AWS re:Invent

NET304-R

Lambda@Edge best practices

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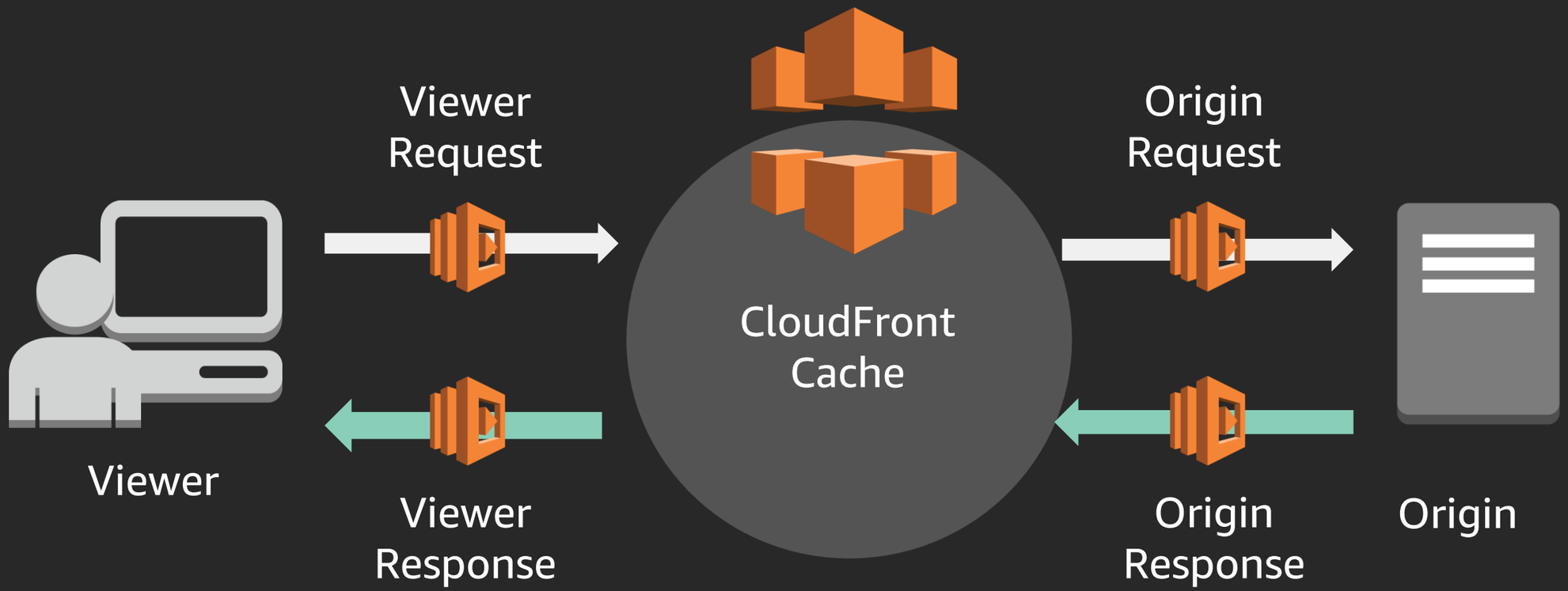
Lambda@Edge use cases

Simple HTTP manipulations	Dynamic content generation	Origin independence
User-agent header normalization	Image manipulation	Pretty URLs
Adding HSTS security headers	Render pages	API wrapper
Enforcing cache-control headers	Redirections	Authorization
A/B testing	SEO optimization	Bot mitigation

Amazon CloudFront and Lambda@Edge



How much does it cost?

Consider an API with 15M requests/month & 128MB Lambda@Edge function executing in 2ms. Viewer request event is configured on CloudFront.

Lambda@Edge is charged based on:

- Number of requests: 15M*,6$/1M = 9$
- Memory*Duration resource usage: 15M * 50ms * 128MB * 0,00005001$/GBS = 4,7$

Total cost is 13,7$/month

Why bother optimizing?

Is Lambda@Edge the right solution for you?

#1: Consider all the available options

- CloudFront already provides native features:
  - Device identification: CloudFront-Is-Mobile-Viewer headers
  - Analytics: CloudFront access logs delivered to Amazon S3 & AWS WAF logs
  - Access Control: CloudFront signed URLs/cookies, geoblocking, AWS WAF
- Leverage responsive web design

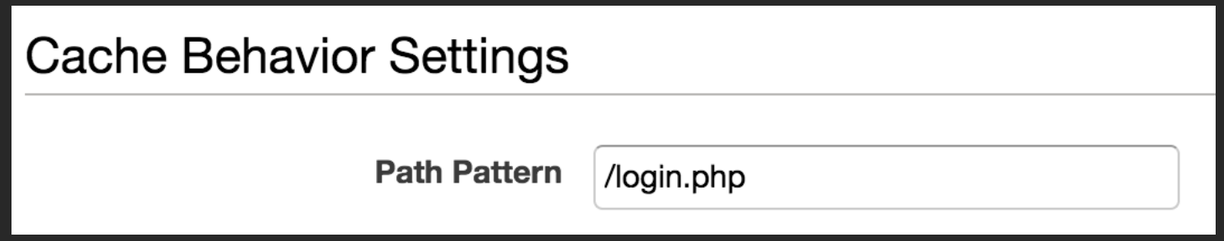
- Some logic is better off on the origin!

