The Great Debate: Scale Out vs Scale Up: Is it either, or …or both?

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TWITTER: @mihay42

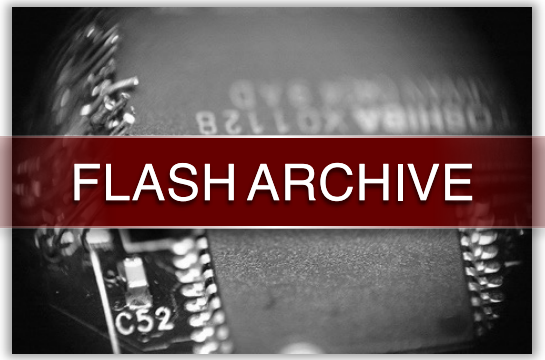
Hitachi Data Systems

A CONTRARIAN TIME

SOURCE – URL: BluRayDiscBack.png | AUTHOR: Cdnomad | LICENSE: Public Domain

"We're bottled-necked on SSD performance!"

A NO-SQL FIRM WITH IN-MEMORY FOCUS



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V U C A

VOLATILITY | UNCERTAINTY | COMPLEXITY | AMBIGUITY

WATERFALL

AGILE

ITERATIVE

...

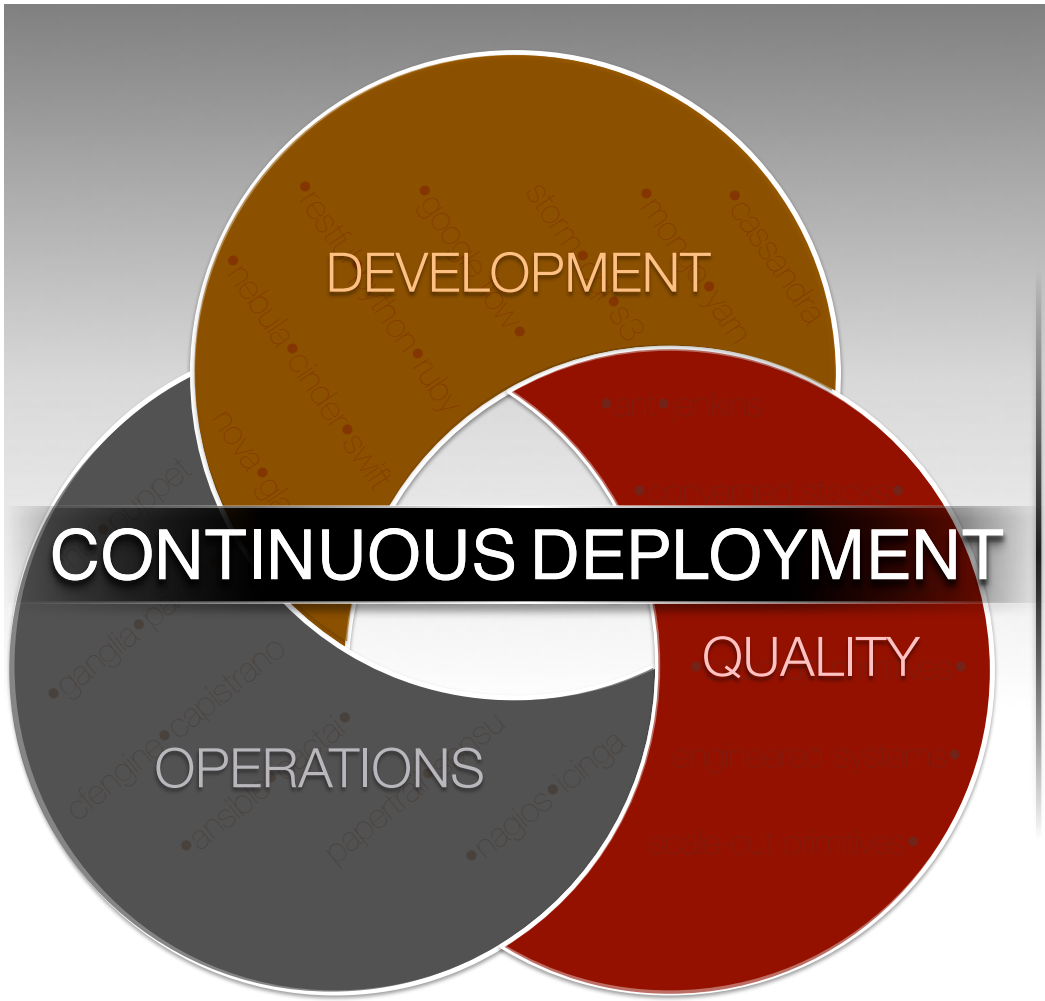
2001 ENGINEERING/DEVELOPMENT 2011

2009 IT & OPERATIONS 2019

ITIL

