APACHE SLING & FRIENDS TECH MEETUP

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Become happier by using Varnish Cache

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Agenda

- Varnish Cache at a glance
- Use Cases and Architectures
- Limitations and Pitfalls

Varnish Cache at a glance

- Reverse Proxy Cache
  - 1.0.0 in 2006
  - Current version is 3.0.4
  - Free under BSD License
  - Available for various Linux Distributions, Max OS X, Open Solaris, Solaris 10, FreeBSD and Windows (with Cygwin)

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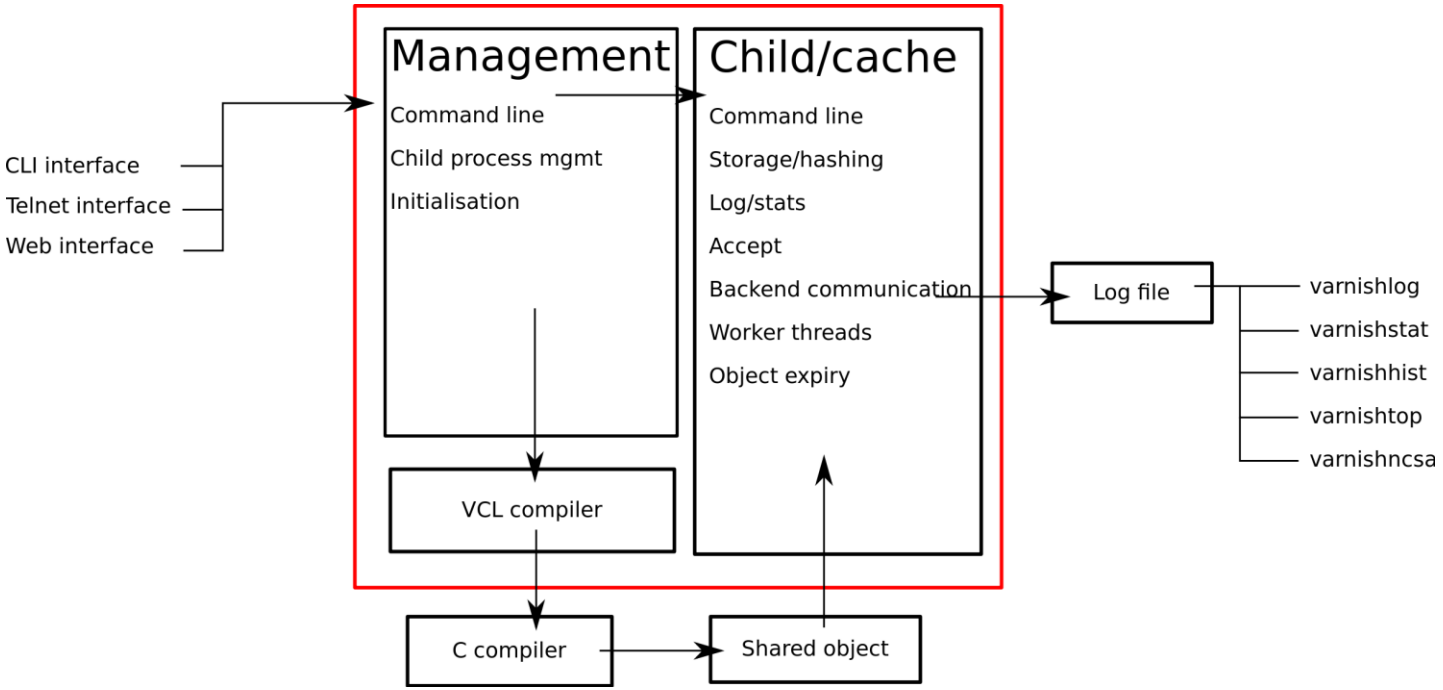
Varnish Cache at a glance

- Designed as HTTP accelerator – not more, not less
  - “Varnish is a modern program, designed and written for modern operating systems” https://www.varnish-cache.org/trac/wiki/VarnishFeatures
  - Storage
    - malloc or file
  - Load balancing
  - ESI (subset)