Optimizing Lambda@Edge configuration

#2: Invoke Lambda@Edge only when you need it

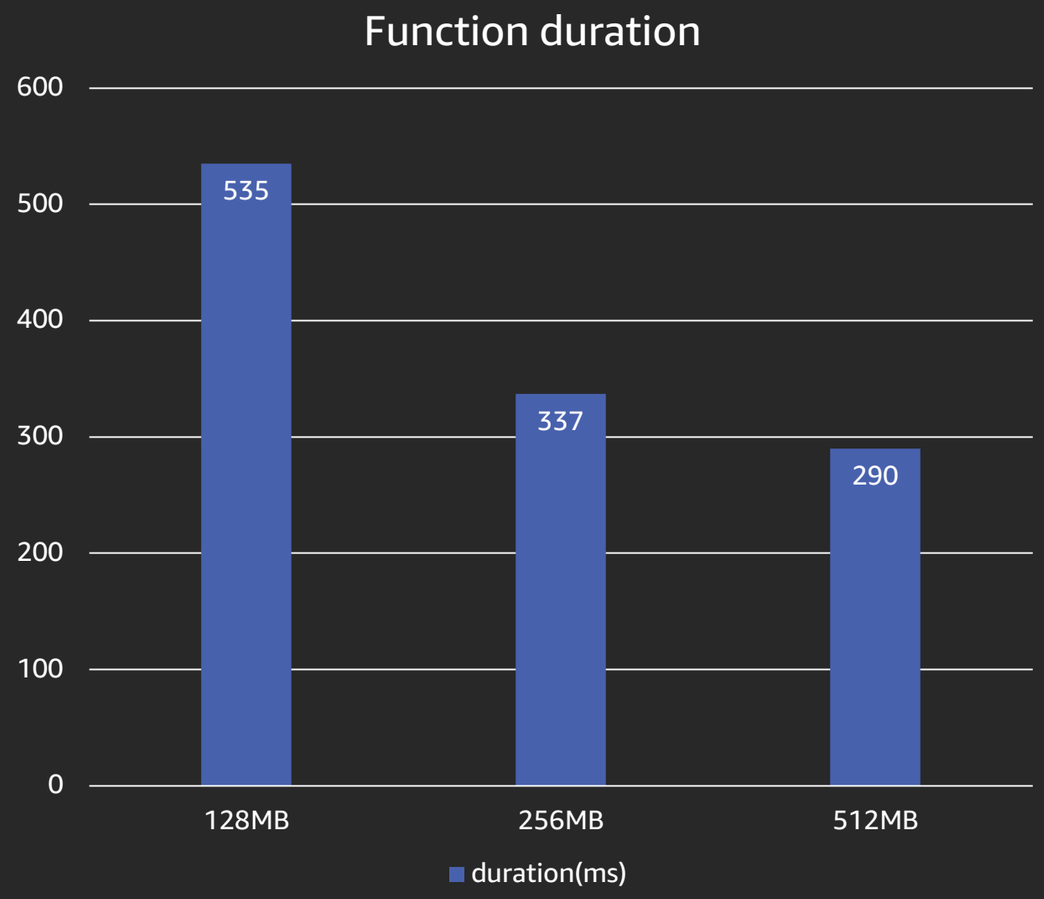
- For every request or only on cache misses?

