

# Meningkatkan Ketersediaan Perkhidmatan Kerajaan Melalui ICT

Ts. Mohd Nawawi Mustafa  
Bahagian Perundingan ICT  
MAMPU

12 Mei 2020

- Isu, Objektif & Skop
- Prinsip Asas Keselamatan
- Rangka Kerja Keselamatan Siber Sektor Awam (RAKKSSA)
- Elemen Bagi Meningkatkan Ketersediaan Perkhidmatan Kerajaan
- Penutup

# ISU, OBJEKTIF & SKOP

3

## ISU

- Sebahagian sistem penyampaian perkhidmatan kerajaan menggunakan ICT mengalami gangguan akibat pengguna/trafik yang tinggi secara mendadak

## OBJEKTIF

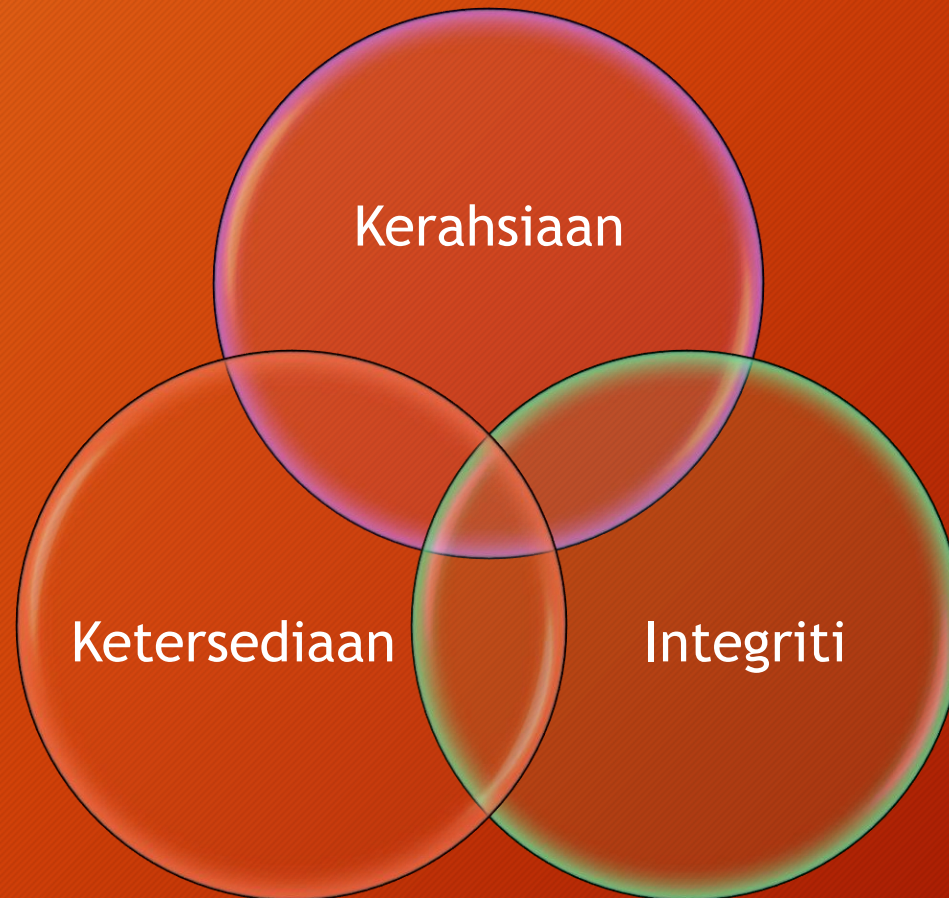
- Sistem penyampaian perkhidmatan kerajaan melalui ICT tidak terganggu semasa lonjakan pengguna/trafik

## SKOP

- Sesi ini hanya membincangkan elemen-elemen teknologi ICT yang perlu diambil kira bagi mengatasi isu *network spike*

# PRINSIP ASAS KESELAMATAN

4



# RAKKSSA



5

## PENYAMPAIAN PERKHIDMATAN SEKTOR AWAM YANG SELAMAT

AWAM

AGENSI KERAJAAN

INDUSTRI

<b>7.0 AUDIT KESELAMATAN</b>	<b>7.3 AUDIT LUAR</b>	<b>1.0 KENAL PASTI</b>				<b>8.0 KUAT KUASA</b>
		1.1 PERSEKITARAN JABATAN	1.2 TADBIR URUS	1.3 ASET	1.4 RISIKO	
		<b>2.0 LINDUNG</b>				
		2.1 PRINSIP KESELAMATAN	2.2 TEKNOLOGI	2.3 PROSES	2.4 MANUSIA	
	<b>7.2 AUDIT DALAM</b>	<b>3.0 KESAN</b>				
		3.1 PEMANTAUAN BERTERUSAN		3.2 ANOMALI & PERISTIWA		
		<b>4.0 TINDAK BALAS</b>				
		4.1 PELAN TINDAK BALAS	4.2 KOMUNIKASI	4.3 ANALISIS		
		4.4 MITIGASI		4.5 PENAMBAHBAIKAN		
	<b>7.1 TAHAP KEMATANGAN</b>	<b>5.0 PULIH</b>				
5.1 PELAN KESINAMBUNGAN PERNIAGAAN DAN PEMULIHAN BENCANA		5.2 PENAMBAHBAIKAN				
<b>6.0 PEROLEH</b>						
6.1 KENAL PASTI KEPERLUAN		6.2 SPESIFIKASI PEROLEHAN	6.3 PENGURUSAN SYARIKAT PEMBEKAL	6.4 JEJAK SUMBER		
5 KITARAN HAYAT SISTEM	6.6 PROSES PENTAULIAHAN	6.7 PROSES PELUCUTAN PENTAULIAHAN	6.8 PELUPUSAN			
		8.1 PENGUATKUASAAN DALAMAN		8.2 PIHAK BERKUASA & SKOP PENGUATKUASAAN		

