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Your world of
performance & capacity.

Welcome to Today's Webinar:
Innovations in Data Center vs. Edge for Capacity Planning

The presentation will begin shortly.

APAKAU

Featured Speaker

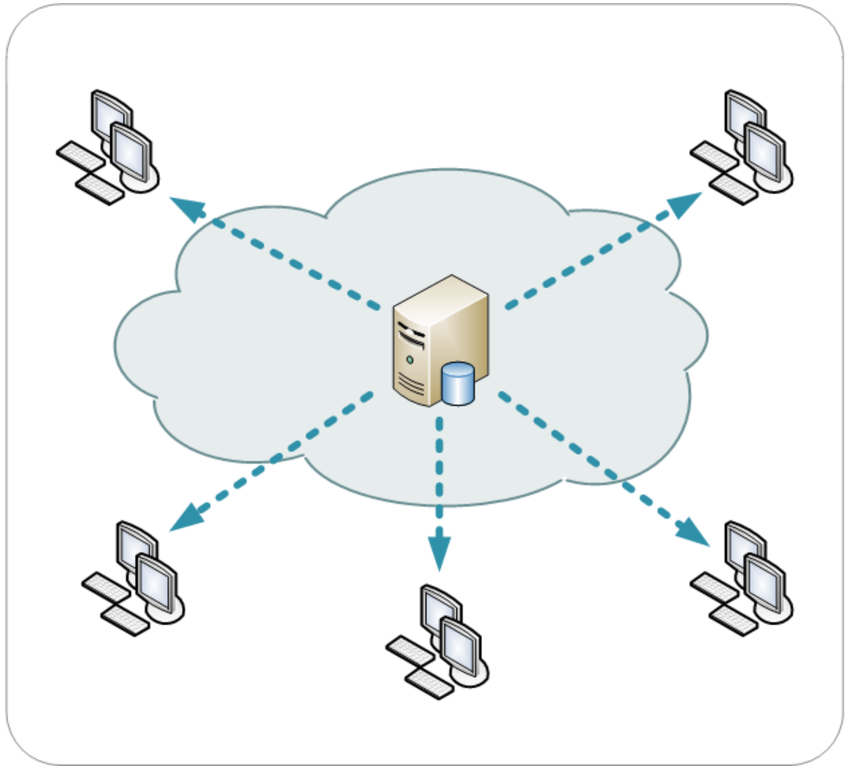
Vic Cekvenich

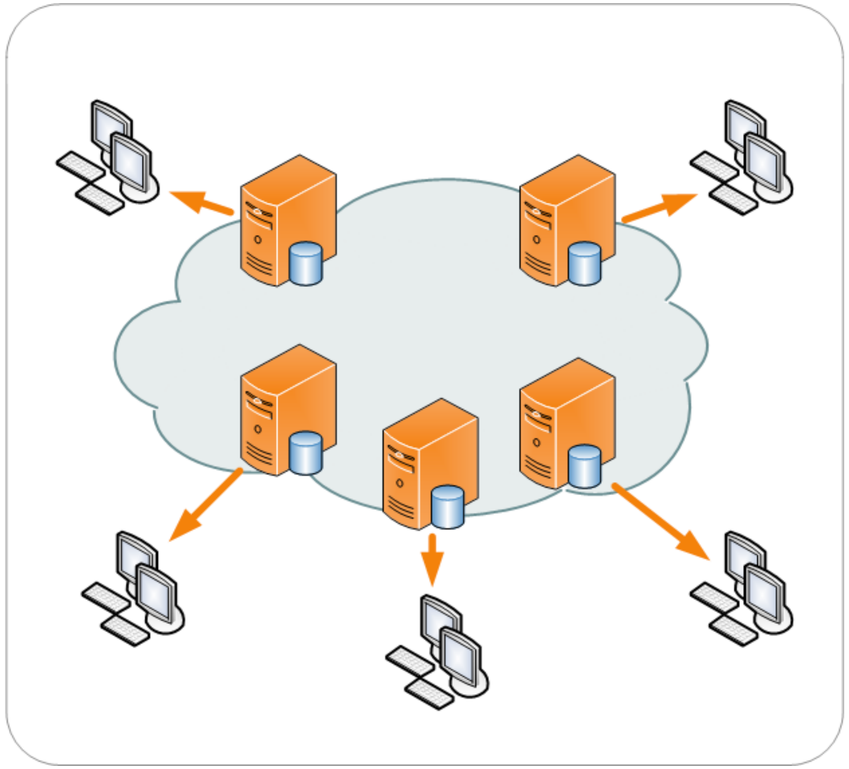
CTO and Co-founder of Apakau

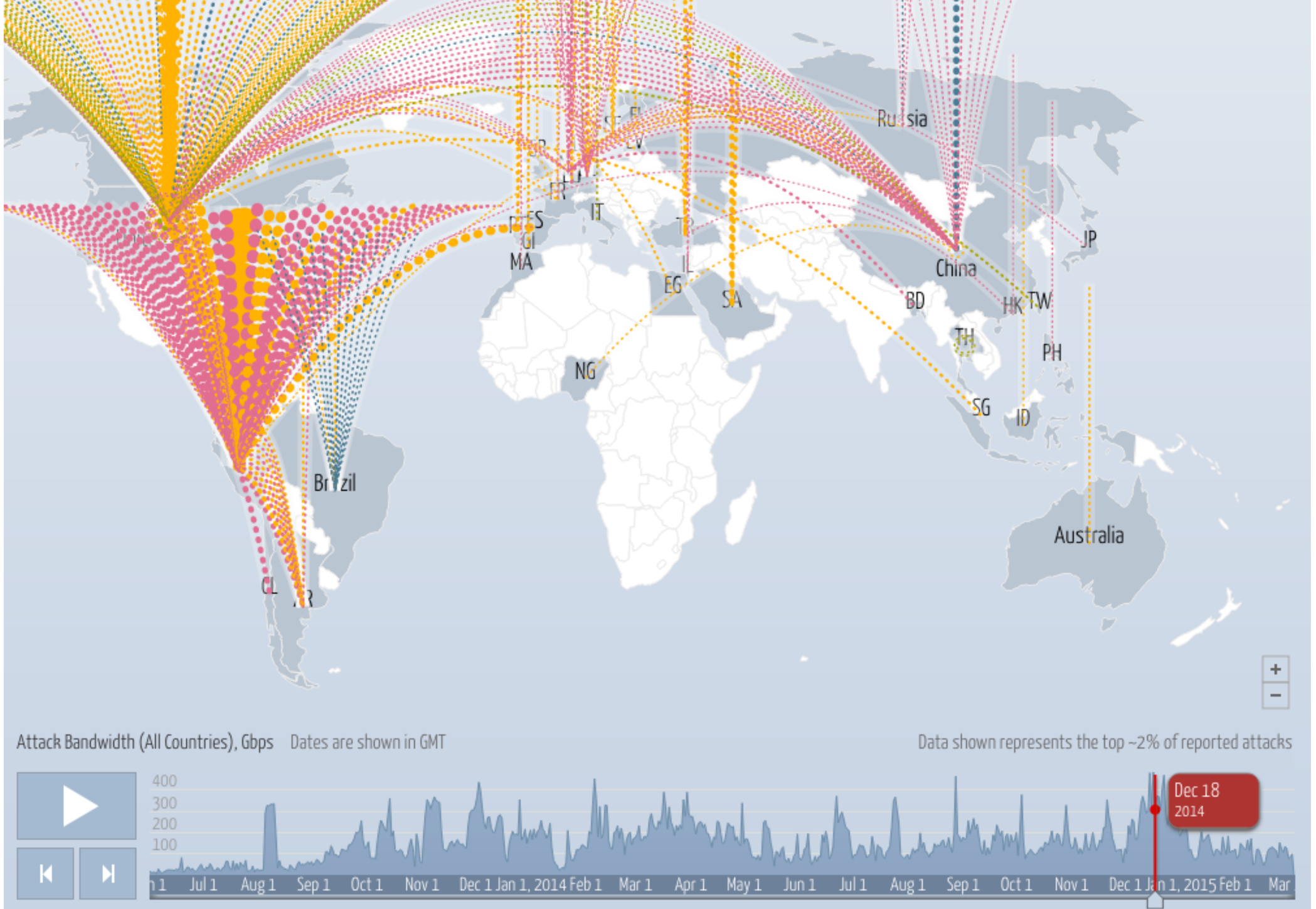
Vic is a seasoned tech executive and entrepreneur. He is the CTO and co-founder of Apakau, a Sunnyvale-based company addressing data latency problems in enterprise infrastructure to improve the performance and capacity of data centers. Vic has over 15 years of experience in developing and leading development teams at NASA, Akamai (largest CDN), Vendio (largest e-Bay partner) and Novell/Silverstream. He also co-founded Keibi (sold to Lithium). Vic authored the book “Struts Fast Track”, and was chosen the JDJ trainer of the year. He is a web and mobile performance advocate and taught a Best Practices series in 2012-2013.