DEVOPS

AGILE



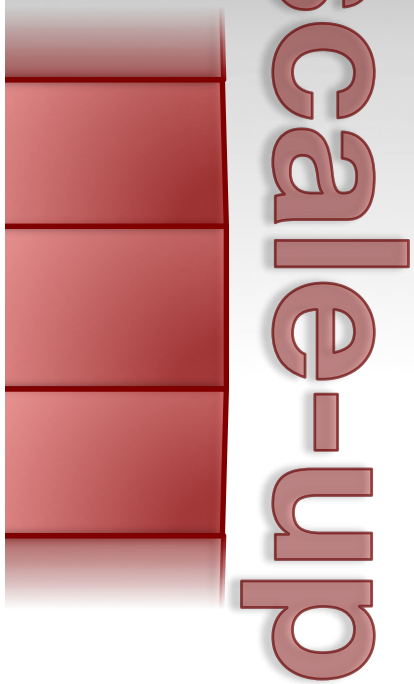
535 deployments per month

6419 deployments per year

196 people deploy to production

SOURCE: ETSY's 2012 DevOps statistics reported at SXSW

SCALE-OUT, SCALE-UP DEFINED

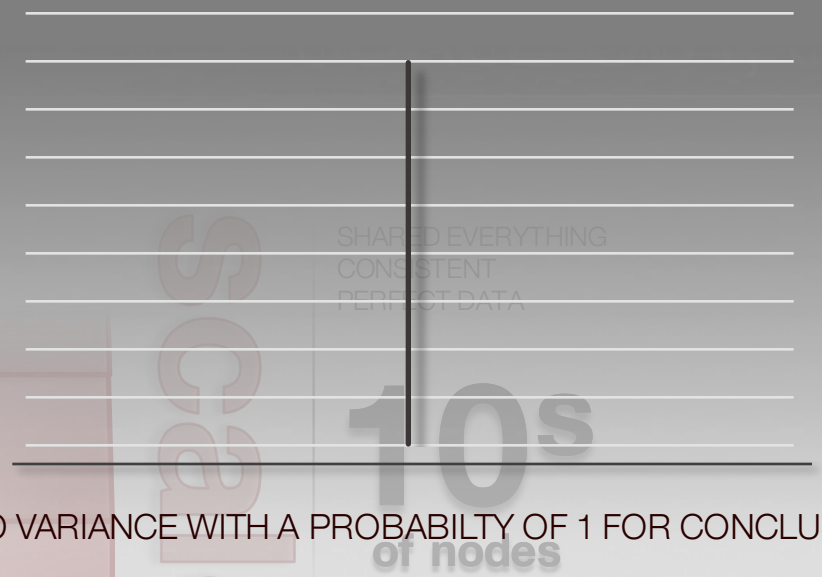


SHARED EVERYTHING
CONSISTENT
PERFECT DATA

10s
of nodes

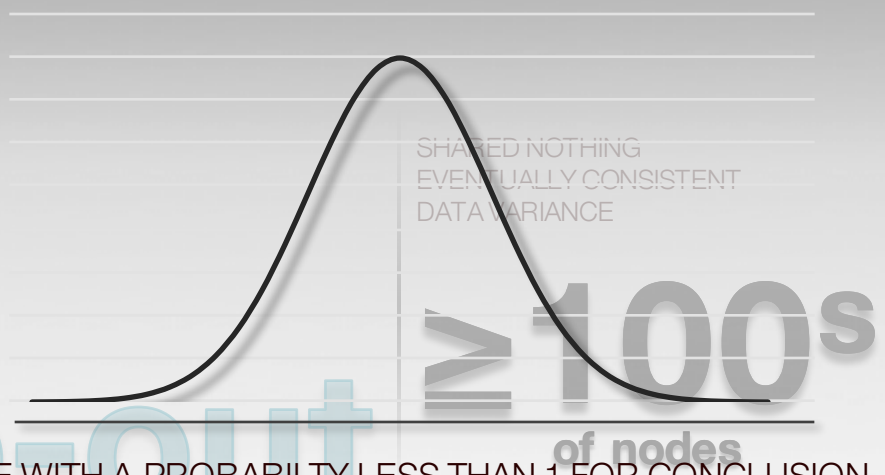
SHARED NOTHING
EVENTUALLY CONSISTENT
DATA VARIANCE

≥100s
of nodes



NO VARIANCE WITH A PROBABILTY OF 1 FOR CONCLUSION

THINK: BANK ACCOUNT BALANCES, FINANCIAL TRADES, COMPONENT FAILURES ON CRITICAL INFRASTRUCTURES, OR ESSENTIALLY ANYTHING WITH RISK AND REGULATION