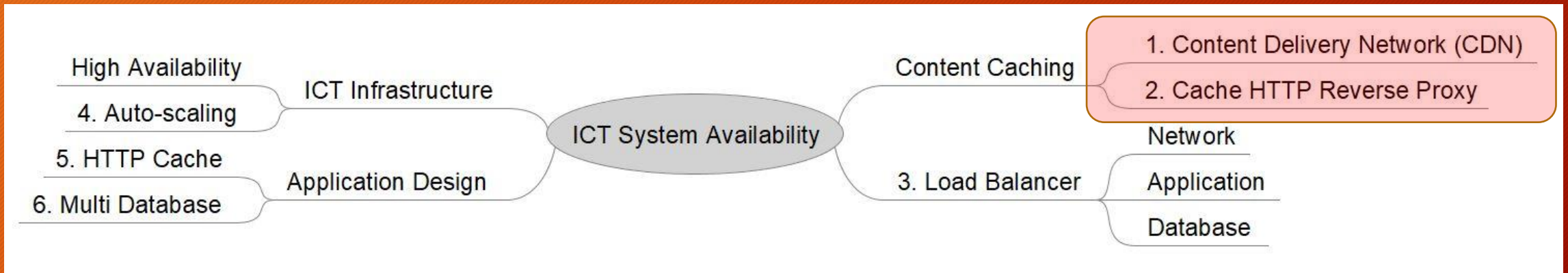
RAKAN STRATEGIK

TADBIR URUS

PENGURUSAN PERUBAHAN

# ELEMEN BAGI KETERSEDIAAN SISTEM ICT

6

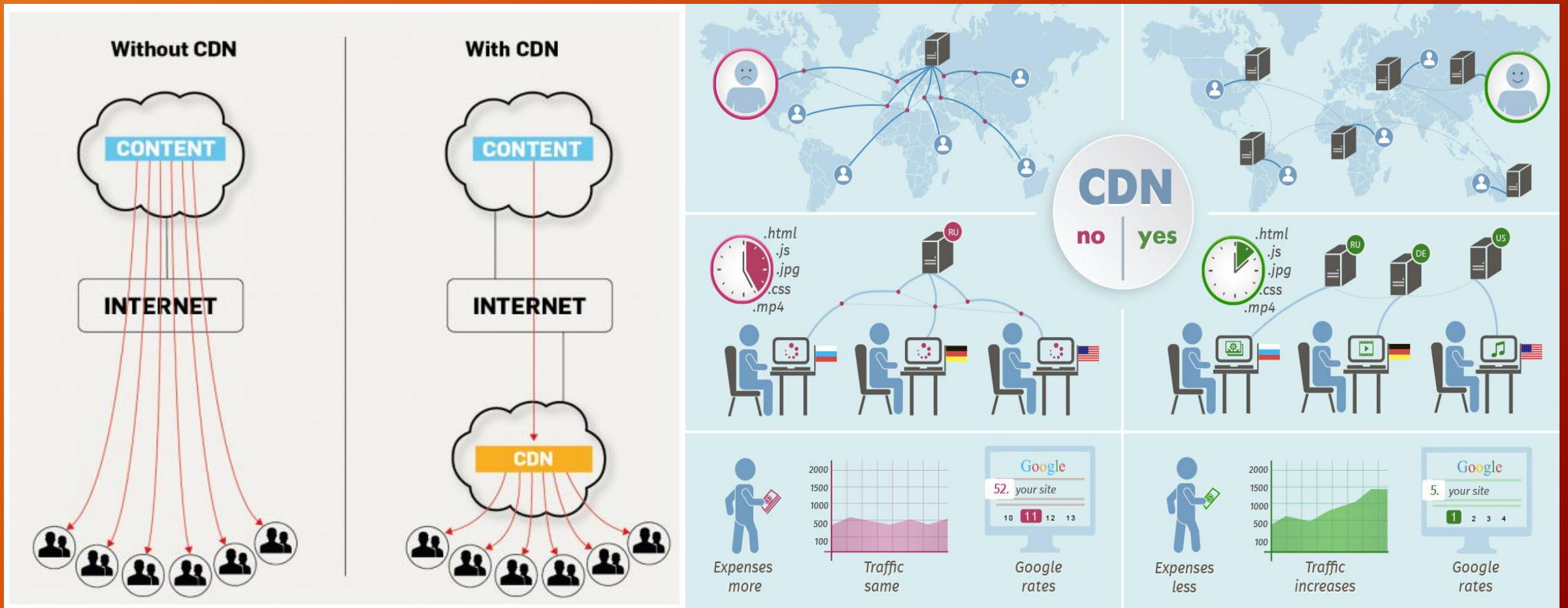


# Content Delivery Network (CDN)

7

- CDNs are systems of servers dispersed geographically across a region. These servers will store a website's content – texts, images, and pages, for example – for later retrieval, with each server having a copy of that content.
- When an end user goes to load a website or platform, they will be connected to the CDN closest to them to retrieve the content data. Using a CDN allows for websites and their content to load faster and download quicker. In short, CDNs improve the quality of your website for the end user by distributing the workload to the server closest to them.