Varnish Cache at a glance

- Process architecture
  - Management process and child process
  - Configuration change without restart

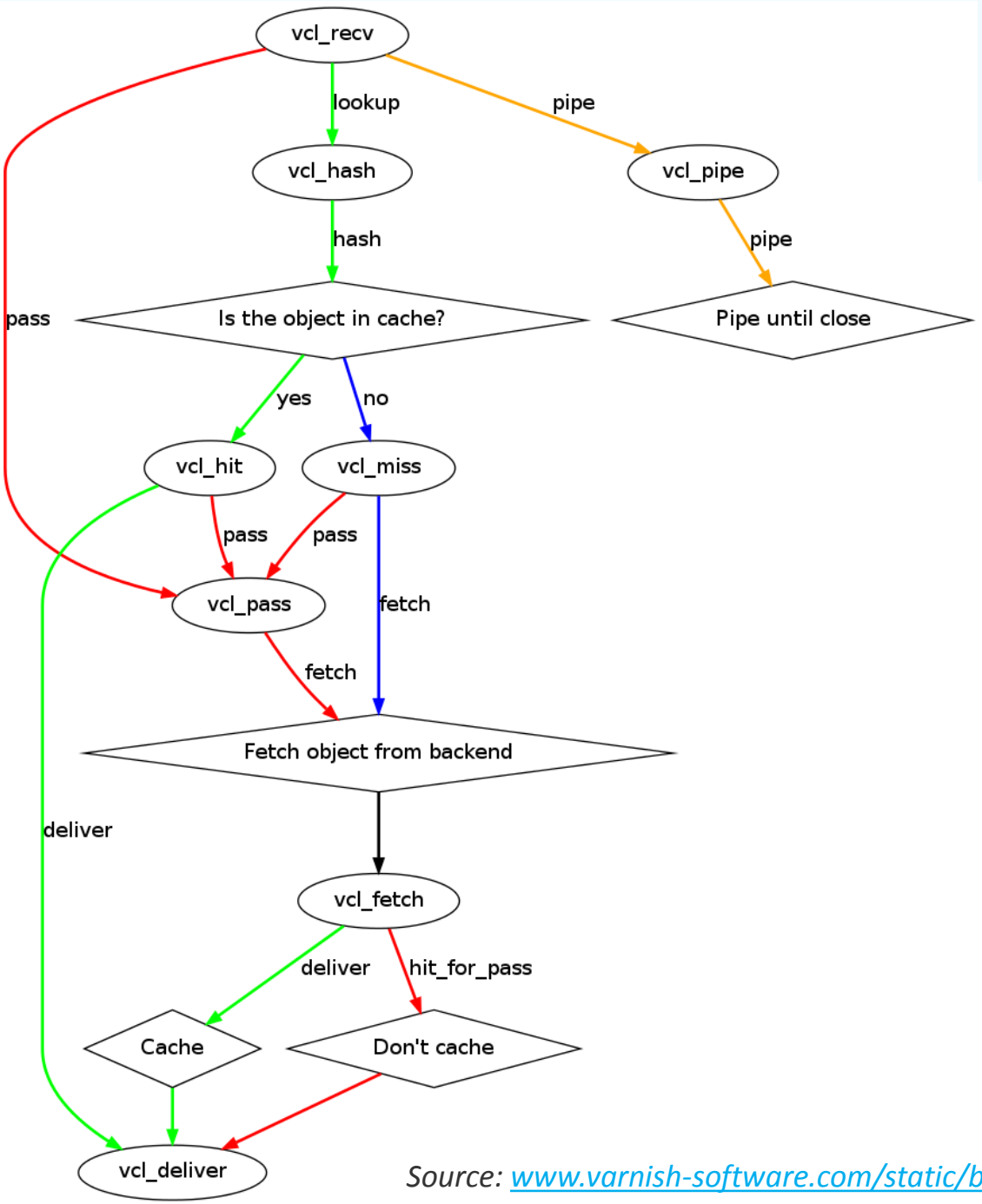


Source: www.varnish-software.com/static/book/Tuning.html

Varnish Cache at a glance

- Configuration
  - Startup parameters
  - Varnish Configuration Language (VCL)

```
sub vcl_fetch {
    if (req.url ~ "\.jpg$") {
        set beresp.ttl = 60s;
    }
}
```