1. Origin vs edge
2. CDN for static
3. Dynamic, distributed app / API Data Network (DDN) such as BaaS(Cloud v2)

Origin vs edge






Russia
China
JP
BD
HK
TW
TH
PH
SG
ID
Australia
Brazil
NG
EG
SA
IT
ES
MA
Attack Bandwidth (All Countries), Gbps
Dates are shown in GMT
Data shown represents the top ~2% of reported attacks
400
300
200
100
Jul 1
Aug 1
Sep 1
Oct 1
Nov 1
Dec 1
Jan 1, 2014
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1
Oct 1
Nov 1
Dec 1
Jan 1, 2015
Feb 1
Mar
Dec 18
2014

Multi Data Center

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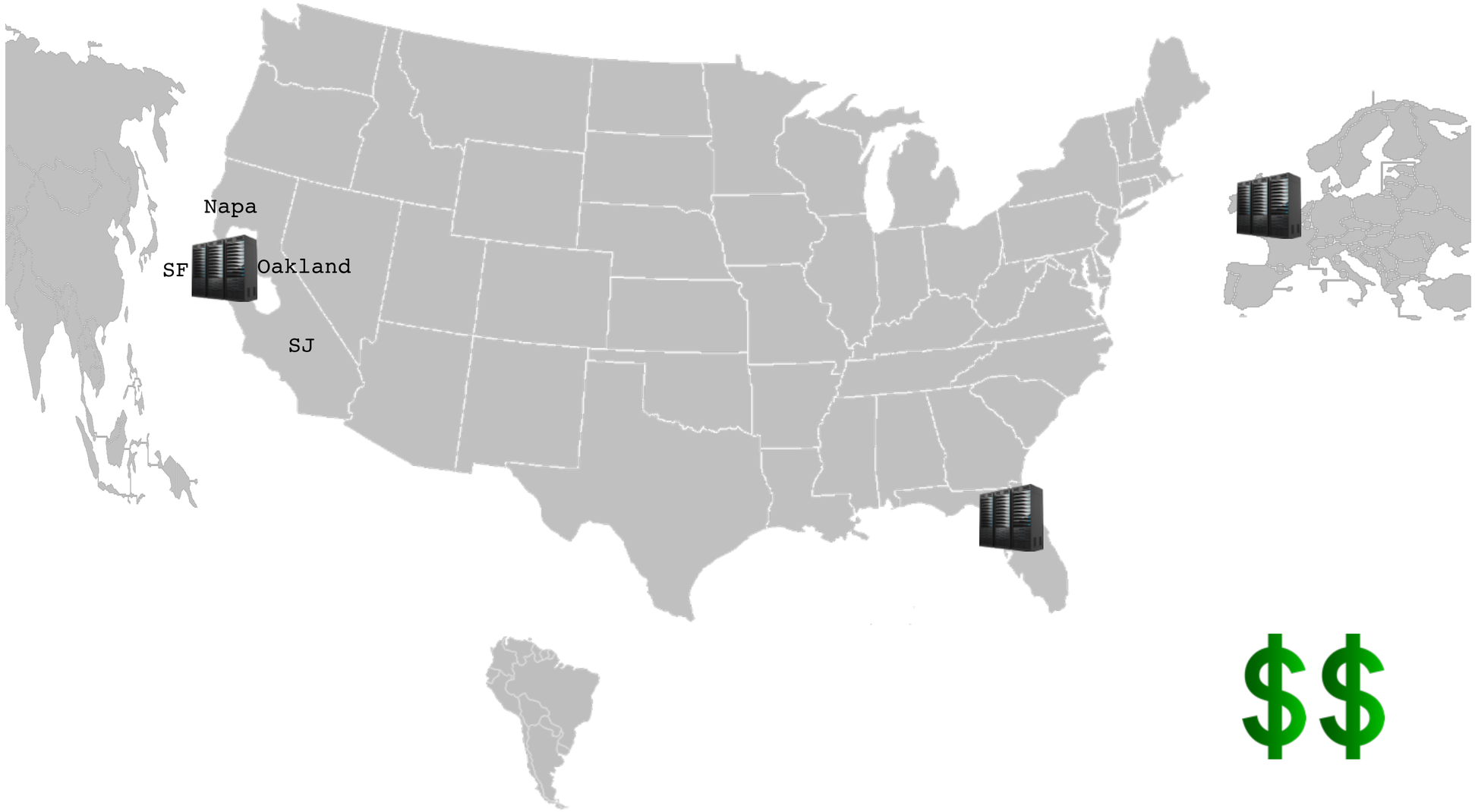