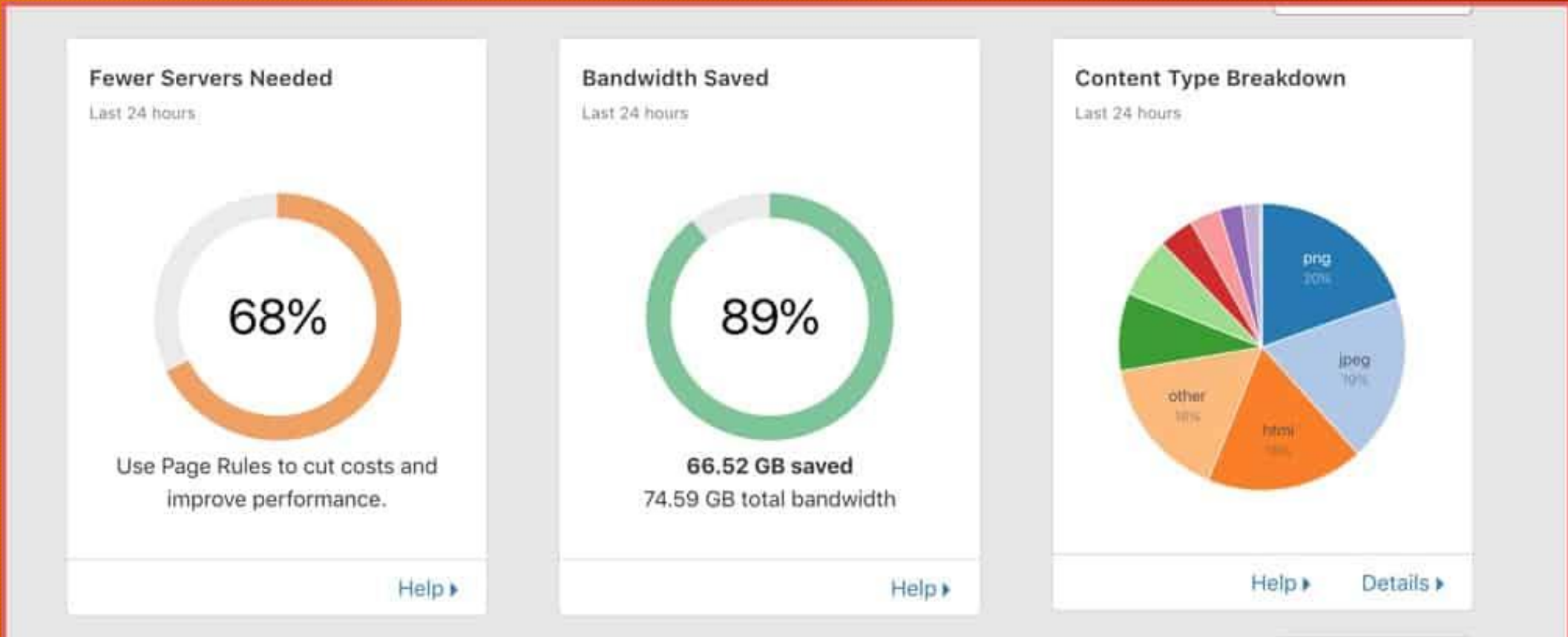
# Kelebihan CDN





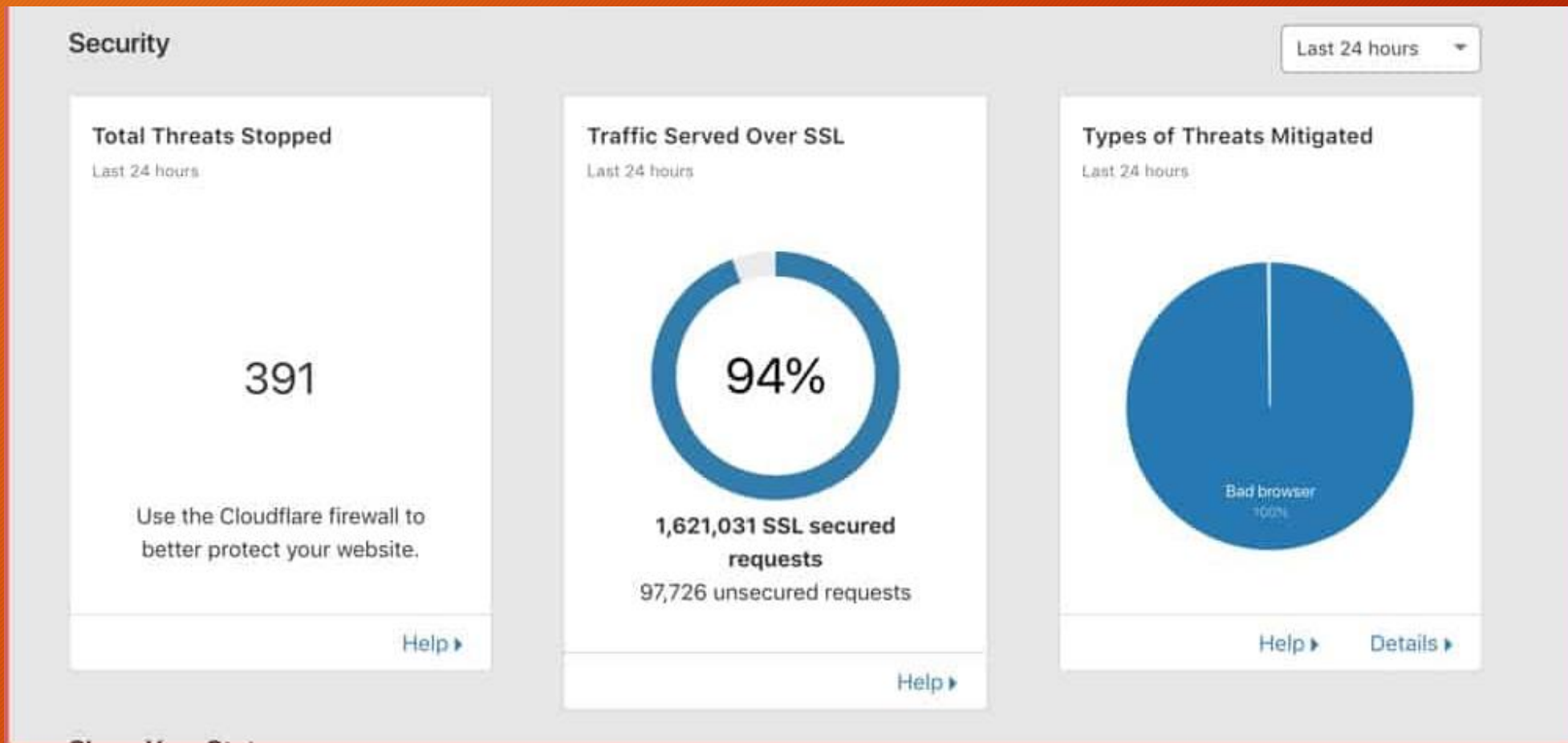
# Kelebihan CDN

9



# Kelebihan CDN

10



# CDN Di Malaysia

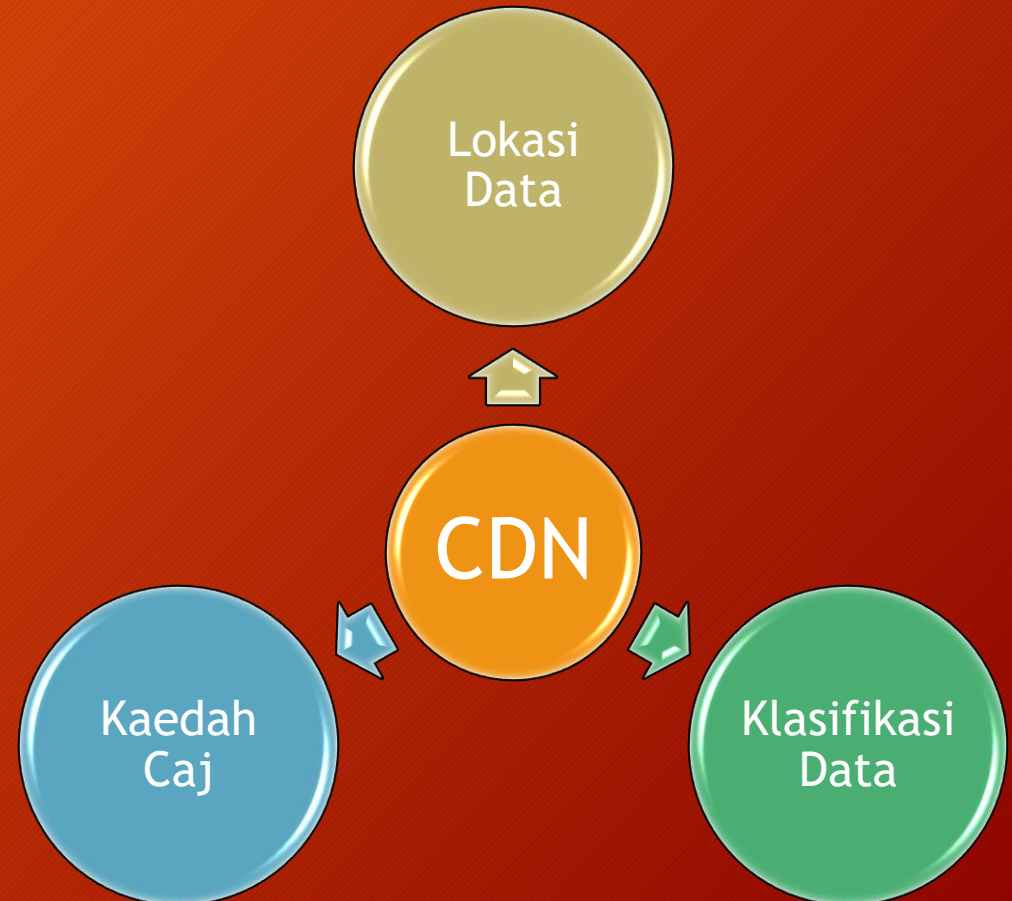
11

CDN	POP count	POP locations
<a href="#">BaishanCloud</a>	1	Kuala Lumpur
<a href="#">CDNetworks</a>	1	Kuala Lumpur
<a href="#">CDNvideo</a>	1	Kuala Lumpur
<a href="#">ChinaCache</a>	1	Kuala Lumpur
<a href="#">CloudFront</a>	1	Kuala Lumpur
<a href="#">Cloudflare</a>	1	Kuala Lumpur
<a href="#">Imperva</a>	1	Kuala Lumpur
<a href="#">Kingsoft Cloud</a>	1	Kuala Lumpur
<a href="#">Level 3</a>	1	Kuala Lumpur
<a href="#">Limelight</a>	4	Kepong - Kinarut - Kuala Lumpur - Sebong
<a href="#">QUANTIL</a>	1	Kuala Lumpur
<a href="#">SwiftServe</a>	1	Kuala Lumpur

# Adakah Sesuai Gunakan CDN?

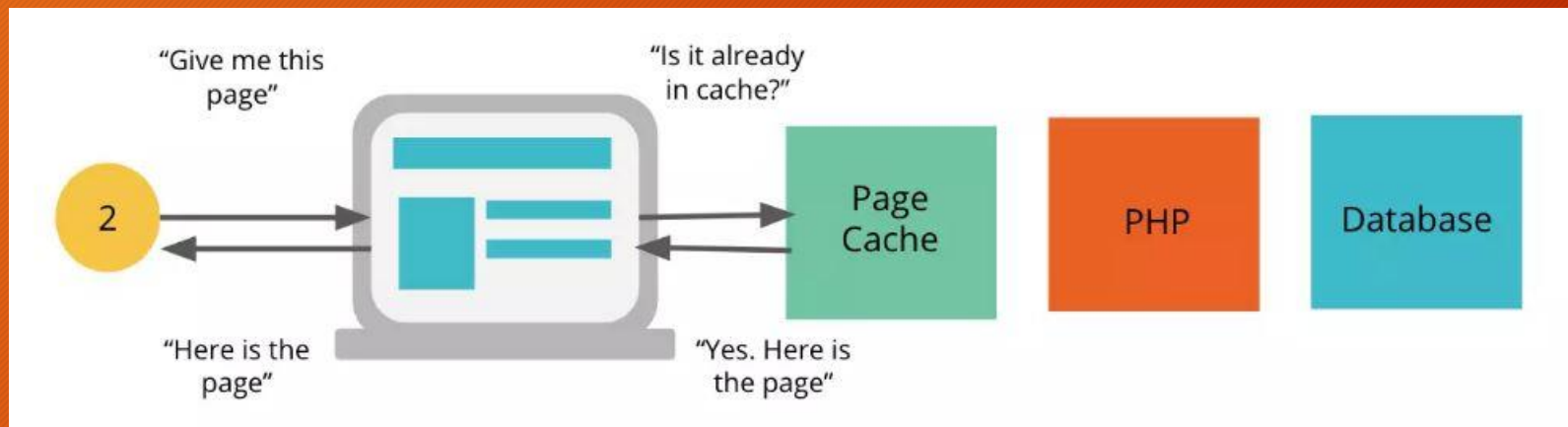
12

- Fail-fail statik (pdf, html, jpg, mpg, dll.) sistem ICT / portal akan disimpan di lokasi yang diluar kawalan agensi
- Adakah mengandungi maklumat terperinci / sensitif?
- Apakah kaedah pembayaran - percuma / tahunan / berdasarkan kapasiti data?



# Caching HTTP Reverse Proxy

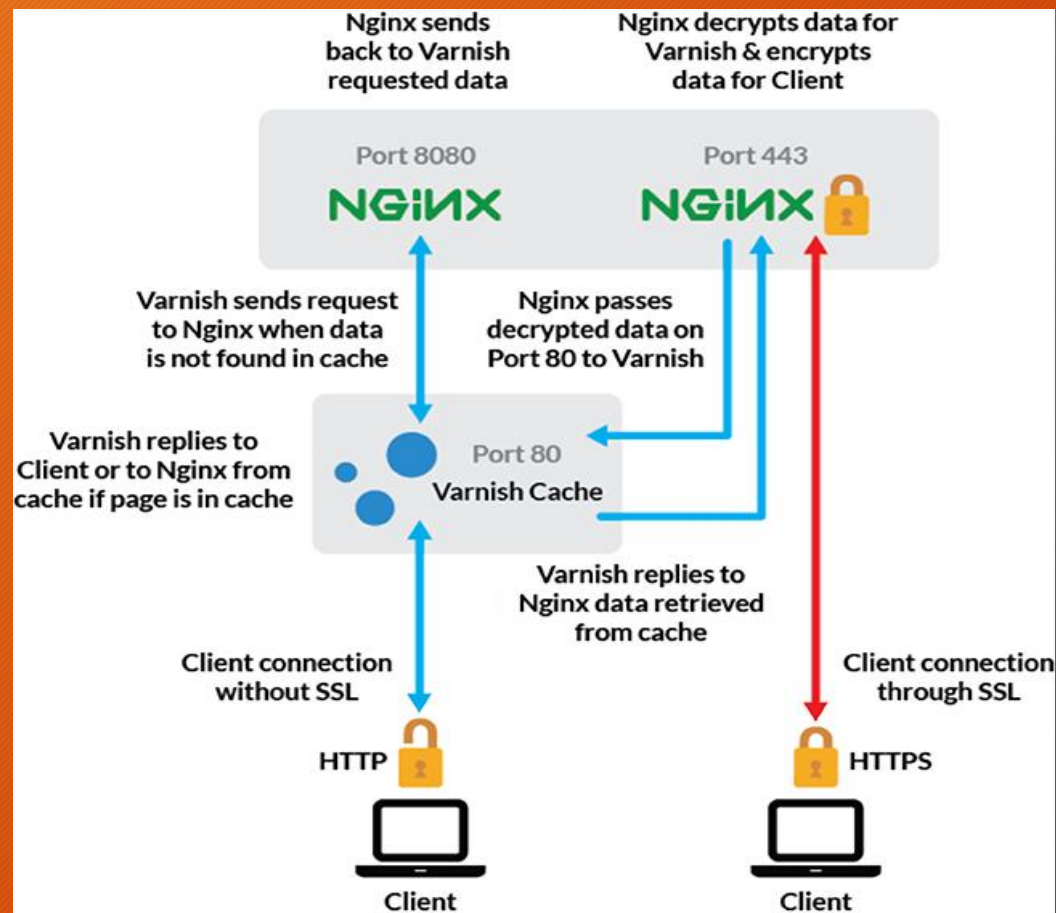
13



- Caching is the process of storing information for a set period of time on a computer.
- Page caching (also known as HTTP or site caching) stores data like images, web pages, and other content temporarily when it's loaded for the first time.
- This data is stored in an unused portion of RAM and has no significant impact on memory.