Source: www.varnish-software.com/static/book/VCL_Basics.html

Varnish Cache at a glance

- Logging
  - Logs to shared memory
  - Separate application for display and write back

Agenda

- Varnish Cache at a glance
- **Use Cases and Architectures**
- Limitations and Pitfalls

Use Cases and Architectures

- Use case 1: Static resources
- Use case 2: REST API calls
- Use case 3: Full website

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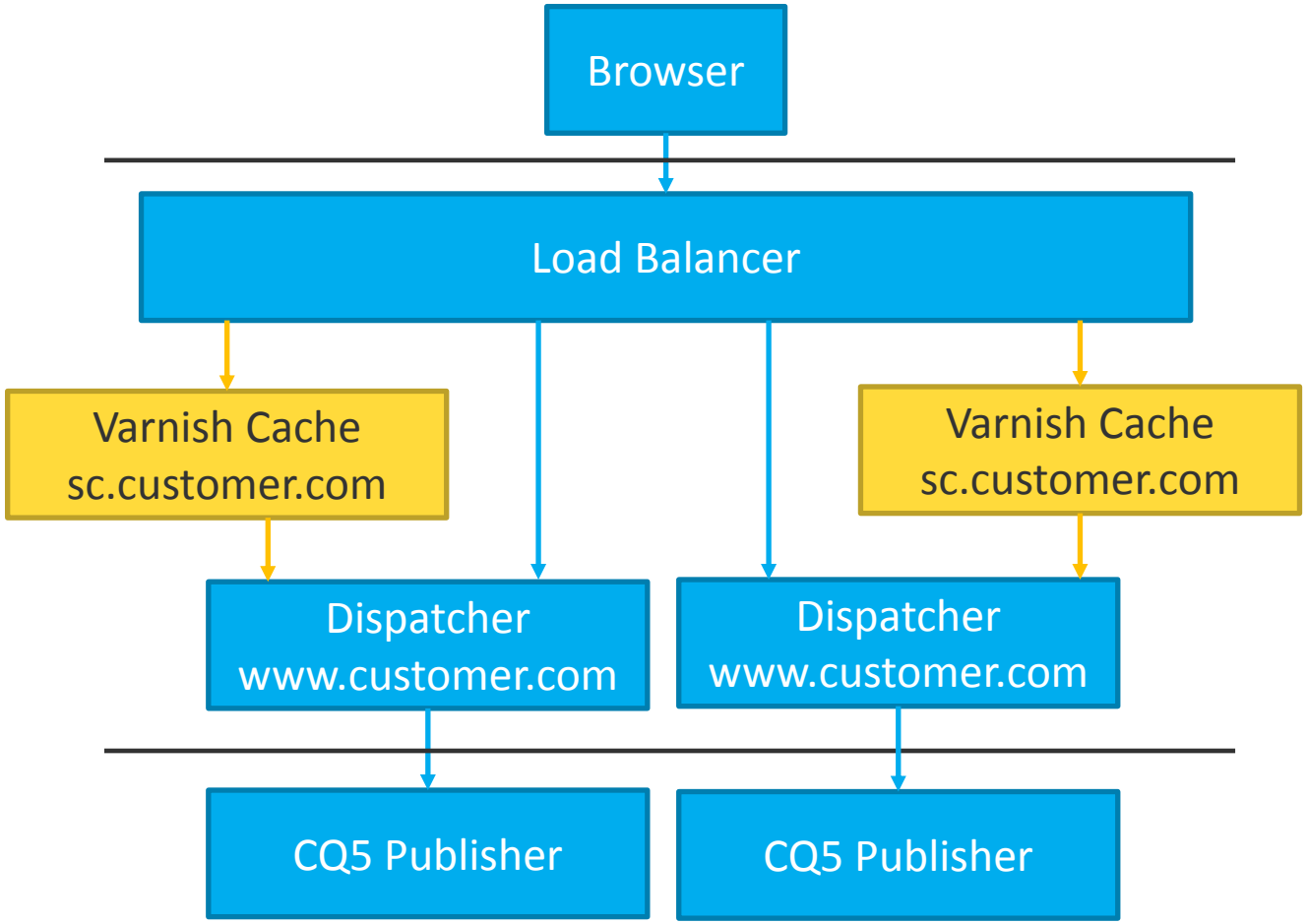
Use Case 1: Static Resources