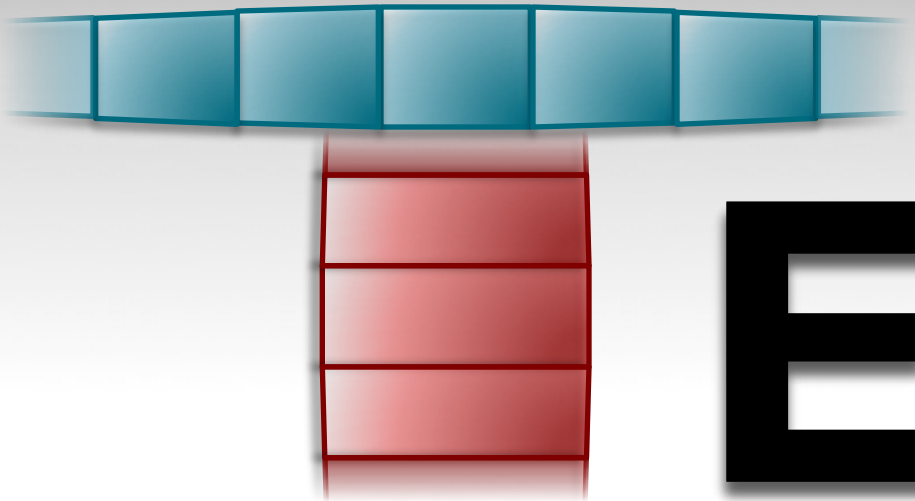
VARIANCE WITH A PROBABILTY LESS THAN 1 FOR CONCLUSION

THINK: SENTIMENT ANALYSIS, PREDICTIVE MAINTENANCE, PROCESS CONTROLS OR ANYTHING WHERE DECISIONS CAN BE MADE WITH SOME DEGREE OF RISK TOLERANCE

SCALE-OUT, SCALE-UP A CAGE MATCH

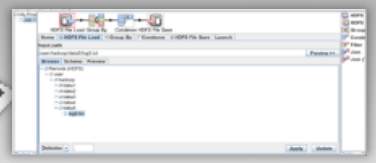
WINNER?

SCALE-OUT, SCALE-UP ON THE SAME…



TEAM!

PUTTING IT ALL TOGETHER

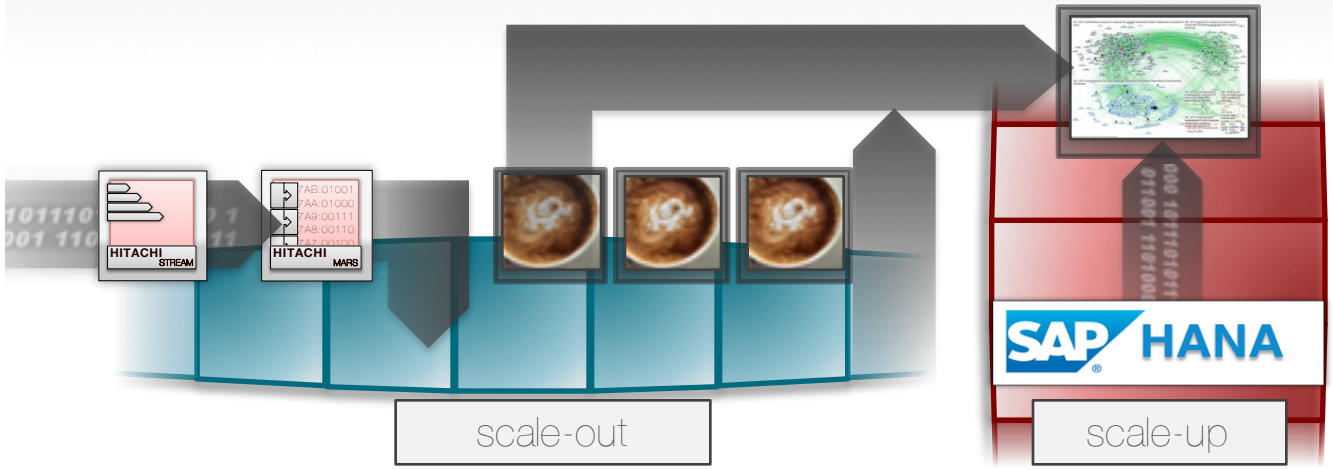


① Acquire packet data to discern indicators of packet loss and persist

② Lookup customer name, ID, etc. from HANA in real-time

③ Spin up Hadoop to compute sentiment on Twitter data by customer

④ Combine all data to try and correlate packet behaviors with sentiment



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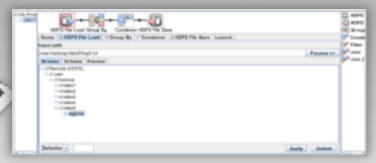

