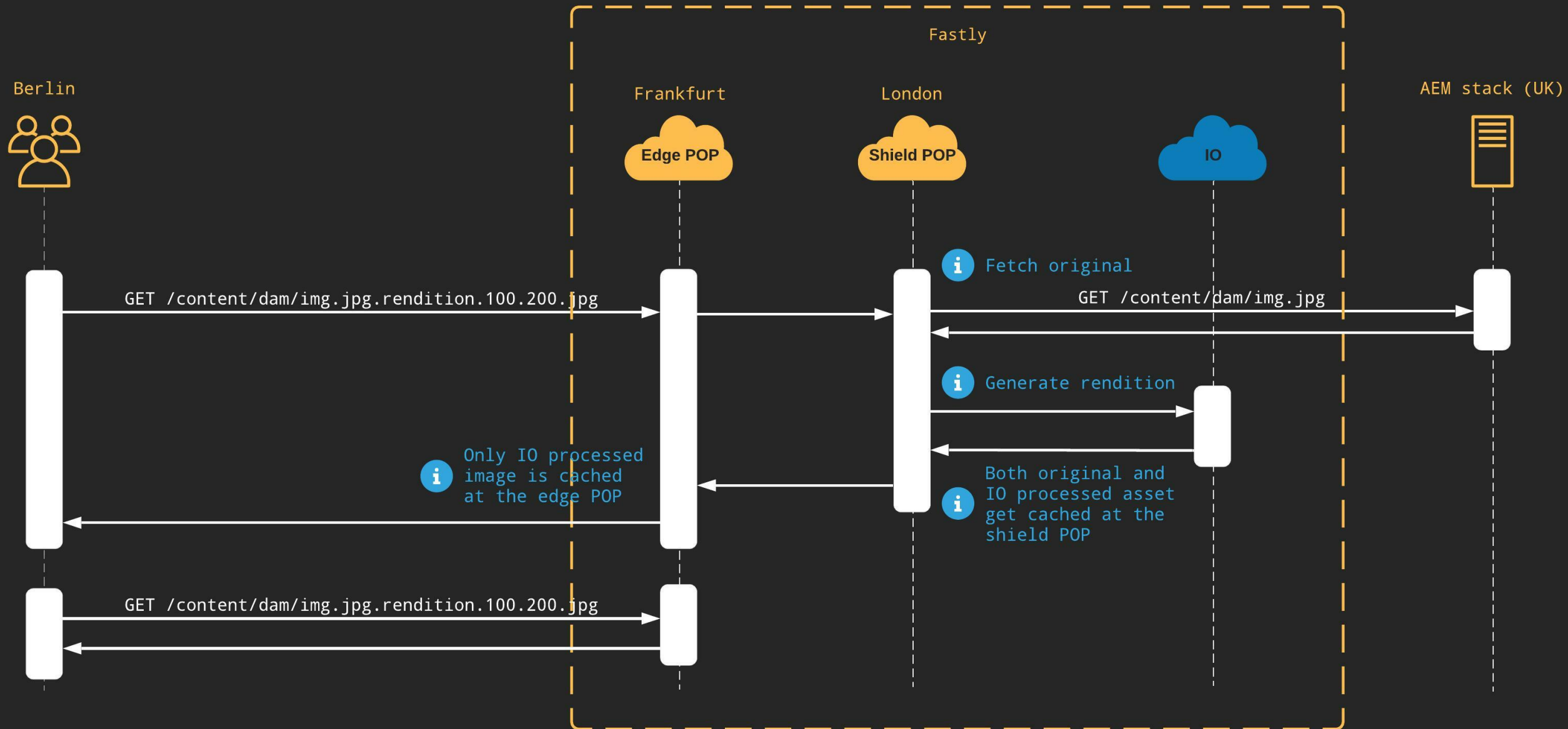
- EXIF/XMP/ICC metadata removal

Prerequisites

- IO (Fastly service add-on)