- Use Case
  - Cache resources like CSS / JS / static images “forever”
- Benefit with Varnish
  - Internal network traffic decreases significant
  - Do not bore backend systems ;-)
- Solution
  - Cookie-less domain sc.customer.com served by Varnish

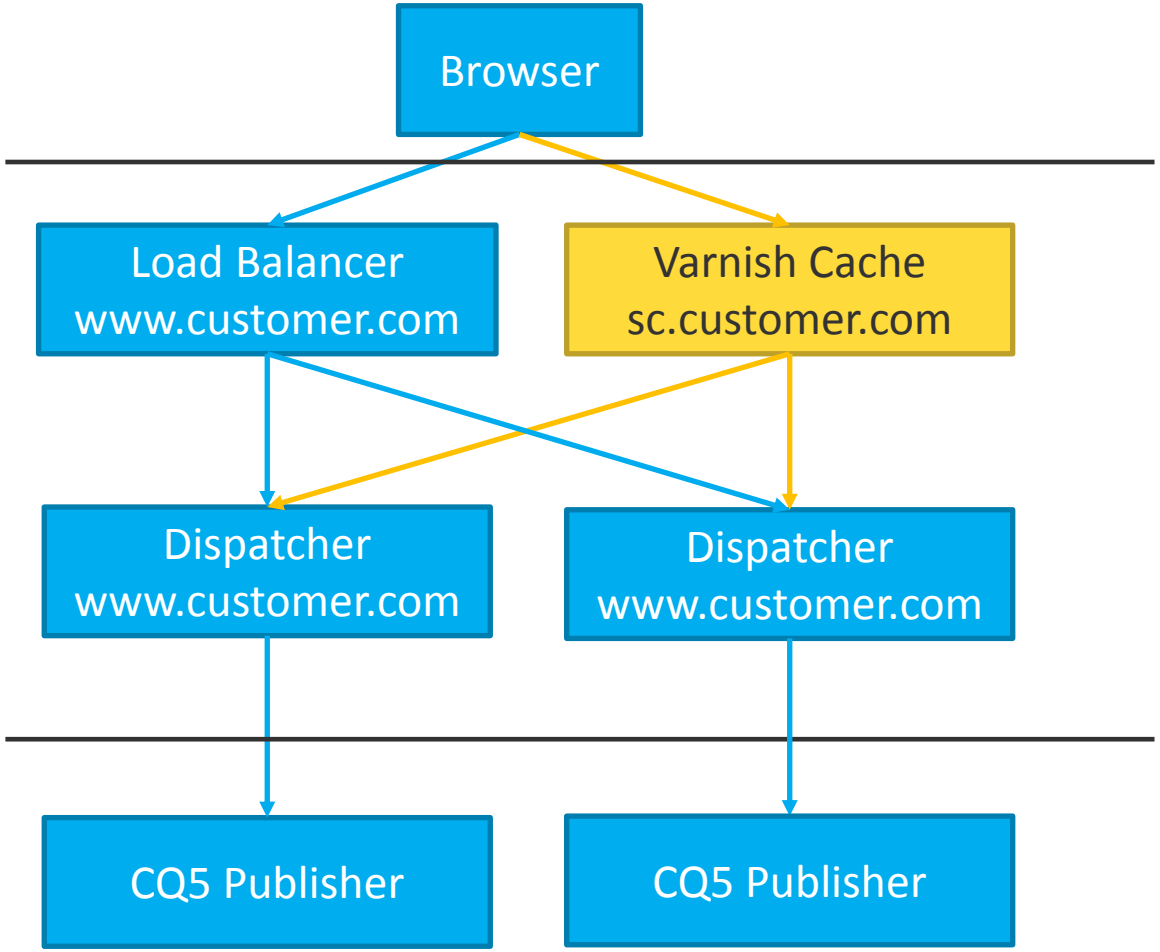
Use Case 1: Static Resources

- Architecture Sample 1



Use Case 1: Static Resources

- Architecture Sample 2



Use Case 1: Static Resources

- Why not directly connect Varnish with CQ5 Publisher?
  - Possible. But requires configuration for restricted paths like /system/console
- Changes in CQ
  - Load resources from static domain with a timestamp:

```
<script
type="text/javascript"
src="http://sc.customer.com/etc/designs/customer/clientlib.201309231000.js"
></script>
<img src="http://sc.customer.com/content/dam/logo.201309231000.png" />
```

```
backend default {
  .host = "dispatcher-hostname";
  .port = "80";
}

sub vcl_recv {