# Varnish HTTP Cache

14



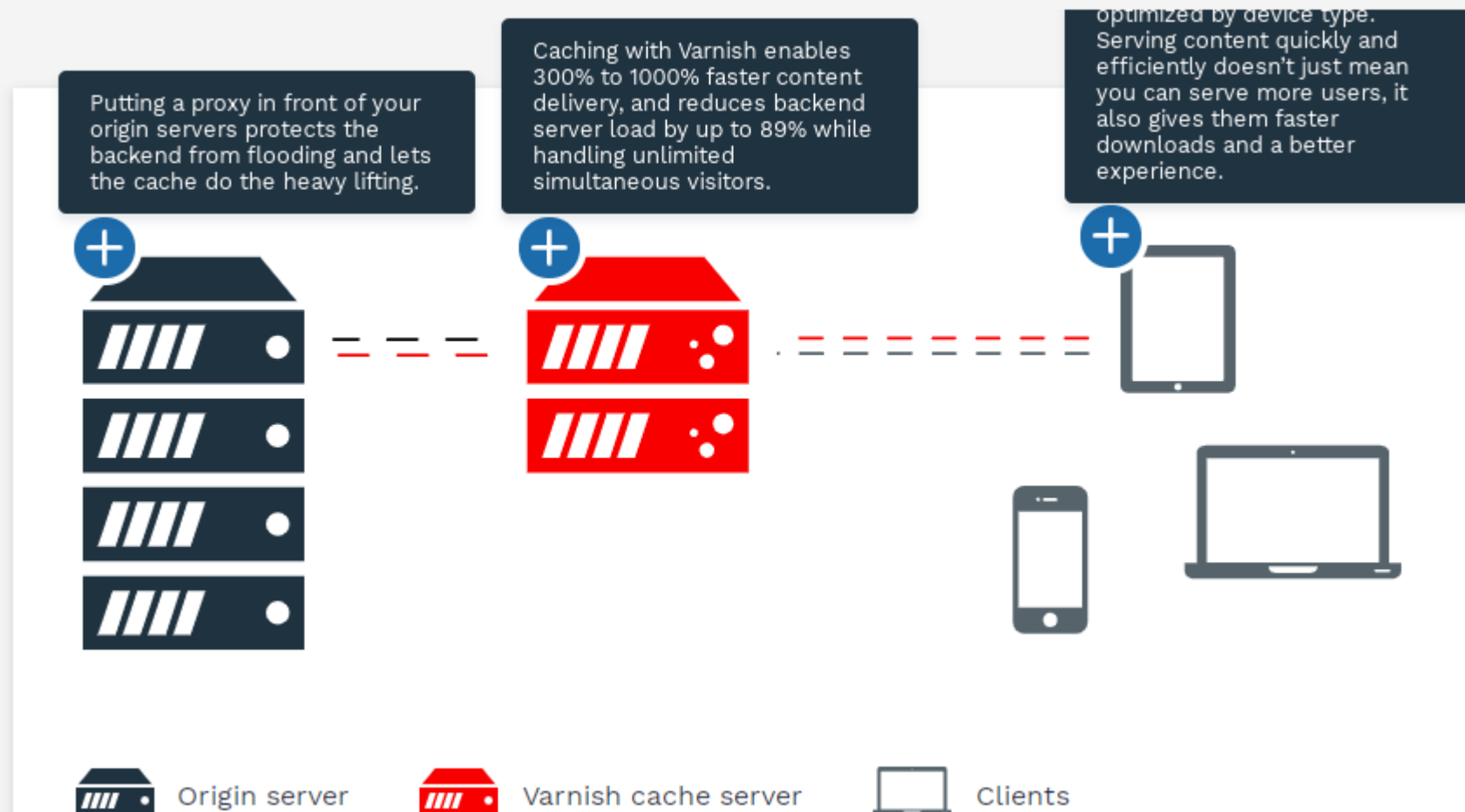
## Installation guide:

- <https://www.tecmint.com/install-varnish-cache-for-nginx-on-centos-rhel-8/>
- <https://hostadvice.com/how-to/how-to-setup-varnish-http-cache-on-an-ubuntu-18-04-vps-or-dedicated-server/>



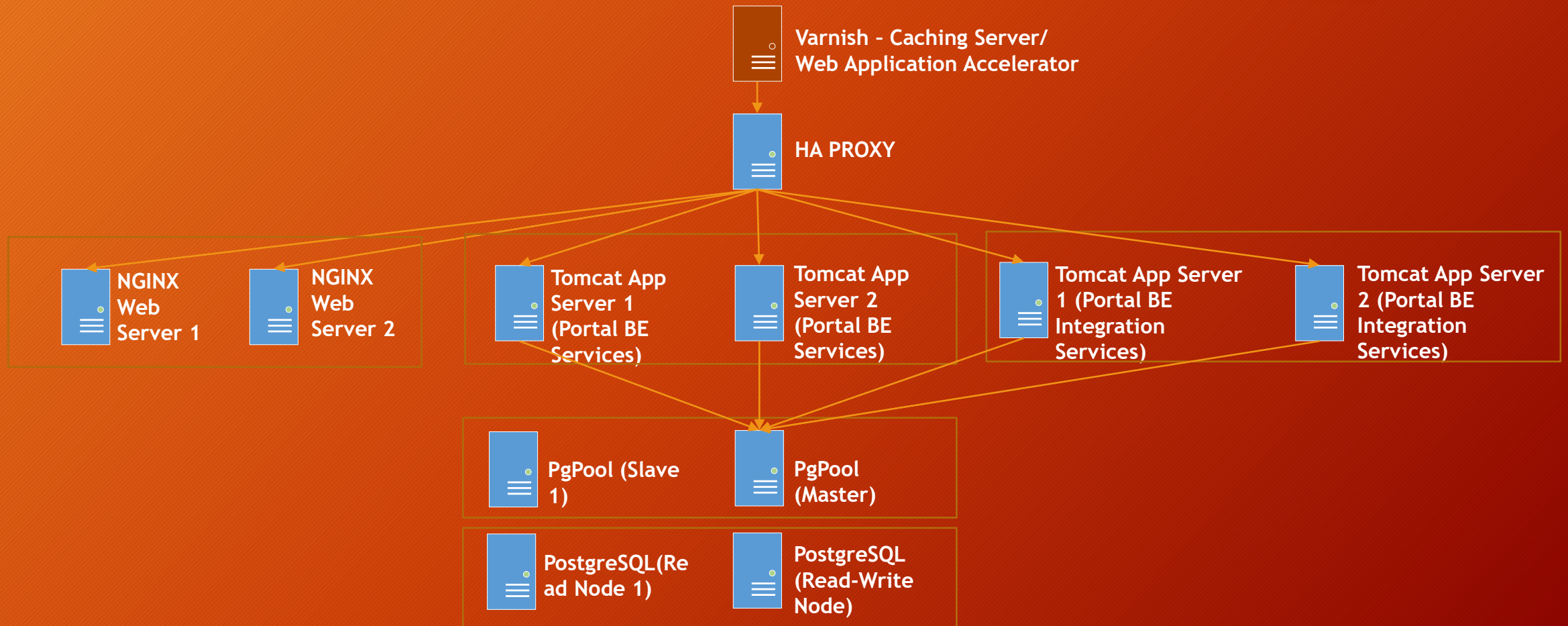
# Kelebihan Varnish HTTP Cache

15



# Varnish - Performance Test

16





# Varnish - Performance Test

17

	90% Response Time	
	JMETER@Perf_Test_Env	
Loop Count	Linux (secs) <u>without</u> Cache Server	Linux (secs) <u>with</u> Cache Server
1	0.46	0.13
2	0.75	0.13
3	1.86	0.10
4	13.9	0.08
5	25.9	0.08

Load static page

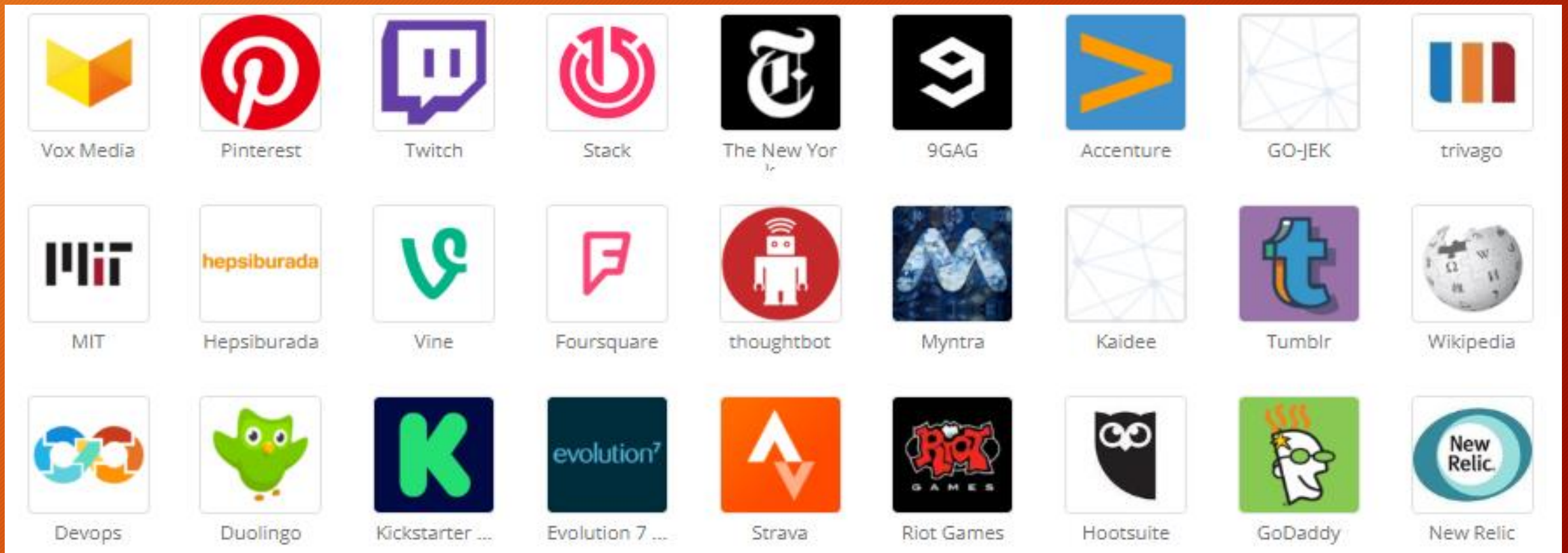
- Setiap ujian (*loop*) adalah sebanyak 4,000 *concurrent users*