Increasing Processing Power Is Not the Solution

The maximum speedup that can be achieved by using N processors is

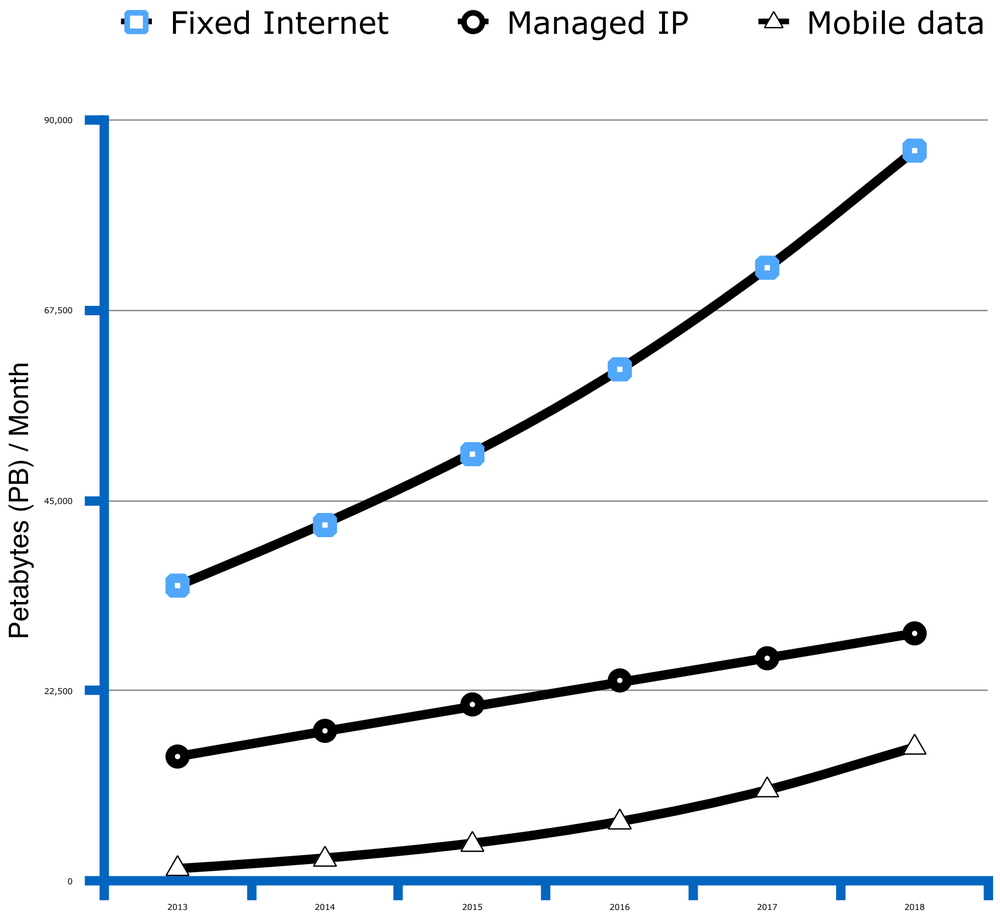
$$S(N) = \frac{1}{(1-P) + \frac{P}{N}}$$

where P is the proportion of a program that can be made parallel.

Example:
Assuming P = 70%, using 4 processors, S = 2.105.
Doubling the processors to 8, S = 2.581

Doubling the processing power has only improved the speedup by roughly 20%

Booming Internet Traffic



Source: Cisco VNI 2014

1. Origin vs edge
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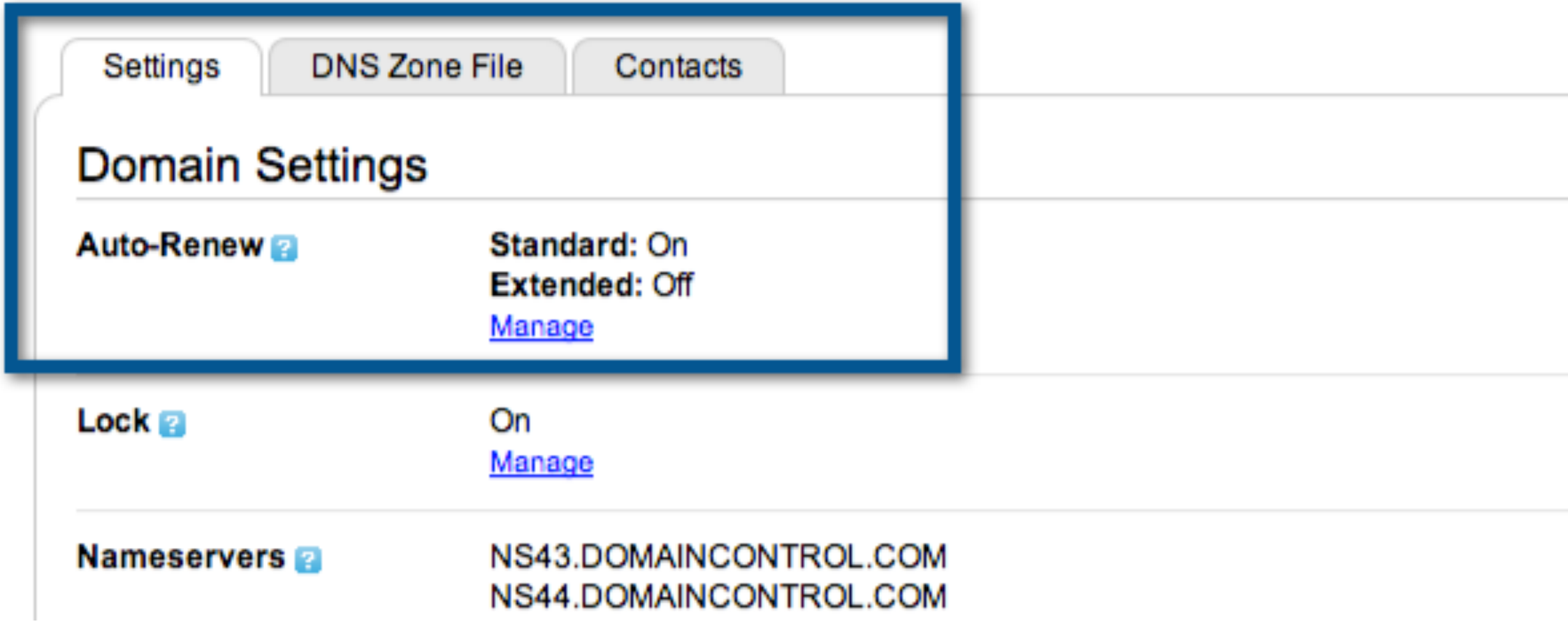
3. Dynamic, distributed app / API Data Network (DDN) such as BaaS(Cloud v2)

The Rise of the CDN (and Cloud)