  if (req.url !~ "^/etc/designs/" && req.url !~ "^/content/dam/"){
    error 405 "Not allowed.";
  }
  unset req.http.cookie;
}

sub vcl_fetch {
  unset beresp.http.set-cookie;
  unset beresp.http.expires;
  unset beresp.http.Etag;
  set beresp.http.Cache-Control = "max-age=86400";
  set beresp.ttl = 4w;
  set beresp.http.magicmarker = "1";
}

sub vcl_deliver {
  if (resp.http.magicmarker) {
    unset resp.http.magicmarker;
    set resp.http.age = "0";
  }
}
```

Use Cases and Architectures

- Use case 1: Static resources
- **Use case 2: REST API calls**
- Use case 3: Full website

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Use Case 2: REST API Calls

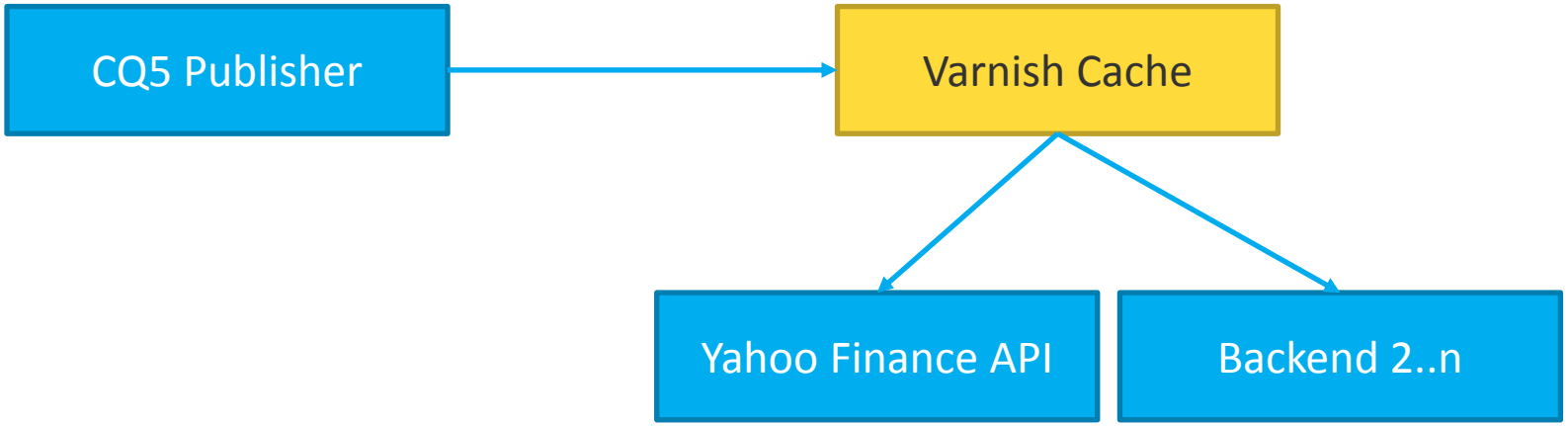
- Use Case
  - Cache requests to backend APIs
- Benefit with Varnish
  - Reduce load on backend systems
  - Reduce response time
  - Handle backend downtime
  - Custom time to life for each backend
- Solution
  - Call backend through Varnish Cache

