

# HTTP Request Signing with AWS Signature Version 4

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# Request Signing in AWS

- Why?
  - Authentication
  - Message integrity
  - Replay prevention
- When?
  - Almost all requests to AWS APIs
- What?
  - Method, endpoint, path, timestamp, query string parameters, body
  - Some headers
- How?
  - HMAC-SHA256 with key derived from shared secret

# Signature Version 4

1. Create the canonical request
2. Create the string to sign
3. Calculate the signature

# SigV4 Step 1: Create the Canonical Request

```
POST /a/././long/path%20name/?a=1&b=2&C=def&C=abc HTTP/1.1
Host: example.amazonaws.com
Content-Type: application/x-www-form-urlencoded; charset=utf-8
X-Amz-Date: 20190722T0530Z
```

```
CanonicalRequest = HTTPRequestMethod + '\n' +
  CanonicalURI + '\n' +
  CanonicalQueryString + '\n' +
  CanonicalHeaders + '\n' +
  SignedHeaders + '\n' +
  HexEncode (Hash (RequestPayload))
```

# SigV4 Step 1: Create the Canonical Request

```
POST /a/././long/path%20name/?a=1&b=2&C=def&C=abc HTTP/1.1
Host: example.amazonaws.com
Content-Type: application/x-www-form-urlencoded; charset=utf-8
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```



**POST**

*CanonicalURI*

*CanonicalQueryString*

*CanonicalHeaders*

*SignedHeaders*

*HexEncode (Hash (RequestPayload) )*

# SigV4 Step 1: Create the Canonical Request

```
POST /a/./long/path%20name/?a=1&b=2&C=def&C=abc HTTP/1.1
Host: example.amazonaws.com
Content-Type: application/x-www-form-urlencoded; charset=utf-8
X-Amz-Date: 20190722T053000Z
```



```
POST
/long/path%2520name/
CanonicalQueryString
CanonicalHeaders
SignedHeaders
HexEncode (Hash (RequestPayload) )
```

# SigV4 Step 1: Create the Canonical Request

```
POST /a/././long/path%20name/?a=1&b=2&C=def&C=abc HTTP/1.1
Host: example.amazonaws.com
Content-Type: application/x-www-form-urlencoded; charset=utf-8
X-Amz-Date: 20190722T053000Z
```



```
POST
/long/path%2520name/
C=abc&C=def&a=1&b=2
CanonicalHeaders
SignedHeaders
HexEncode (Hash (RequestPayload))
```

# SigV4 Step 1: Create the Canonical Request

```
POST /a/././long/path%20name/?a=1&b=2&C=def&C=abc HTTP/1.1
Host: example.amazonaws.com
Content-Type: application/x-www-form-urlencoded; charset=utf-8
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```



```
POST
/long/path%2520name/
C=abc&C=def&a=1&b=2
content-type:application/x-www-form-urlencoded; charset=utf8
host:example.amazonaws.com
x-amz-date:20190722T053000Z
```

```
content-type;host;x-amz-date
HexEncode (Hash (RequestPayload) )
```



# SigV4 Step 1: Create the Canonical Request

```
POST /a/././long/path%20name/?a=1&b=2&C=def&C=abc HTTP/1.1
Host: example.amazonaws.com
Content-Type: application/x-www-form-urlencoded; charset=utf-8
X-Amz-Date: 20190722T053000Z
```



```
POST
/long/path%2520name/
C=abc&C=def&a=1&b=2
content-type:application/x-www-form-urlencoded; charset=utf8
host:example.amazonaws.com
x-amz-date:20190722T053000Z

content-type;host;x-amz-date
e3b0c44298fc1c149afbf4c8996fb92427ae41e4649b934ca495991b7852b855
```

# SigV4 Step 2: Create the String to Sign

```
StringToSign = Algorithm + '\n' +  
               RequestDateTime + '\n' +  
               CredentialScope + '\n' +  
               HexEncode (Hash (CanonicalRequest))
```



```
AWS4-HMAC-SHA256  
20190722T053000Z  
20190722/us-east-1/example/aws4_request  
f536975d06c0309214f805bb90ccff089219ecd68b2577efef23edd43b7e1a59
```

# SigV4 Step 3: Calculate the Signature

```
kSecret    = SecretKey
kDate      = HMAC('AWS' + kSecret, Date)
kRegion    = HMAC(kDate, Region)
kService   = HMAC(kRegion, Service)
kSigning   = HMAC(kService, "aws4_request")

Signature  = HexEncode(HMAC(kSigning, StringToSign))
```