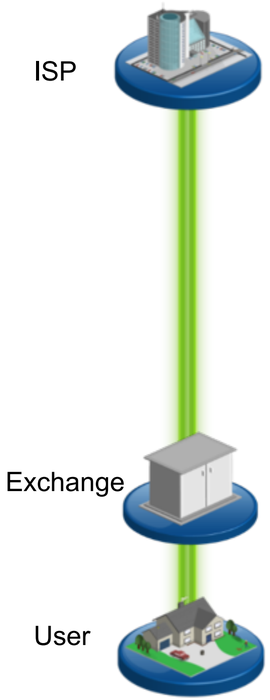
Source: CDN.com

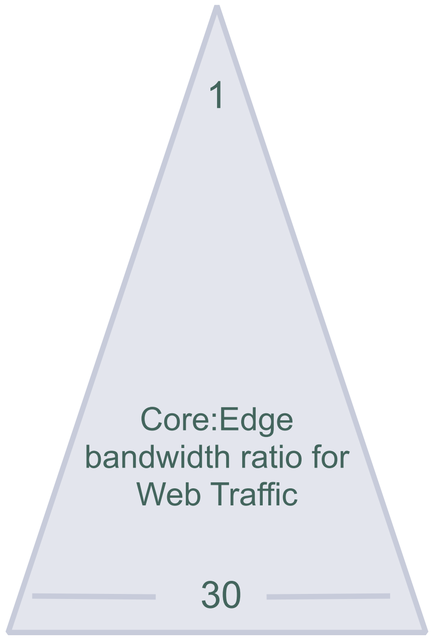
Poll Question

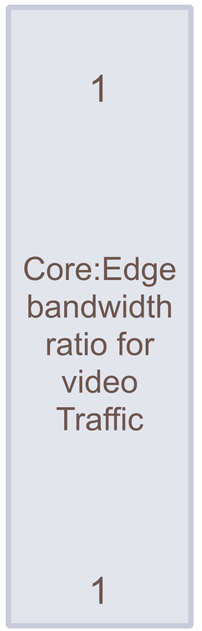
A Simple DNS Change

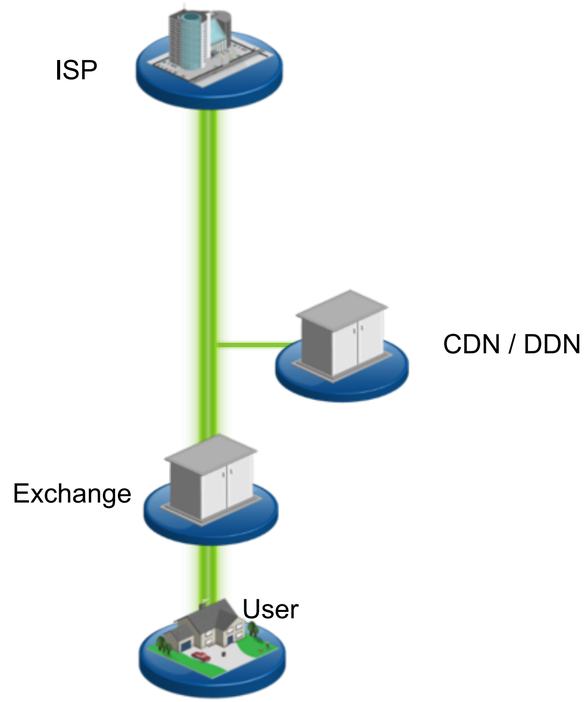


Edge Capacity vs. Central Capacity









For each % increase in edge capacity, central capacity needs to grow by 30x for video streaming