Use Case 2: REST API Calls

- Sample: Yahoo Finance API
  - http://finance.yahoo.com/d/quotes.csv?s=ADBE&f=snd1l1c1p2
  - Last trade date, price, change and percents
  - But: has limit of requests/day
- CQ Publisher calls Varnish with prefix “finance”
  - http://varnish/finance/d/quotes.csv?s=ADBE&f=snd1l1c1p2
- Varnish executes API Call and caches the response for one hour

Use Case 2: REST API Calls

- Architecture



```
backend yahoofinance {
  .host = "finance.yahoo.com";
  .port = "80";
}

sub vcl_recv {
  if (req.url ~ "^/finance") {
    set req.backend = yahoofinance;
    set req.url = regsub(req.url, "^/finance", "");
    unset req.http.cookie;
  }
}

sub vcl_fetch {
  if(req.backend == yahoofinance) {
    set beresp.ttl = 1h;
    unset beresp.http.set-cookie;
    return(deliver);
  }
}
```

Use Cases and Architectures

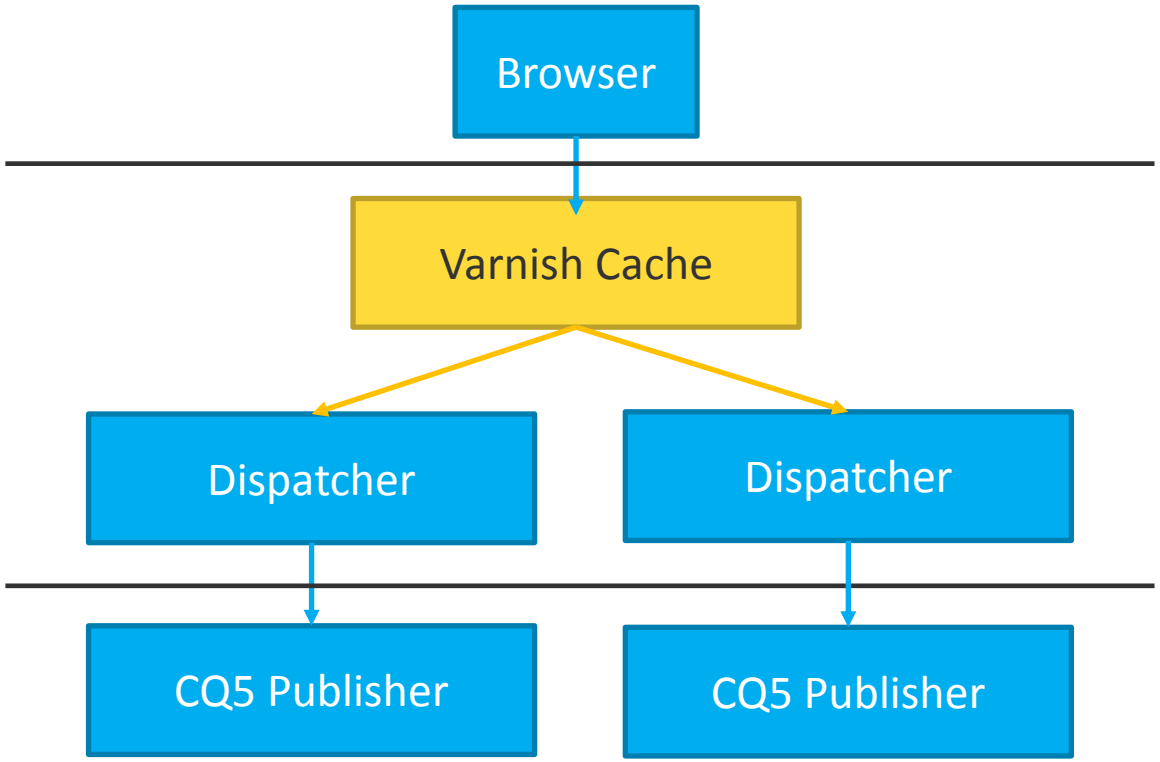
- Use case 1: Static resources
- Use case 2: REST API calls
- Use case 3: Full website