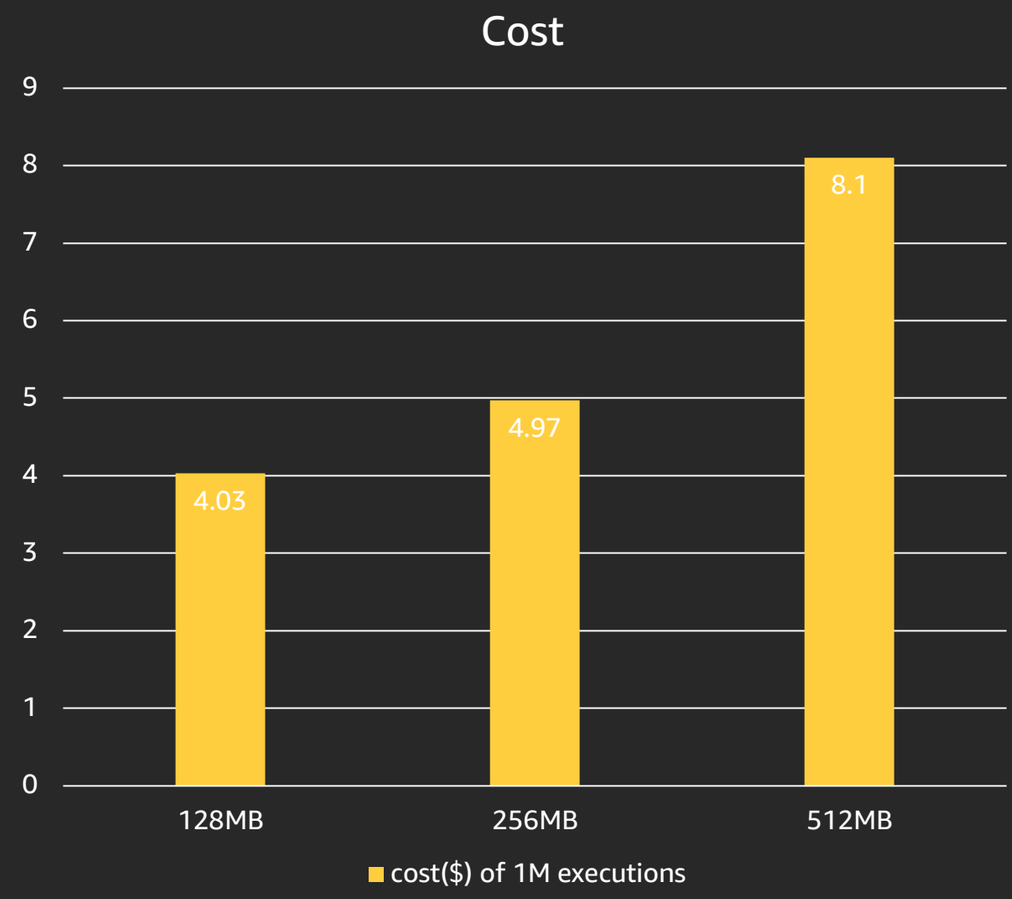
- Use the most specific CloudFront behavior:



- Remove it when it’s not used anymore

#3: Choose the optimal memory configuration





Optimizing Lambda@Edge code

#4: Optimize function code

- Reduce deployment package size
- Parallelism using async calls

```
// Node.js

let responses = await Promise.all([

        httpGet({ hostname: 'HTML template', path: '' }),

        ddbGet({ TableName: ddbTableName, Key: { name: 'mytable' } })

]);
```

#5: Leverage global variables (1/2)

```
// Node.js
const dns = require('dns');
let bestOrigin;
let expires = 0;
exports.handler = (event, context, callback) => {
        const request = event.Records[0].cf.request;
        getBestOrigin().then((origin) => {
                request.origin.custom.domainName = origin;
                headers.host[0].value = origin;
                callback(null, request);
        });
}
```

#5: Leverage global variables (2/2)

```
// Node.js
function getBestOrigin() {
        const now = Date.now();
        if (now < expires) return Promise.resolve(bestOrigin);
        return new Promise((resolve, reject) => {
                dns.resolveCname(DNS_HOST, (err, addr) => {
                        bestOrigin = addr[0];
                        expires = now + TTL;
                        resolve(bestOrigin);
                });
        });
}
```

#6: Optimize external network calls

```
// Node.js
const http = require('https’);


exports.handler = (event, context, callback) => {
       http.get({ hostname: 'hello.com', path: '/’ }, (resp) => {
              let data = ’’;
              resp.on('data', (chunk) => { data += chunk; });
              resp.on('end', () => { resolve(data); });
       });
}
```

#6: Optimize external network calls

```
// Node.js
const http = require('https');
const keepAliveAgent = new http.Agent({ keepAlive: true, keepAliveMsecs: 2000 });
exports.handler = (event, context, callback) => {
       http.get({ hostname: 'hello.com', path: '/', agent: keepAliveAgent }, (resp) => {
              let data = '';
              resp.on('data', (chunk) => { data += chunk; });
              resp.on('end', () => { resolve(data); });
       });
}
```

Know the limits!

#7: Know the limits!

Functional:

- Blacklisted/read-only headers
- Function size—1MB vs 50MB
- Response size—40K vs 1MB

Resource allocation

- Memory—128M vs 3G
- Timeout—5s vs 30s
- 1K concurrent execution region
- Scaling mechanism

Additional resources

- https://aws.amazon.com/lambda/edge/
- https://aws.amazon.com/blogs/networking-and-content-delivery/lambdaedge-design-best-practices/

- https://docs.aws.amazon.com/AmazonCloudFront/latest/DeveloperGuide/lambda-edge-testing-debugging.html

- AWS Blog: Cookie syncing for AdTech; Visitor prioritization for e-commerce; Paywall for publishers

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