Source: BT Research and Tech 2012

1. Origin vs edge
2. CDN for static
3. Dynamic, distributed app / api Data Network (DDN)

Latency: Affects Business' Bottom Line

A 100 ms delay resulted in a 1% loss in sales*

A 500 ms delay caused a 20% drop in traffic**

1 s delay caused a 7% decline in conversions***

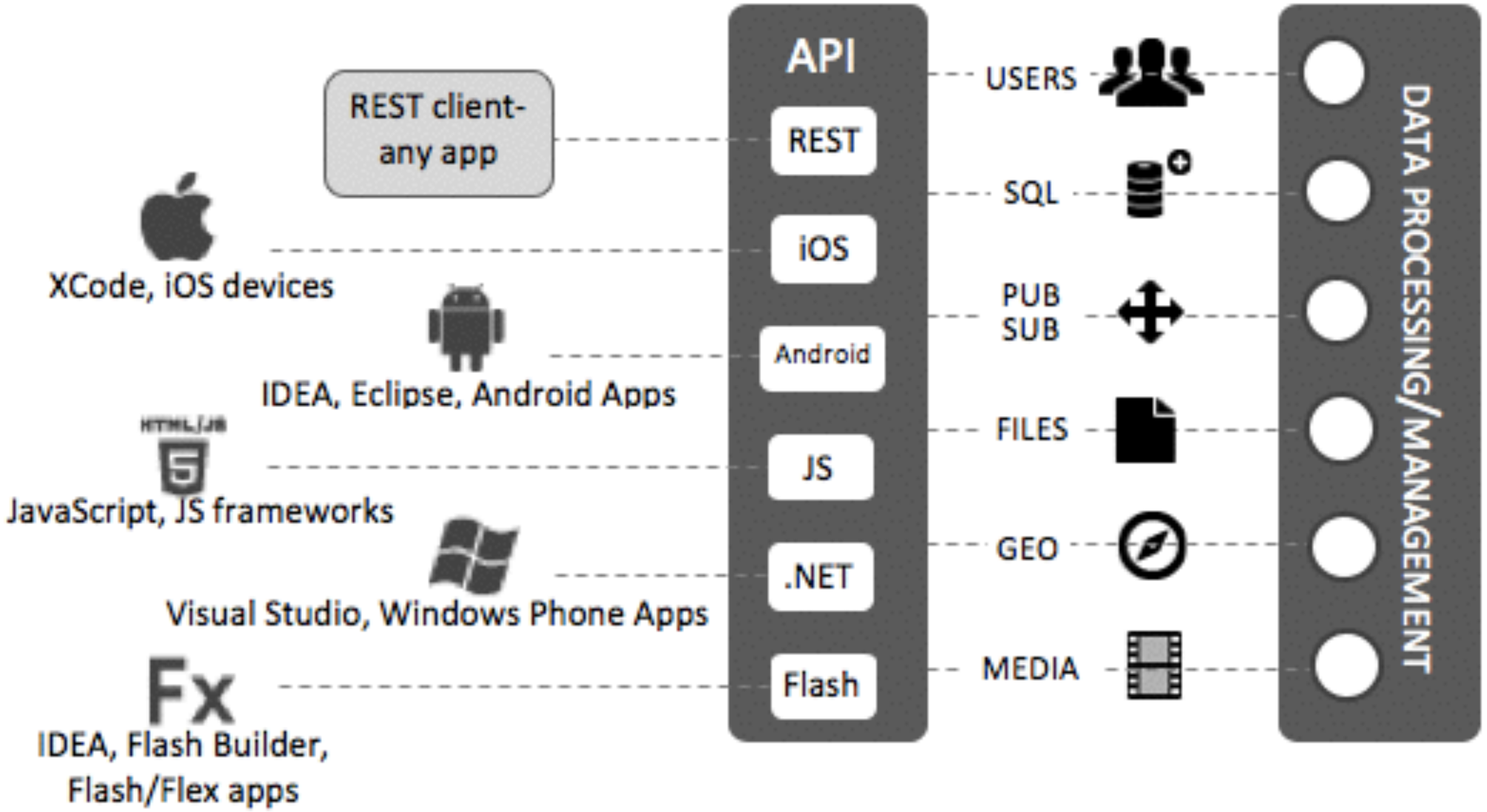
*Amazon; **Google; ***Aberdeen Group

Latency: Lower Latency is More Important than Up Time

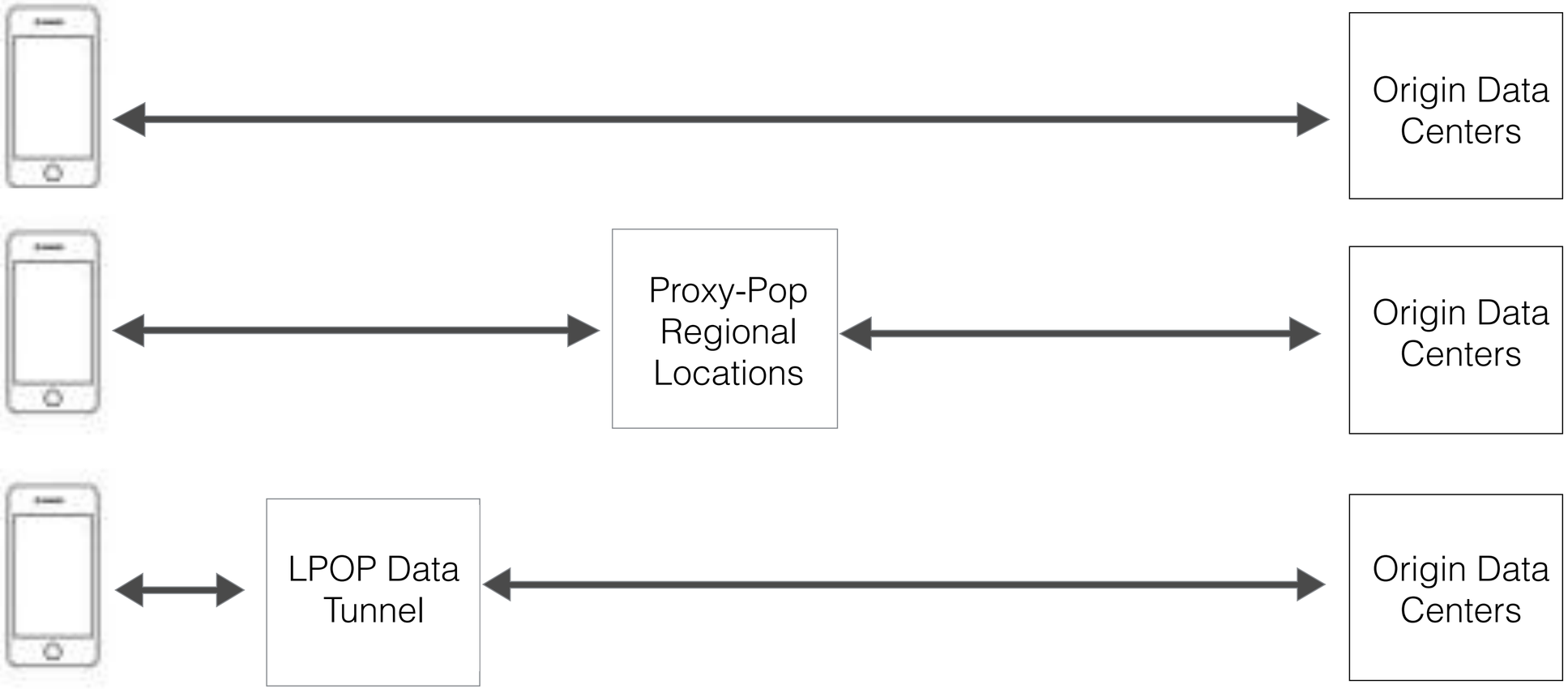
> “Downtime is better for a B2C web service than slowness. Slowness makes you hate using the service, downtime you just try again later.”

Lenny Rachitsky

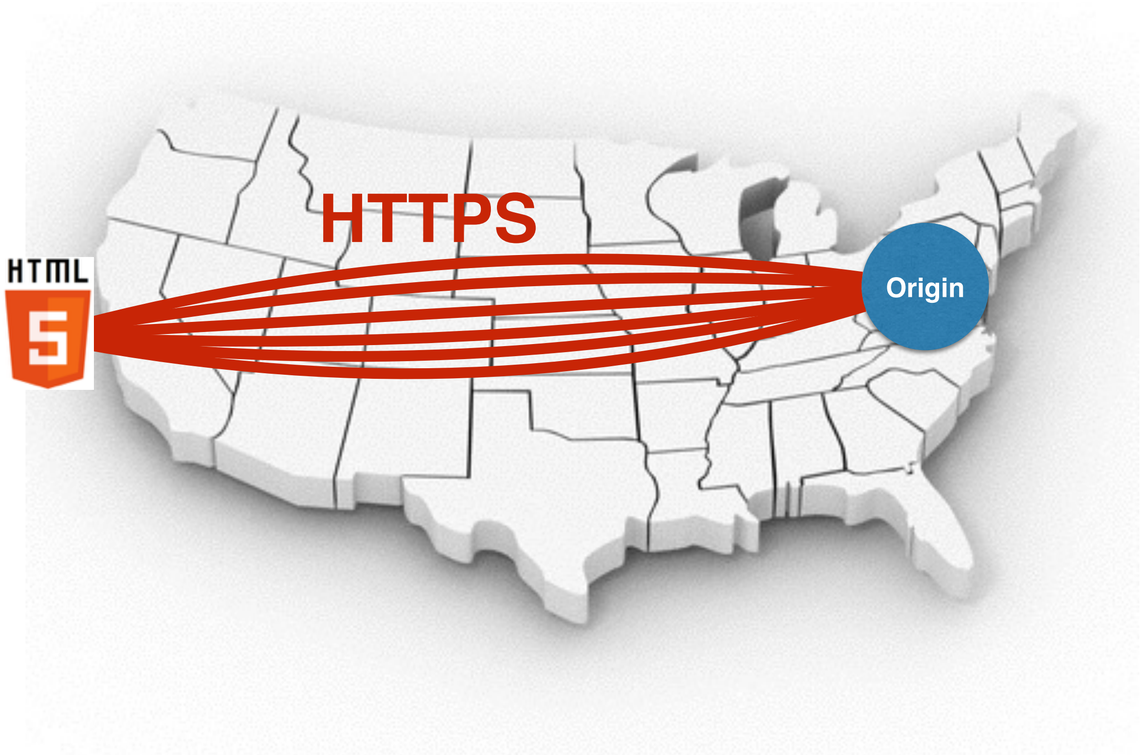
API/RPC/REST/Dynamic Data (Cloud v2)