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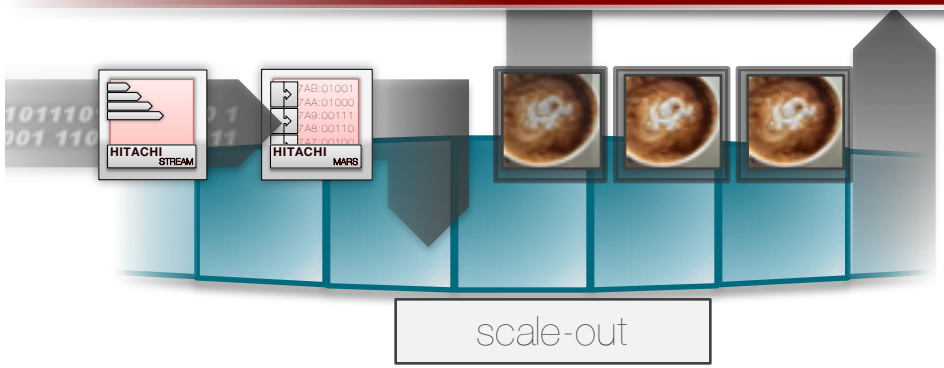
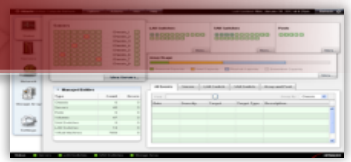
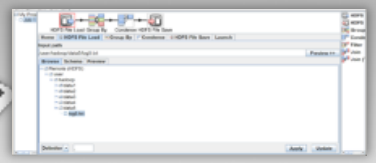
LATENCY LEADS TO POOR QUALITY





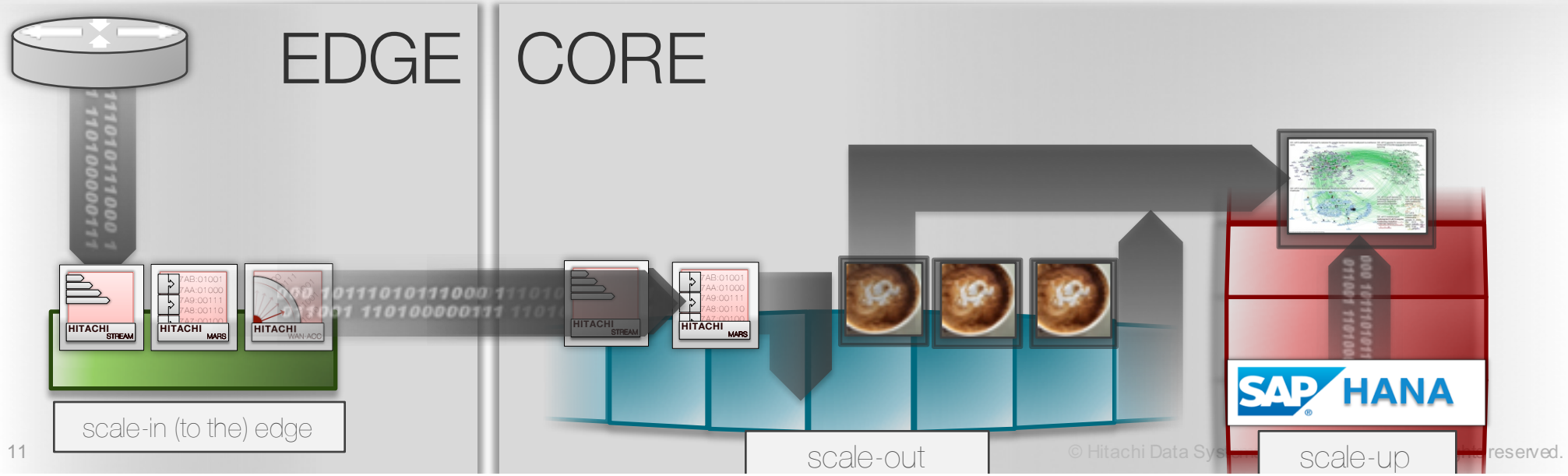
AGUMENT WITH EDGE SCALE-IN



① Spin up packet acquisition & WAN-ACC engines on the edge

② Load the relevant models and queries

③ Decommission packet acquisition in the core



IN-MEMORY COMPUTE PRESSURES NETWORKS

IMPLICATION: NEW (STORAGE) ARCHITECTURES ARE REQUIRED

	FABRIC		NETWORK
	FABRICS (e.g. PCIe, IB) LEAD SERIAL NETWORK RATES		
THROUGHPUT	Giga**BYTES**/sec [UNIT: 8 bits]	>	Giga**BITS**/sec [UNIT: 1 bit]
LATENCY	**0.1's MICRO**seconds [ORDER: 0.0000001s]	<	**10's MICRO**seconds [ORDER: 0.00001s]