		90% Response Time	
		JMETER@Perf_Test_Env	
Loop Count	Operation	Linux (secs) <u>without</u> Cache Server	Linux (secs) <u>with</u> Cache Server
1	Load registration		
	Page	0.18	0.09
	Submit	0.46	0.52

Load page & submit data

# Pengguna Varnish

18

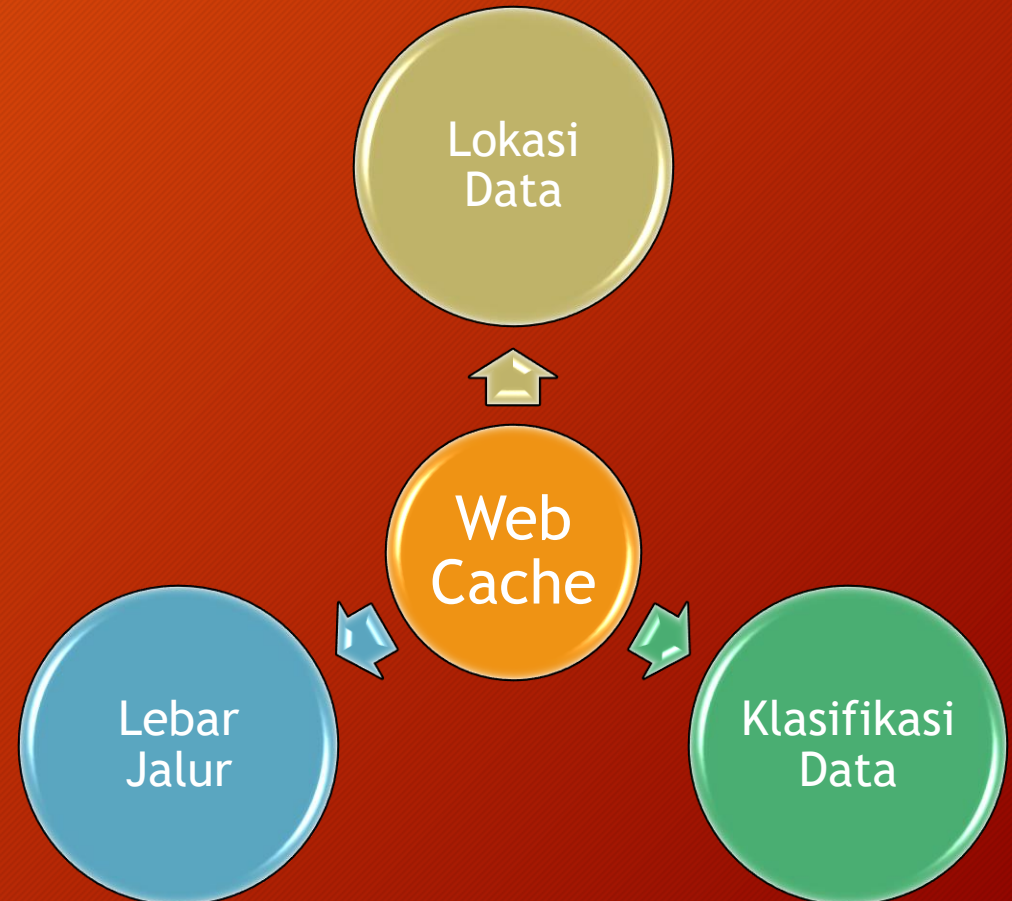


Why companies use Varnish: High-performance, Very fast, Very Stable, Very Robust, HTTP Reverse Proxy, Open source, Web application accelerator, Easy to configure, Widely Used and Great Community

# Adakah Sesuai Gunakan Varnish?

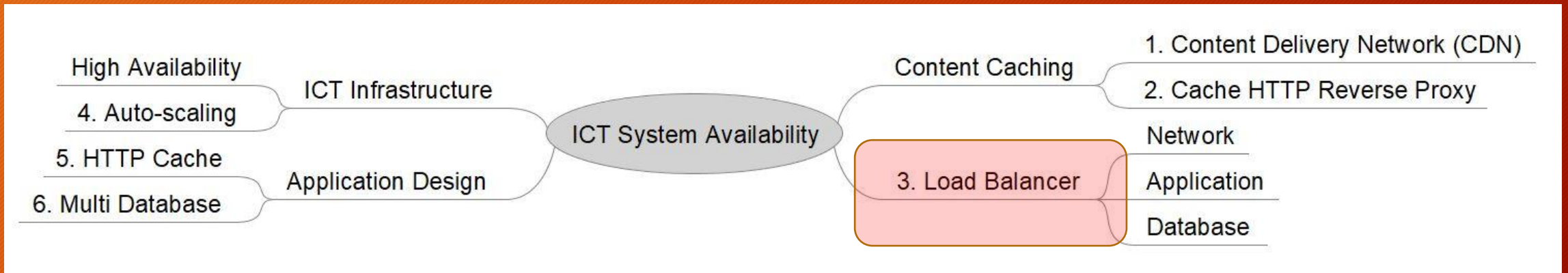
19

- Fail-fail statik (pdf, html, jpg, mpg, dll.) sistem ICT / portal akan disimpan di lokasi yang ditentukan oleh agensi
- Adakah mengandungi maklumat terperinci / sensitif?
- Adakah lebar jalur rangkaian mencukupi?