- Shielding is mandatory

- VCL changes
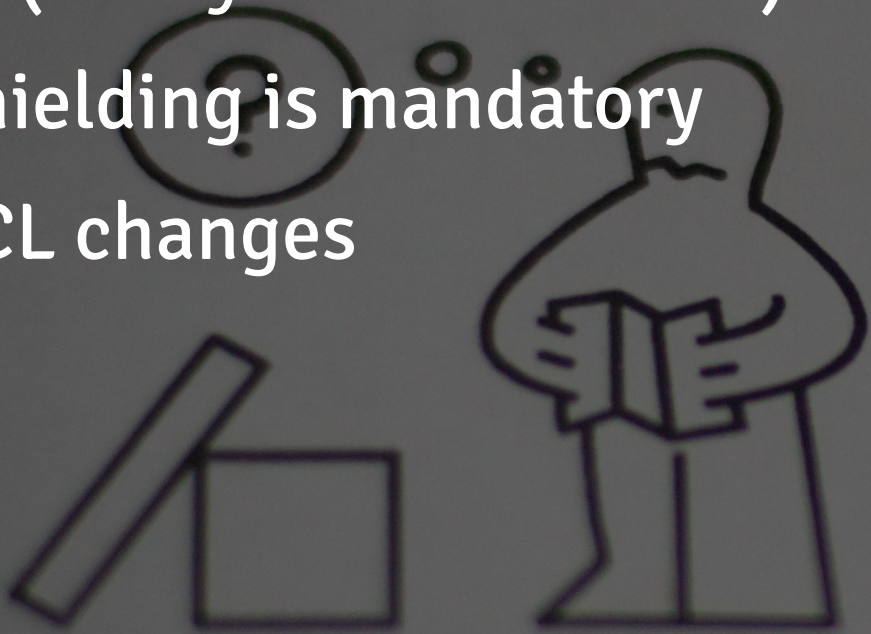
Shielding

How it works?

VCL snippet

```vcl
sub vcl_recv {
    # ...

    # Remove all QS from image requests to prevent IO service abusing
    if (req.url.ext ~ "(?i)^(?:gif|png|jpe?g)$") {
        set req.url = querystring.remove(req.url);
    }

    # AEM DAM assets
    if (req.http.X-Varnish-Backend == "dispatcher" && req.url ~ "^/content/dam/.+?\.(gif|png|jpe?g)\.rendition\.[0-9]+\.[0-9]+\.(gif|png|jpe?g)(\?[^\?]*)?$") {
        set req.http.X-Fastly-Imageopto-Api = "fastly";
        set req.url = querystring.set(req.url, "auto", "webp");
        set req.url = querystring.set(req.url, "quality", "82");

        # Extract width from image URL
        declare local var.width STRING;
        set var.width = regsub(req.url, "^.+\.rendition\.([0-9]+)\..+", "\1");

        # Only configured renditions should be processed by IO
        if (var.width ~ "^(3|290|451|902|1570|3140)$") {
            # Height from the URL doesn't reflect actual image height
            set req.url = querystring.set(req.url, "width", var.width);
        } else {
            unset req.http.X-Fastly-Imageopto-Api;
            set req.url = querystring.remove(req.url);
        }
    } elseif {
        # other image origins
    }

    # ...
}
```

VCL snippet (cont'd)

```
sub rewrite_dam_asset_url {
    if (req.http.X-Varnish-Backend == "dispatcher" && req.http.X-Fastly-Imageopto-Api == "fastly") {
        set bereq.url = regsub(bereq.url, "\.rendition\.[0-9]+\.[0-9]+\.(gif|png|jpe?g)", "");
    }
}

sub vcl_miss {
    # ...
    if (req.backend.is_origin) {
        call rewrite_dam_asset_url;
    }
    # ...
}

sub vcl_pass {
    # ...
    if (req.backend.is_origin) {
        call rewrite_dam_asset_url;
    }
    # ...
}
```

What we use IO for?