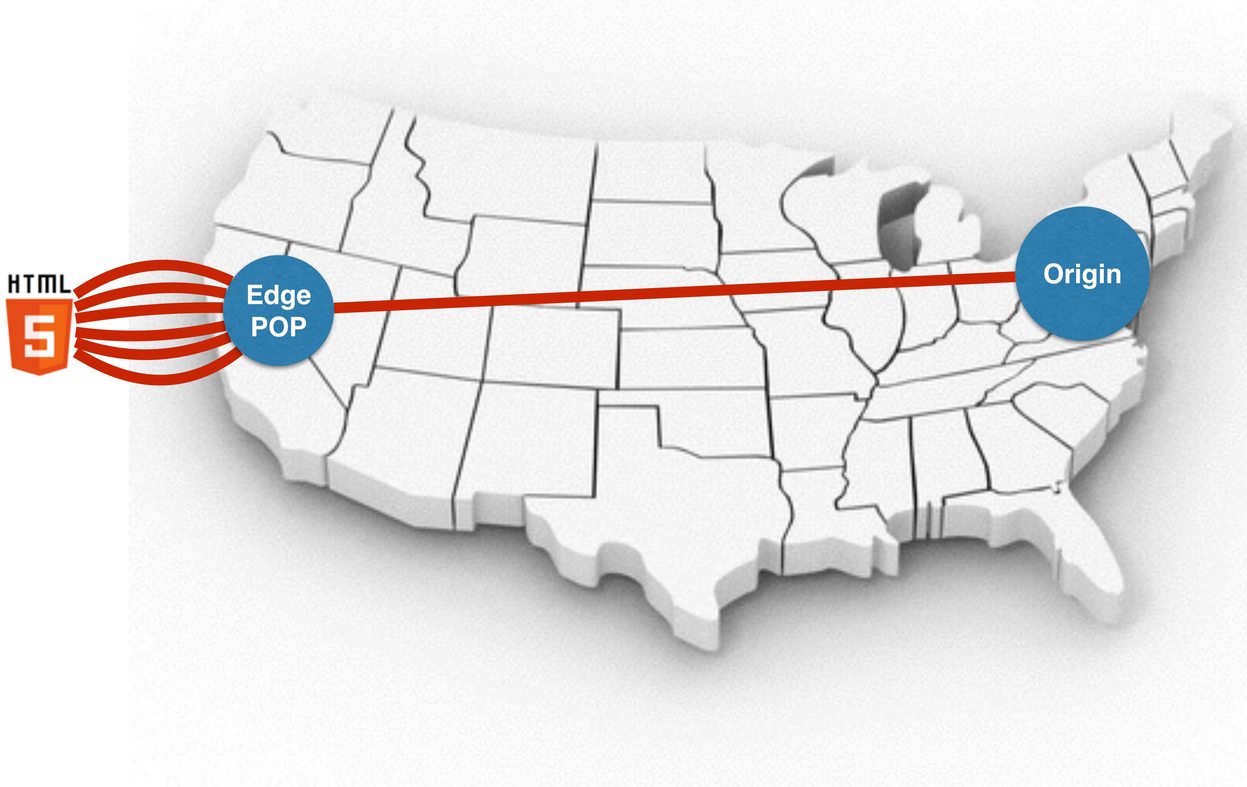


Local Pops Are Closer To The Enduser For Faster Service



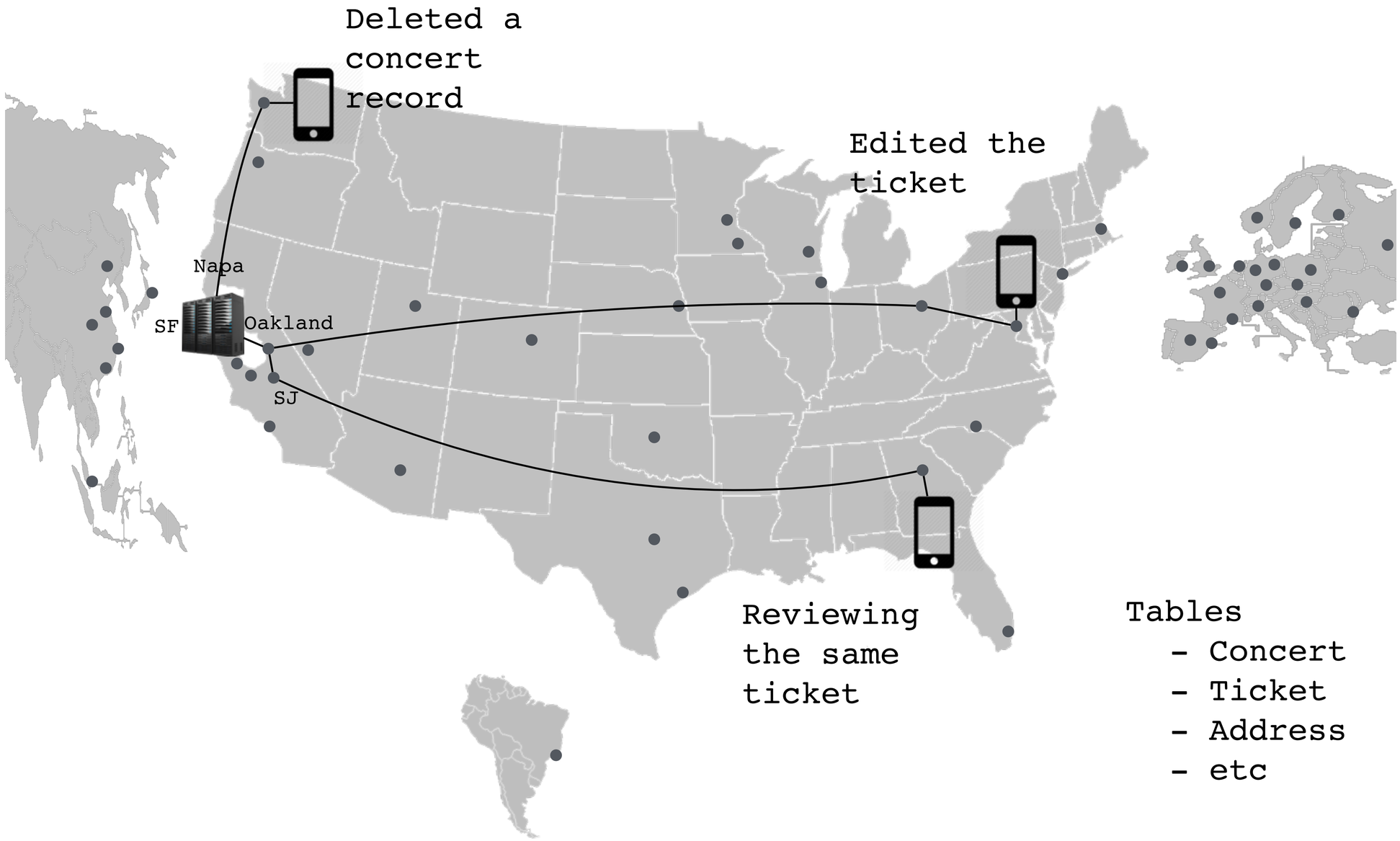
Early SSL Termination





Moment Of Inflection

DDN: Related Entity



Tables
- Concert
- Ticket
- Address
- etc

API List

API	Cache TTL		Cache Hit Ratio	# Reads	# Writes
/cashreceipts	60	Seconds	55	446247	157910
/cashsales	60	Seconds	31	419835	807912
/companies	60	Seconds	89	81833	263950
/invoices	60	Seconds	57	291269	290609
/items	60	Seconds	88	763994	550119
/purchaseorders	60	Seconds	45	142250	815237
/salesorders	60	Seconds	51	45420	636413

API	Cache TTL	Cache Hit Ratio	# Reads	# Writes
Showing 1 to 7 of 7 entries		Previous	1	Next

Entity Relation For: /items

Entity
purchaseorders
salesorders

Entity
Showing 1 to 2 of 2 entries

Tests

Test 1: with/without CDN for a static object

- 24 KB image file was loaded on a server in San Jose.

Test 2: with/without CDN for a dynamic object

- AccountingSuite® List_Items API.
- JSON: a list of items sorted based on their respective item_code.
- GET https://api.accountingsuite.com/items

Tests

10 servers (simulating users):

- San Francisco (2)
- New York City
- London (UK)
- Tokyo (Japan)
- Sydney (Australia)
- Portland (Oregon)
- Sao Paolo (Brazil)
- Amsterdam (Netherlands)
- Singapore

CDN Test (24KB Image)

90th Percentile

(in milli-second)	Origin	CDN1 Cache Miss	CDN2 Cache Miss	CDN1 Cache Hit	CDN2 Cache Hit
Global	793	572	776	550	433
SF1	13	13	87	12	48
SF2	13	10	74	11	48
OR	75	-	115	-	102
NY	267	71	283	29	255