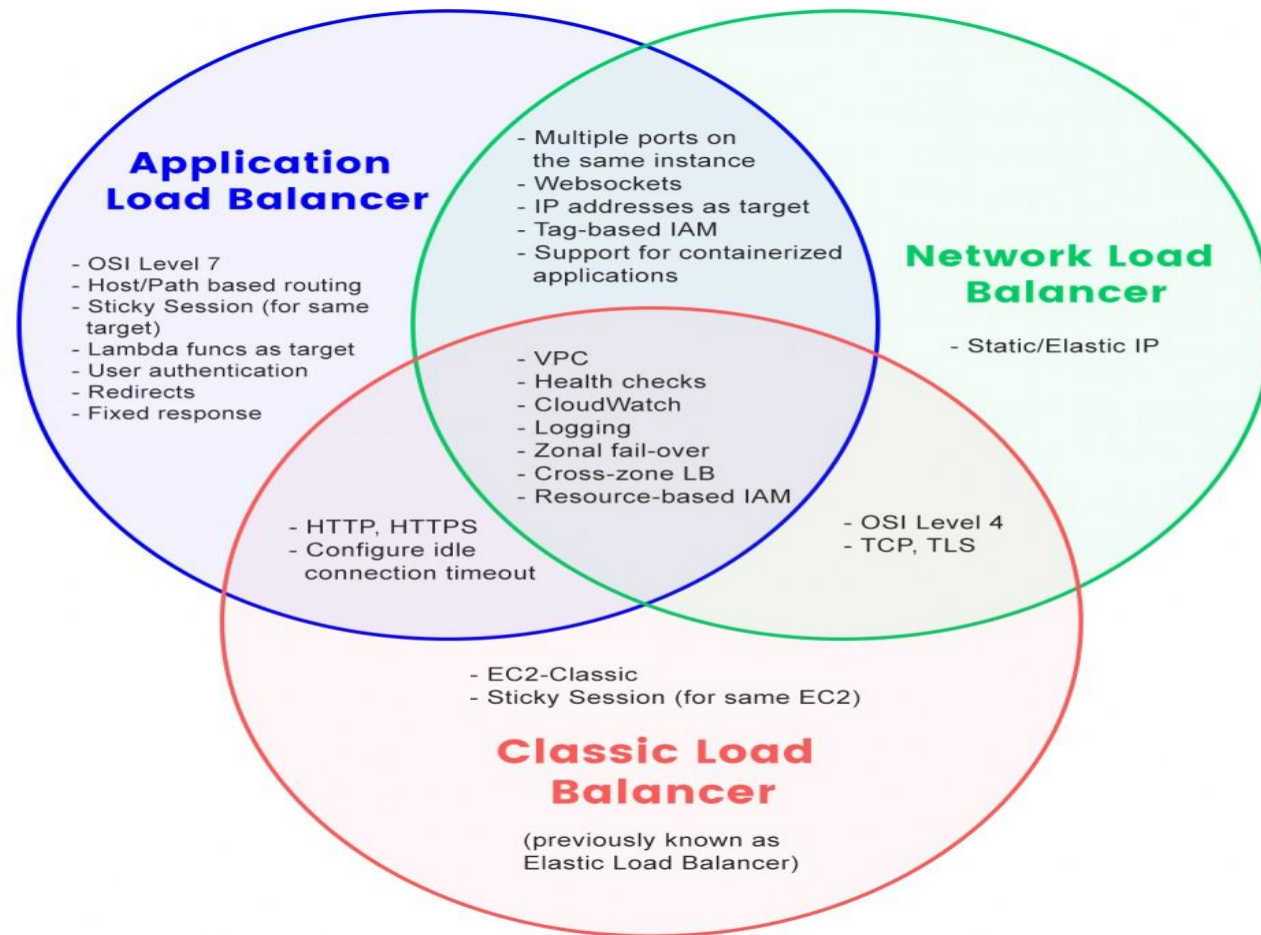
# ELEMEN BAGI KETERSEDIAAN SISTEM ICT

20



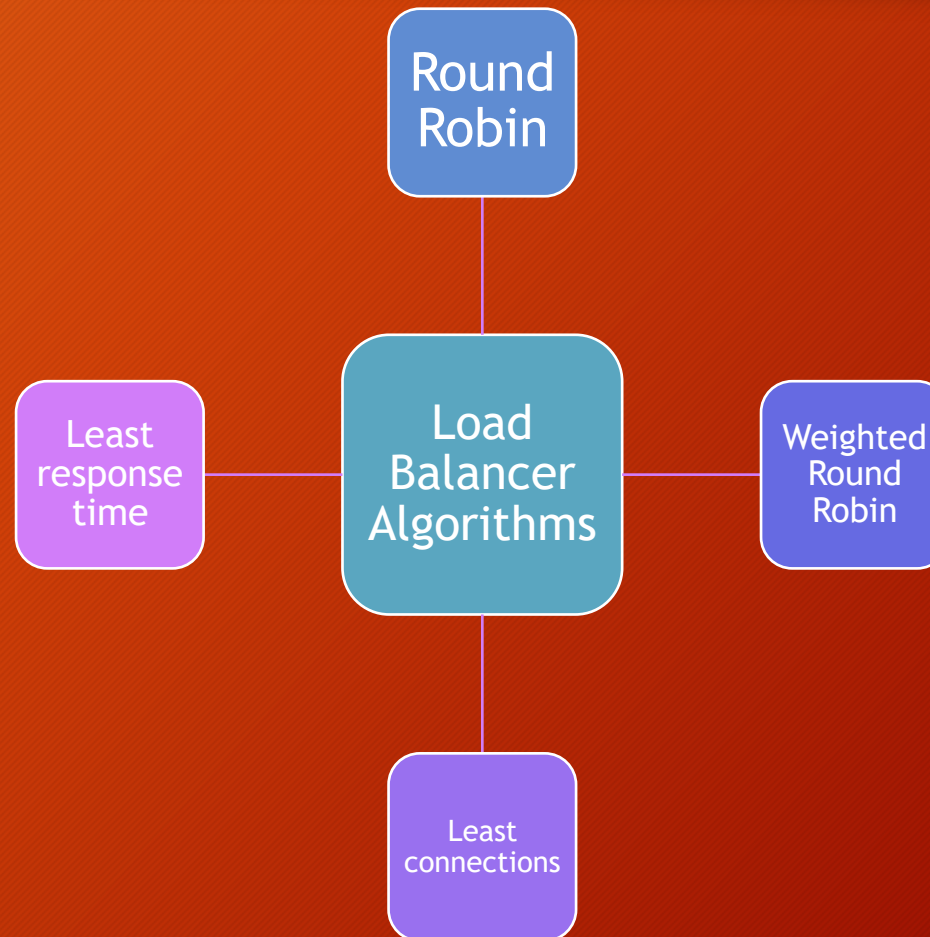
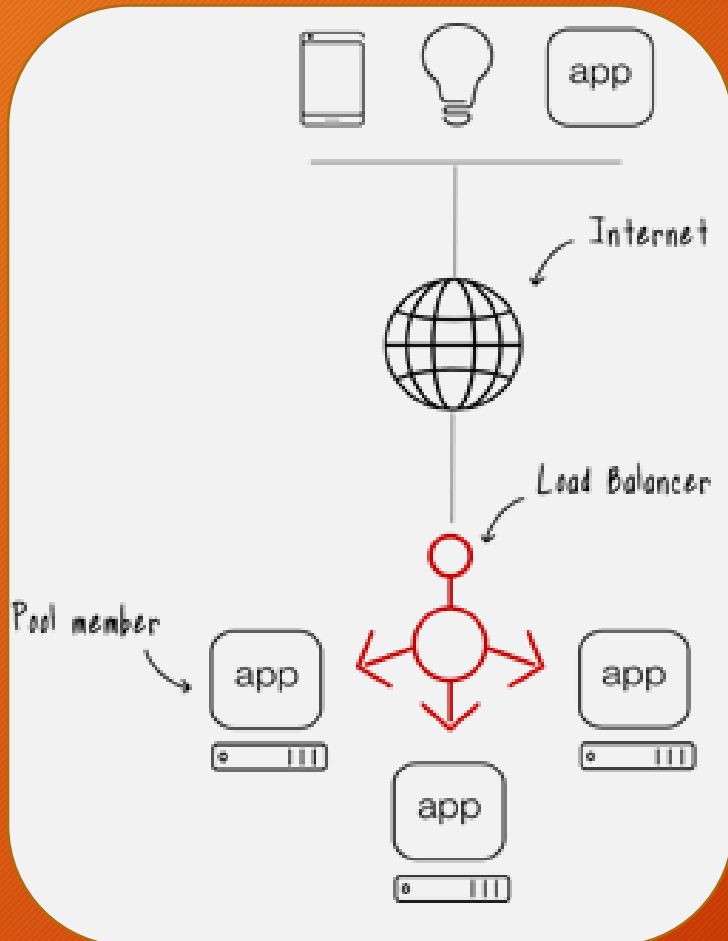
# Types of Load Balancer

21



# Methods of Load Balancer

22



# Isu Berkaitan Load Balancer

23

- Load Balancer (LB) berfungsi dengan baik jika digunakan pada aplikasi / portal yang tidak memerlukan pengguna login
- Tidak semua aplikasi dibangunkan untuk digunakan pada LB
  - a) *Session* pengguna disimpan di dalam fail pada server
  - b) Penggunaan *resource server* tidak dapat dioptimalkan kerana kaedah 'round robin' tidak dapat digunakan
  - c) LB dikonfigurasi dengan '*sticky session*' (*persistence*) menyebabkan penggunaan *resource* yang tidak seimbang
- Cadangan penyelesaian: pembangunan arkitektur aplikasi hendaklah mengambil kira centralised session storage seperti penggunaan pangkalan data / Redis

# Default Session Configuration in Laravel

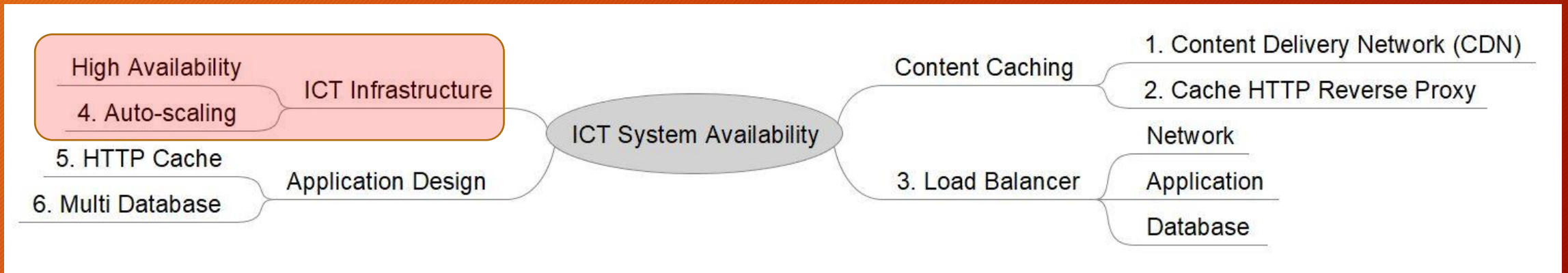
24

```
return [  
  
    /*  
    |-----  
    | Default Session Driver  
    |-----  
    |  
    | This option controls the default session "driver" that will be used on  
    | requests. By default, we will use the lightweight native driver but  
    | you may specify any of the other wonderful drivers provided here.  
    |  
    | Supported: "file", "cookie", "database", "apc",  
    |             "memcached", "redis", "dynamodb", "array"  
    |-----  
    */  
  
    'driver' => env('SESSION_DRIVER', 'file'),
```