- Rendition generation

- Auto WebP

- Metadata removal

- Quality adjustments
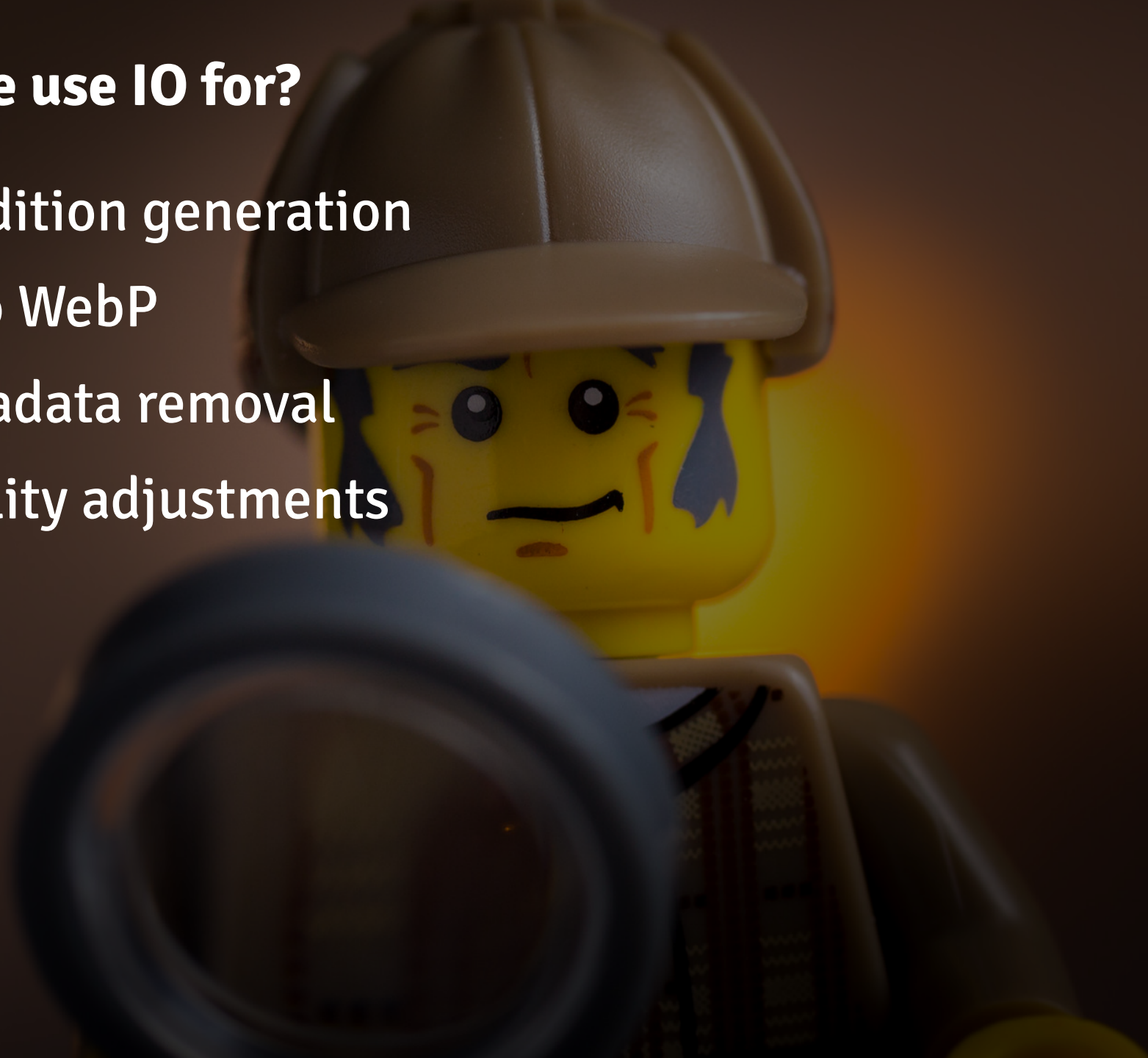
Demo time!

Standard image request

```
$ curl -SsD - -o /dev/null 'https://example.com/content/dam/path/to/an/image.jpg.rendition.1570.4710.jpg'
HTTP/2 200

cache-control: public, max-age=2592000
content-type: image/jpeg
etag: "CVnRHI+4Vr1/WUT+clygQT7e8VuTBUqAQjeXw6Cxj+E"
fastly-io-info: ifsz=228878 idim=2000x768 ifmt=jpeg ofsz=90848 odim=1570x603 ofmt=jpeg
fastly-stats: io=1
x-served-by: cache-lcy19238-LCY, cache-fra19152-FRA
x-cache: HIT, HIT
x-cache-hits: 1, 1
vary: Accept
content-length: 90848
...
```

WebP request

```
$ curl -SsD - -o /dev/null 'https://example.com/content/dam/path/to/an/image.jpg.rendition.1570.4710.jpg' -H 'Accept: image/webp'
HTTP/2 200

cache-control: public, max-age=2592000
content-type: image/webp
etag: "VhkfSZ3mOeiPwQsNRYqwviNpmTWOa4xRS1lEjo0IJsM"
fastly-io-info: ifsz=228878 idim=2000x768 ifmt=jpeg ofsz=65030 odim=1570x603 ofmt=webp
fastly-stats: io=1
x-served-by: cache-lcy19253-LCY, cache-fra19167-FRA
x-cache: HIT, HIT
x-cache-hits: 1, 1
vary: Accept
content-length: 65030
...
```

It's a trap!