SP	622	587	675	459	540
LON	664	466	537	25	467
AMS	870	86	643	83	607
TOK	789	383	783	418	37
SNG	1223	595	795	596	46
SYD	581	597	903	442	11

Average

(in milli-second)	Origin	CDN1 Cache Miss	CDN2 Cache Miss	CDN1 Cache Hit	CDN2 Cache Hit
Global	476	271	410	247	128
SF1	12	21	57	11	32
SF2	12	10	39	10	32
OR	72	-	107	-	97
NY	241	45	238	20	82
SP	611	498	540	463	455
LON	511	120	181	66	116
AMS	671	98	586	42	326
TOK	570	350	668	358	22
SNG	898	564	709	556	13
SYD	566	490	842	438	8

DDN Test (API)

Origin 90th Percentile

(in milli-second)	90th Percentile
Global	1,770
SF1	1,263
SF2	1,228
OR	1,120
NY	1,086
SP	1,304
LON	1,691
AMS	2,160
TOK	1,552
SNG	1,926
SYD	1,853

DDN 90th Percentile

(in milli-second)	Cache miss	2nd Call	3rd Call
Global	1271	301	300
SF1	816	9	8
SF2	743	11	11
OR1	880	61	61
OR2	913	62	66
AMS	889	70	75
LON	1044	137	85
TOK	1193	174	175
SNG	1724	640	587
SYD	1238	300	299

DDN Test (API)

Origin

(in milli-second)	Average	Min	Max
Global	1,368	644	12,295
SF1	1,074	891	1,655
SF2	1,068	925	1,895
OR	974	828	1,364
NY	900	644	1,621
SP	1,201	1,066	1,762
LON	1,498	976	8,637
AMS	1,522	966	2,679
TOK	1,438	1,252	1,827
SNG	1,850	1,559	12,295
SYD	1,664	1,441	2,274

DDN Average

(in milli-second)	Cache miss	2nd Call	3rd Call
Global	924	128	124
SF1	708	7	7
SF2	707	8	8
OR1	792	59	59
OR2	826	60	61
AMS	730	52	78
LON	861	71	55
TOK	1093	167	166
SNG	1389	386	363
SYD	652	297	297

DDN Test (API)

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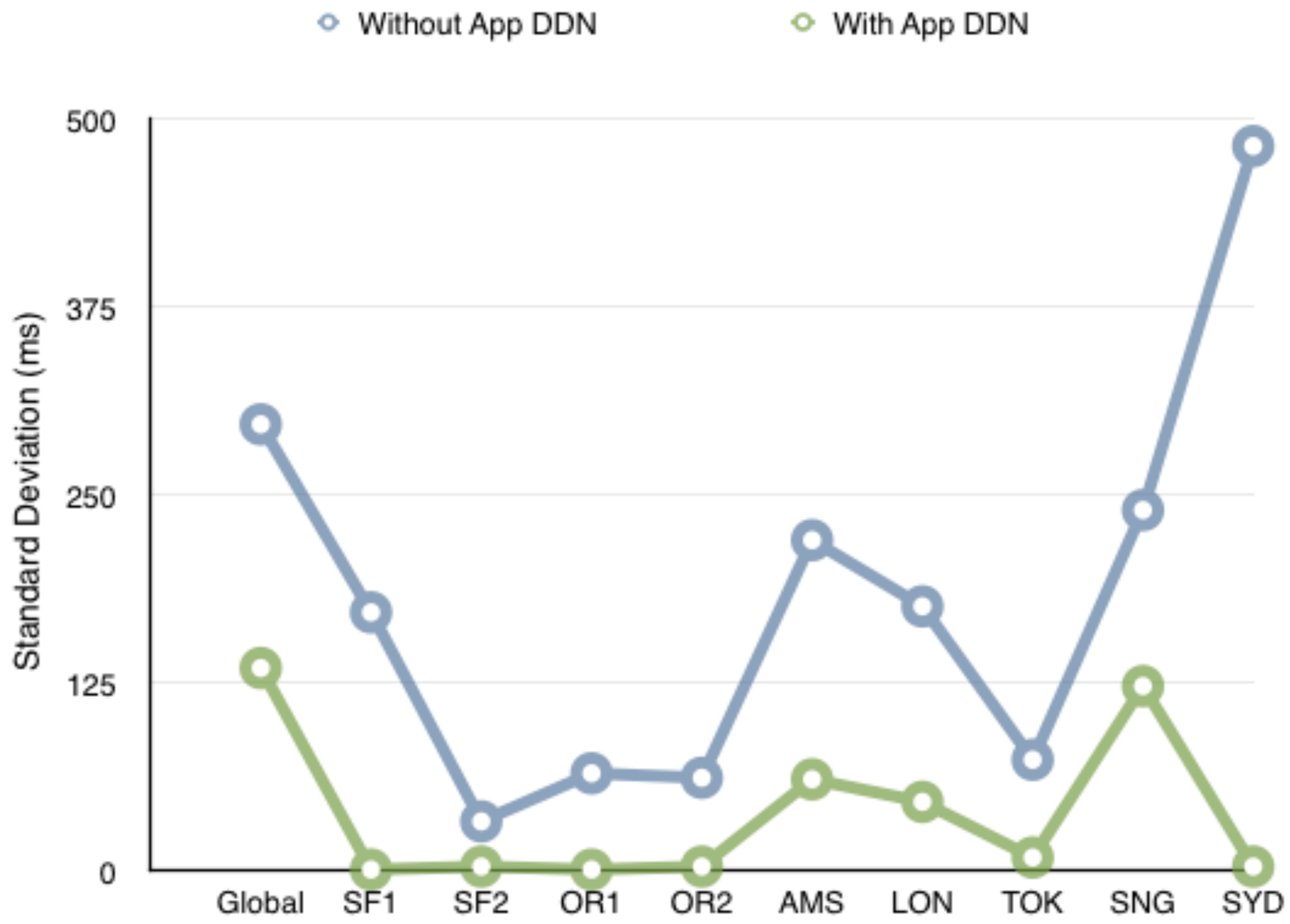
Origin Standard Deviation