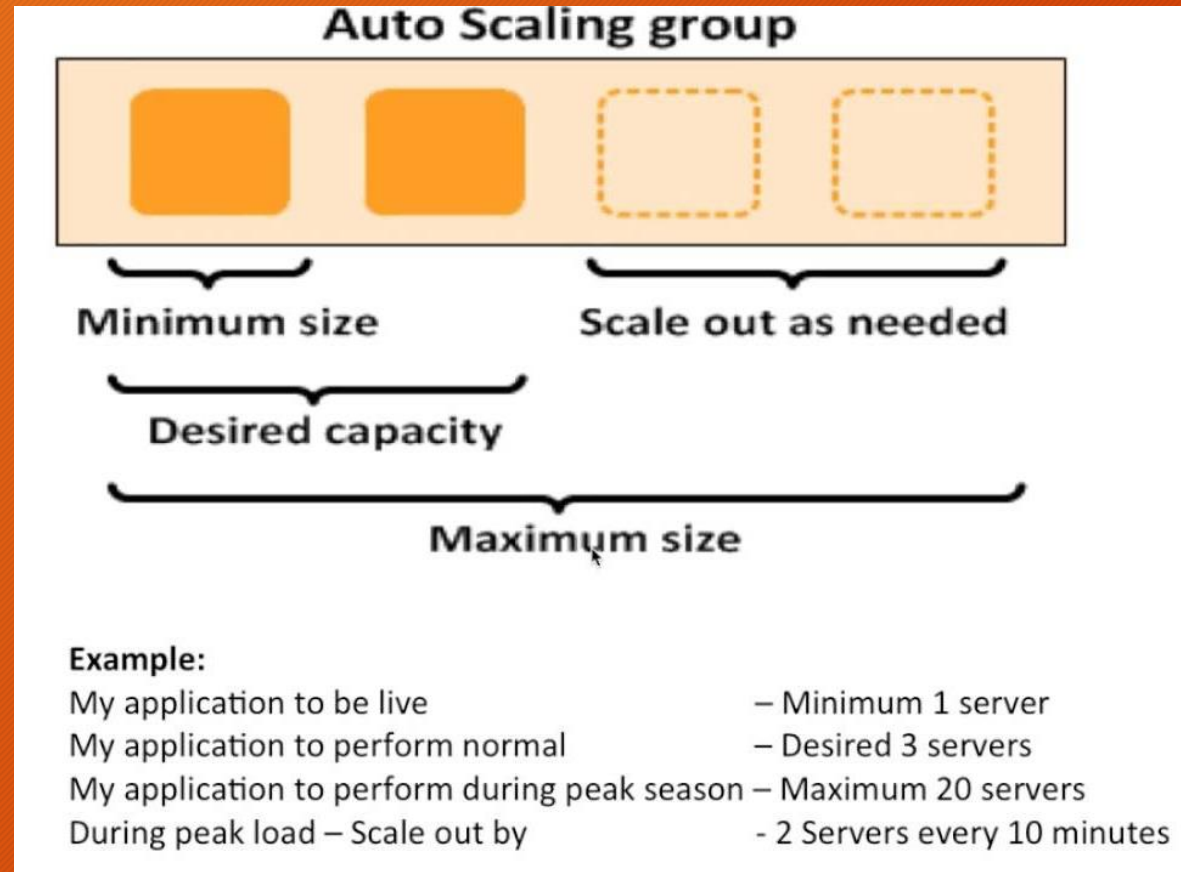
# ELEMEN BAGI KETERSEDIAAN SISTEM ICT

25



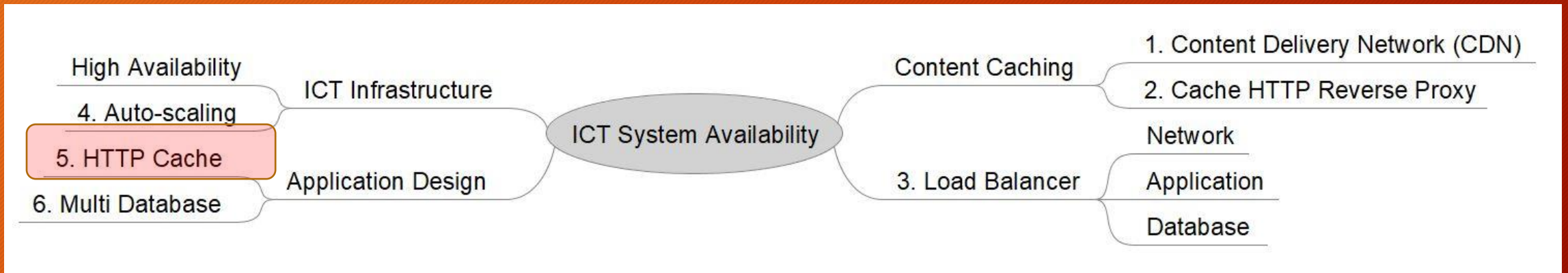
# Auto Scaling Server

26



# ELEMEN BAGI KETERSEDIAAN SISTEM ICT

27



# HTTP Cache

28

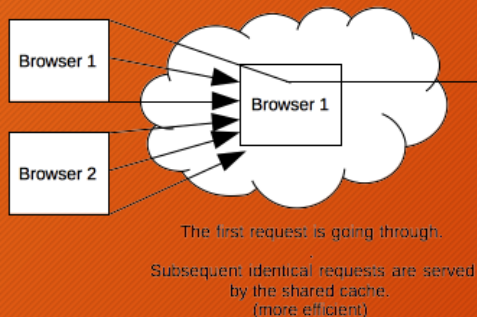
No cache



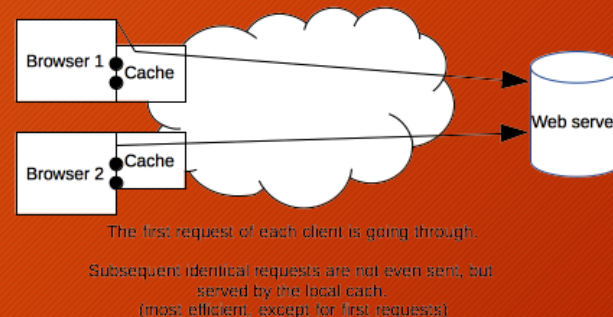
## Cache Control:

- Enable/disable cache
- Expiration
- Validation
- Cache validation
- Freshness

Shared cache

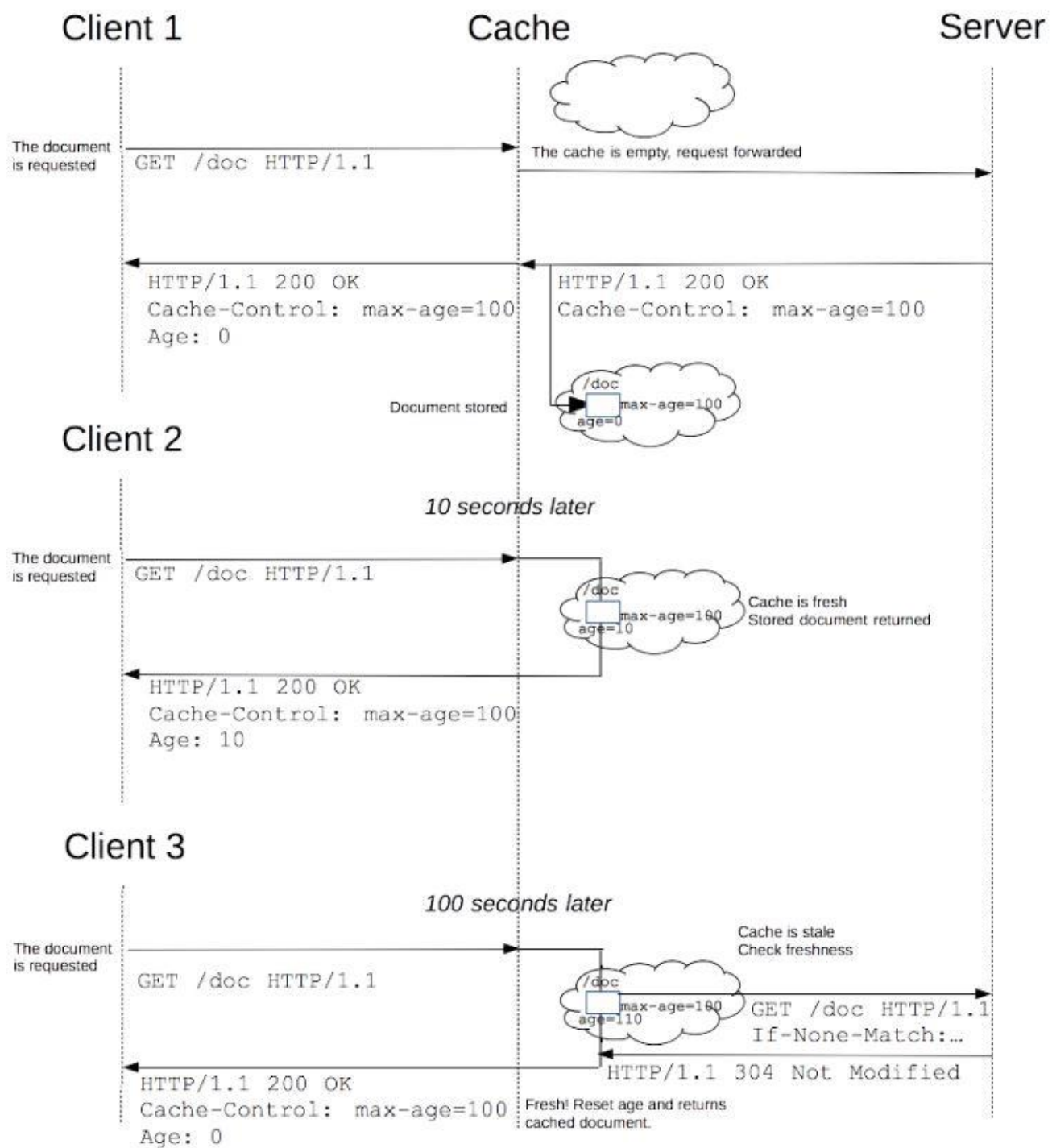


Local (private) cache



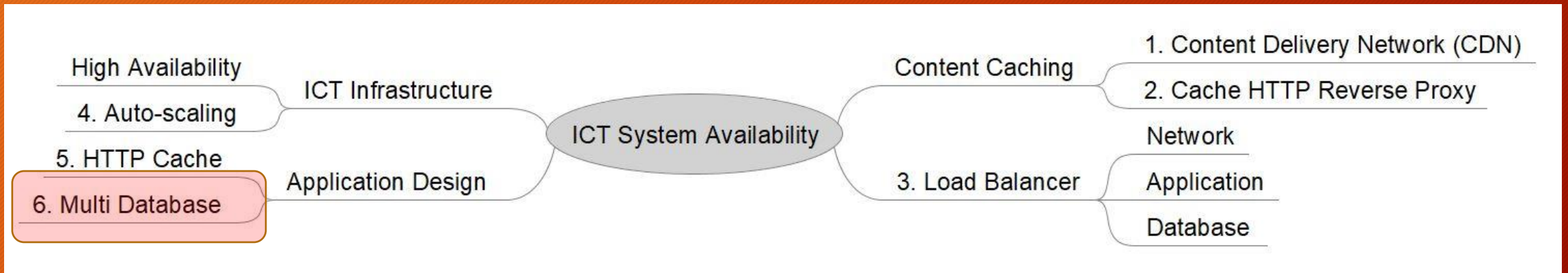
# HTTP Cache

29



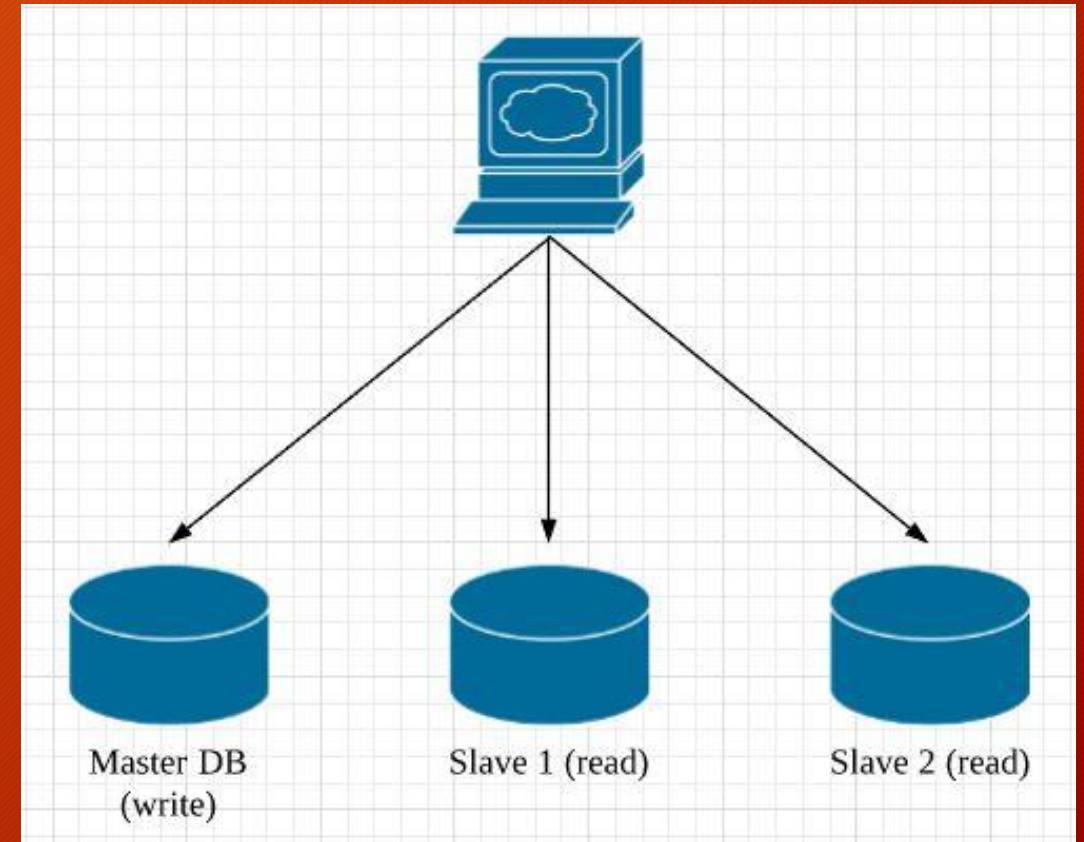
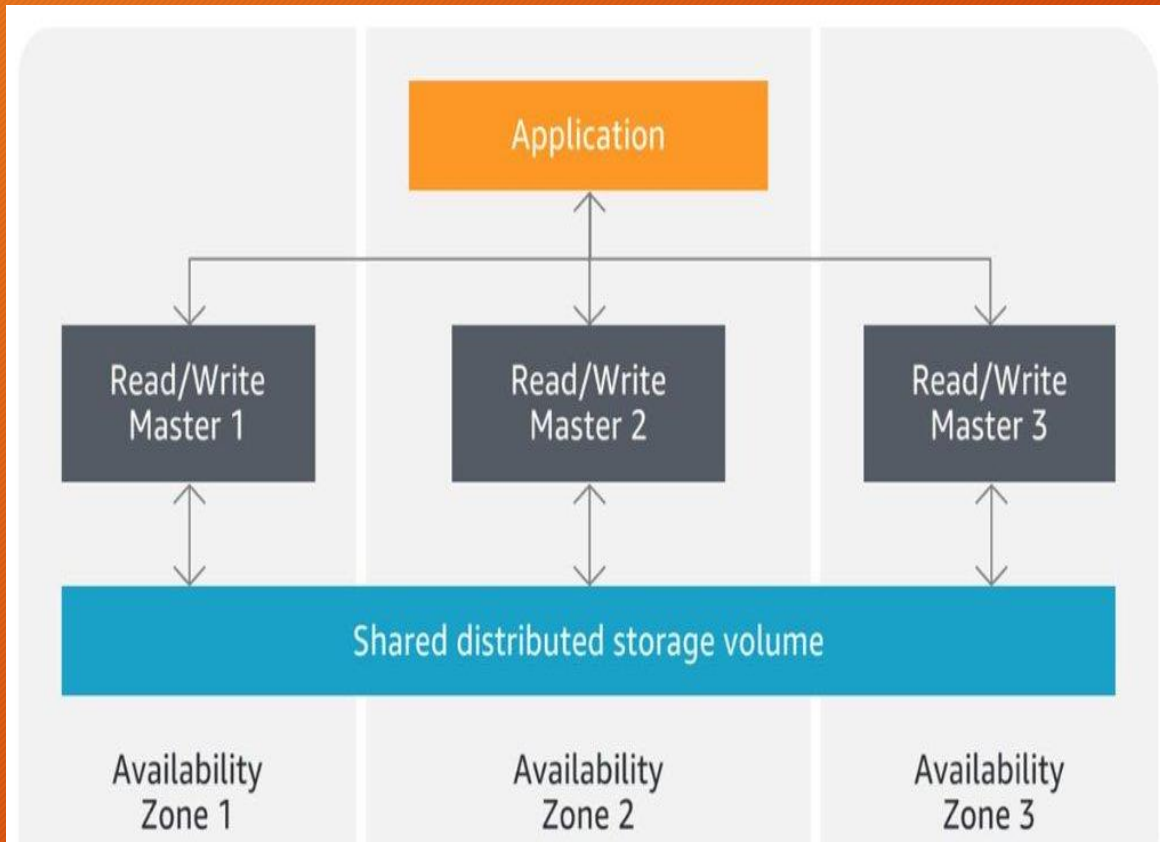
# ELEMEN BAGI KETERSEDIAAN SISTEM ICT

30



# Multi Database

31



- Elemen utama bagi meningkatkan ketersediaan sistem penyampaian perkhidmatan kerajaan melalui ICT adalah dengan menggunakan Content Delivery Network (CDN) dan/atau Local Caching HTTP Reverse Proxy
- Keselamatan dan klasifikasi maklumat yang disimpan perlu di ambil kira dalam pemilihan teknologi yang sesuai
- Lain-lain faktor yang dibincangkan boleh digunakan sebagai elemen tambahan bagi meningkatkan ketersediaan sistem
- Pematuhan ke atas akta, arahan, pekeliling dan lain-lain peraturan berkuatkuasa adalah penting bagi menjamin CIA data dan maklumat



Sekian,  
Terima Kasih

Mohd Nawawi Mustafa  
Bahagian Perundingan ICT  
MAMPU  
[mnawawi@mampu.gov.my](mailto:mnawawi@mampu.gov.my)