Use Case 3: Full Website

- Use Case
  - Cache generated HTML and related resources
- Benefit with Varnish
  - Reduce load on backend systems
  - Reduce response time
  - Granular cache invalidation

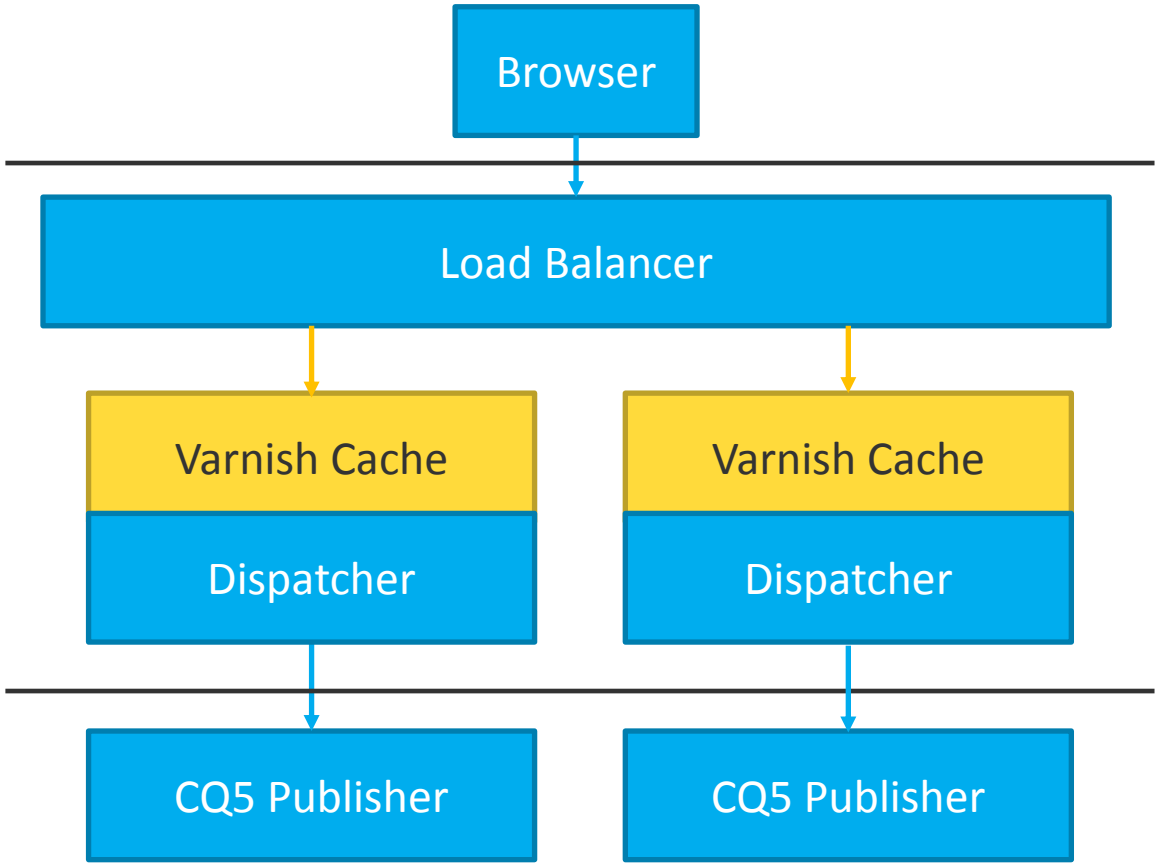
Use Case 3: Full Website

- Architecture Sample 1



Use Case 3: Full Website

- Architecture Sample 2



Use Case 3: Full Website

- Cache Invalidation

	Short TTL (1 minute)	Long TTL (1 month)
Frequently called pages	+	+
Seldom called pages	-	+
Instant invalidation	-	+
Low complexity	+	-