(in milli-second)	σ
Global	607
SF1	139
SF2	161
OR	113
NY	211
SP	88
LON	993
AMS	446
TOK	97
SNG	874
SYD	177

DDN Standard Deviation

(in milli-second)	Cache miss	2nd Call	3rd Call
Global	297	145	135
SF1	172	1	1
SF2	33	3	3
OR1	65	1	1
OR2	62	3	3
AMS	220	21	61
LON	176	60	46
TOK	74	16	9
SNG	240	150	123
SYD	482	3	3

Standard Deviation of API Response Time



Source: Apakau White Paper

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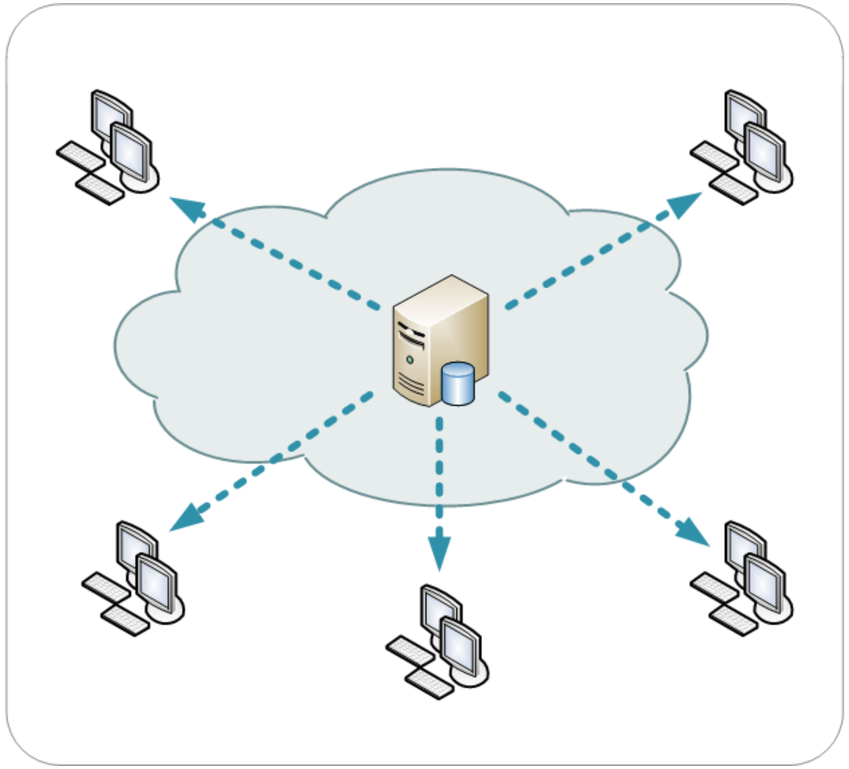
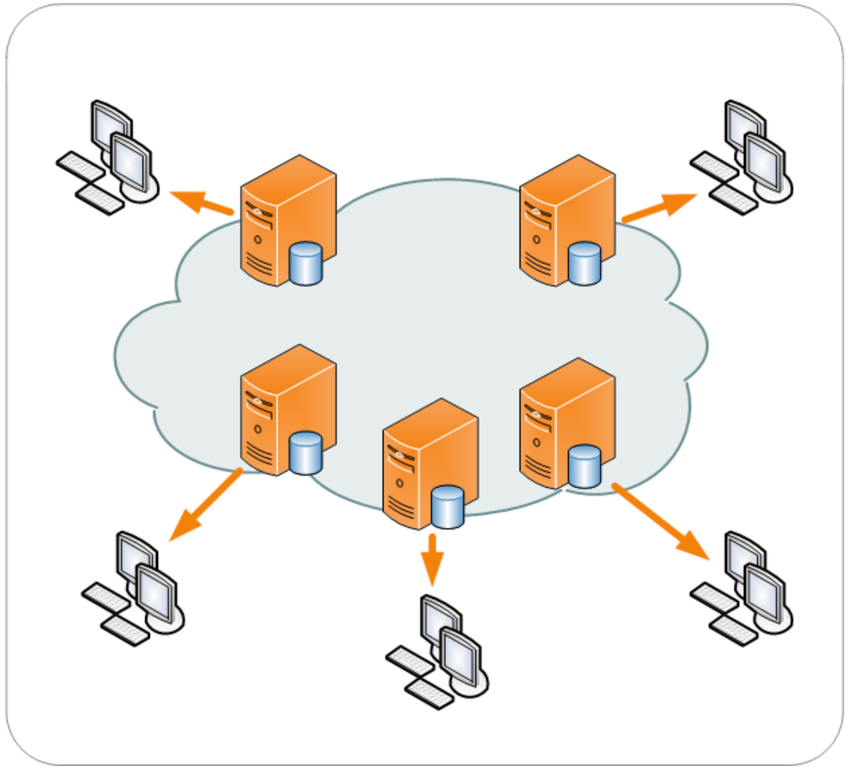
Origin vs edge





THANK YOU

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3 blocks to both the Alamo and the Riverwalk