AEM assets go-live

SIZES		SIZES
BEFORE IO ROLLOUT		**AFTER IO ROLLOUT**
TOTAL SIZE 3,947KB	**119% LARGER**	**TOTAL SIZE** 8,654KB
THIRD PARTY SIZE 925KB	0% NO CHANGE	**THIRD PARTY SIZE** 927KB
HTML SIZE 85KB	1% LARGER	**HTML SIZE** 86KB
CSS SIZE 100KB	0% NO CHANGE	**CSS SIZE** 100KB
JS SIZE 1,103KB	0% NO CHANGE	**JS SIZE** 1,105KB
IMAGE SIZE 2,466KB	191% LARGER	**IMAGE SIZE** 7,171KB
FONTS SIZE 190KB	0% NO CHANGE	**FONTS SIZE** 190KB
FLASH SIZE 0KB	0% NO CHANGE	**FLASH SIZE** 0KB
VIDEO SIZE 0KB	0% NO CHANGE	**VIDEO SIZE** 0KB
OTHER SIZE 2KB	0% NO CHANGE	**OTHER SIZE** 2KB

What went wrong?

- 2-stage deployment
  - VCL changes (headers/QS/URL rewrites)
  - IO add-on deployment
- Order matters :)
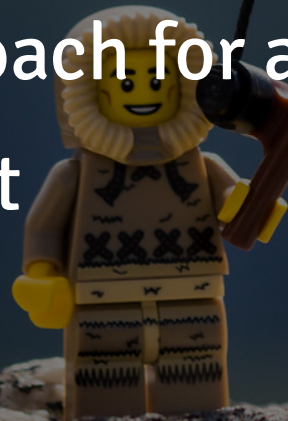
AEM assets go-live (cont'd)

SIZES		SIZES
TOTAL SIZE **3,947KB**	**16%** SMALLER	**TOTAL SIZE** **3,308KB**
THIRD PARTY SIZE 925KB	0% NO CHANGE	**THIRD PARTY SIZE** 927KB
HTML SIZE 85KB	1% SMALLER	**HTML SIZE** 84KB
CSS SIZE 100KB	0% NO CHANGE	**CSS SIZE** 100KB
JS SIZE 1,103KB	0% NO CHANGE	**JS SIZE** 1,105KB
IMAGE SIZE 2,466KB	26% SMALLER	**IMAGE SIZE** 1,827KB
FONTS SIZE 190KB	0% NO CHANGE	**FONTS SIZE** 190KB
FLASH SIZE 0KB	0% NO CHANGE	**FLASH SIZE** 0KB
VIDEO SIZE 0KB	0% NO CHANGE	**VIDEO SIZE** 0KB
OTHER SIZE 2KB	0% NO CHANGE	**OTHER SIZE** 2KB

Non-AEM assets go-live

SIZES		SIZES
TOTAL SIZE 2,661KB	**41%** SMALLER	**TOTAL SIZE** 1,558KB
THIRD PARTY SIZE 548KB	96% SMALLER	**THIRD PARTY SIZE** 24KB
HTML SIZE 76KB	22% SMALLER	**HTML SIZE** 59KB
CSS SIZE 44KB	7% LARGER	**CSS SIZE** 47KB
JS SIZE 889KB	69% SMALLER	**JS SIZE** 274KB
IMAGE SIZE 1,562KB	30% SMALLER	**IMAGE SIZE** 1,089KB
FONTS SIZE 89KB	0% NO CHANGE	**FONTS SIZE** 89KB
FLASH SIZE 0KB	0% NO CHANGE	**FLASH SIZE** 0KB
VIDEO SIZE 0KB	0% NO CHANGE	**VIDEO SIZE** 0KB
OTHER SIZE 0KB	0% NO CHANGE	**OTHER SIZE** 0KB

Why not Dynamic Media?

- Implementation cost

  - Fastly was already part of the application stack

  - Fully functional PoC took 1 day

  - Zero changes in AEM codebase

- Unified approach for all the origins

- On-going cost

https://flic.kr/p/wUJ1UF

Thank you!