Use Case 3: Full Website

- Excludes from cache

```
sub vcl_recv {
  if (req.url ~ "\?"
   || req.url ~ "\/cug_") {
    return(pass);
  }
}

sub vcl_fetch {
  if (beresp.http.Dispatcher ~ "no-cache"
   || beresp.http.cache-control ~ "(no-cache|private)"
   || beresp.http.pragma ~ "no-cache") {
    set beresp.ttl = 0s;
  }
  else {
    set beresp.ttl = 4w;
  }
}
```

Use Case 3: Full Website

- Invalidate a page with “smart bans”

```
acl purgers {
  "127.0.0.1";
  "192.168.0.0"/24;
}

sub vcl_recv {
  if (req.http.X-Purge-URL) {
    if (!client.ip ~ purgers) {
      error 405 "Method not allowed";
    }
    ban("obj.http.x-url == " + req.http.X-Purge-URL);
    error 200 "Banned URL";
  }
}

sub vcl_fetch {
  set beresp.http.x-url = req.url;
}
```

Use Case 3: Full Website

- Invalidate from CQ Publisher with Modification Listener
  - Modify: `/content/customer/en/news/adaptto`
  - Risky: Purge only page and sub pages
    `/content/customer/en/news/adaptto.*`
  - Safe: Purge whole language tree
    `/content/customer/en.*`

Agenda

- Varnish Cache at a glance
- Use Cases and Architectures
- Limitations and Pitfalls

Limitations and Pitfalls

- SSL termination
  - **Problem**
    Varnish has no SSL termination
  - **Justification**
    Varnish source code: 80’000 lines of code
    OpenSSL: 340’000 lines of code
  - **Solution**
    Use another tier in front of Varnish (nginx, pond, …)

Limitations and Pitfalls

- Avoid “double purge”
  - **Assumed situation**
    2 Publisher and 1 Varnish
  - **Problem**
    Modification listener is executed on both Publishers → 2 purge requests
  - **Solution**
    Define “master” publisher and handle failover

Limitations and Pitfalls

- Proxy
  - **Assumed situation**
    - Varnish is used to cache REST API Calls
    - Your customer force to use proxy for all external requests
  - **Problem**
    Varnish has no configuration for backend through proxy
  - **Solution**
    Set proxy as backend and tweak URL

Limitations and Pitfalls

- Proxy solution

```
backend proxy {
  .host = "corporate-proxy-hostname";
  .port = "8080";
}

sub vcl_recv {
  set req.backend = proxy;
  set req.http.X-Forwarded-For = client.ip;
  set req.http.host = "dispatcher-hostname";
  set req.http.port = 80;

  set req.url = "http://" + req.http.host + ":" +
                    req.http.port + req.url;
}
```

Thank you

Namics

- 5 Locations in Germany and Switzerland

  Frankfurt, Hamburg, München, Zürich, St. Gallen

- Many interesting projects with CQ5 and other technologies

- 400 + 1 (?) Employees

  www.namics.com/jobs

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Resources and Further Links

- https://www.varnish-cache.org/trac/wiki/VCLExampleLongerCaching
- https://www.varnish-software.com/static/book/Tuning.html
- https://www.varnish-software.com/static/book/_images/vcl.png
- http://blog.namics.com/2013/01/www-zh-ch-ist-50x-schneller-und-stabiler.html
- http://blog.namics.com/2010/12/varnish-cache.html

Variable availability in VCL

Variable	recv	fetch	pass	miss	hit	error	deliver	pipe	hash
req.*	R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W
bereq.*		R/W	R/W	R/W				R/W	
obj.hits					R		R		
obj.ttl					R/W	R/W			
obj.grace					R/W				
obj.*					R	R/W			
beresp.*		R/W							
resp.*						R/W	R/W		