INTERNET OF THINGS

50billion

(IN 2020 ACCORDING TO CISCO)

IS IN-MEMORY COMPUTE WAN COMPATIBLE?

TRADEoffs

real-time OR latency

connectivity OR cost

reliability OR bandwidth

private OR unsecured

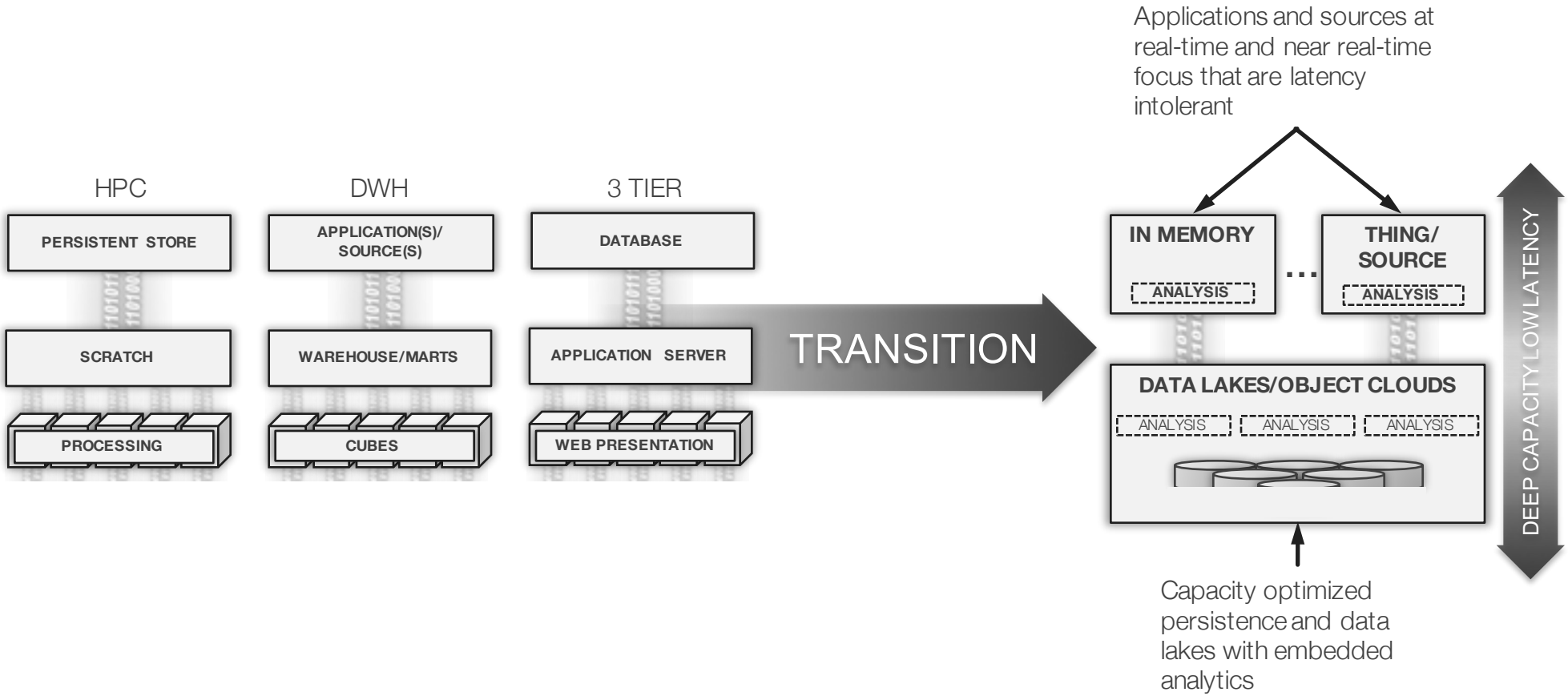
COSTLY

10 Gbps leased line

$50k-$70k / month

Transition to Multi-Modal Architectures

HITACHI
Inspire the Next



Transition to Multi-Modal Architectures

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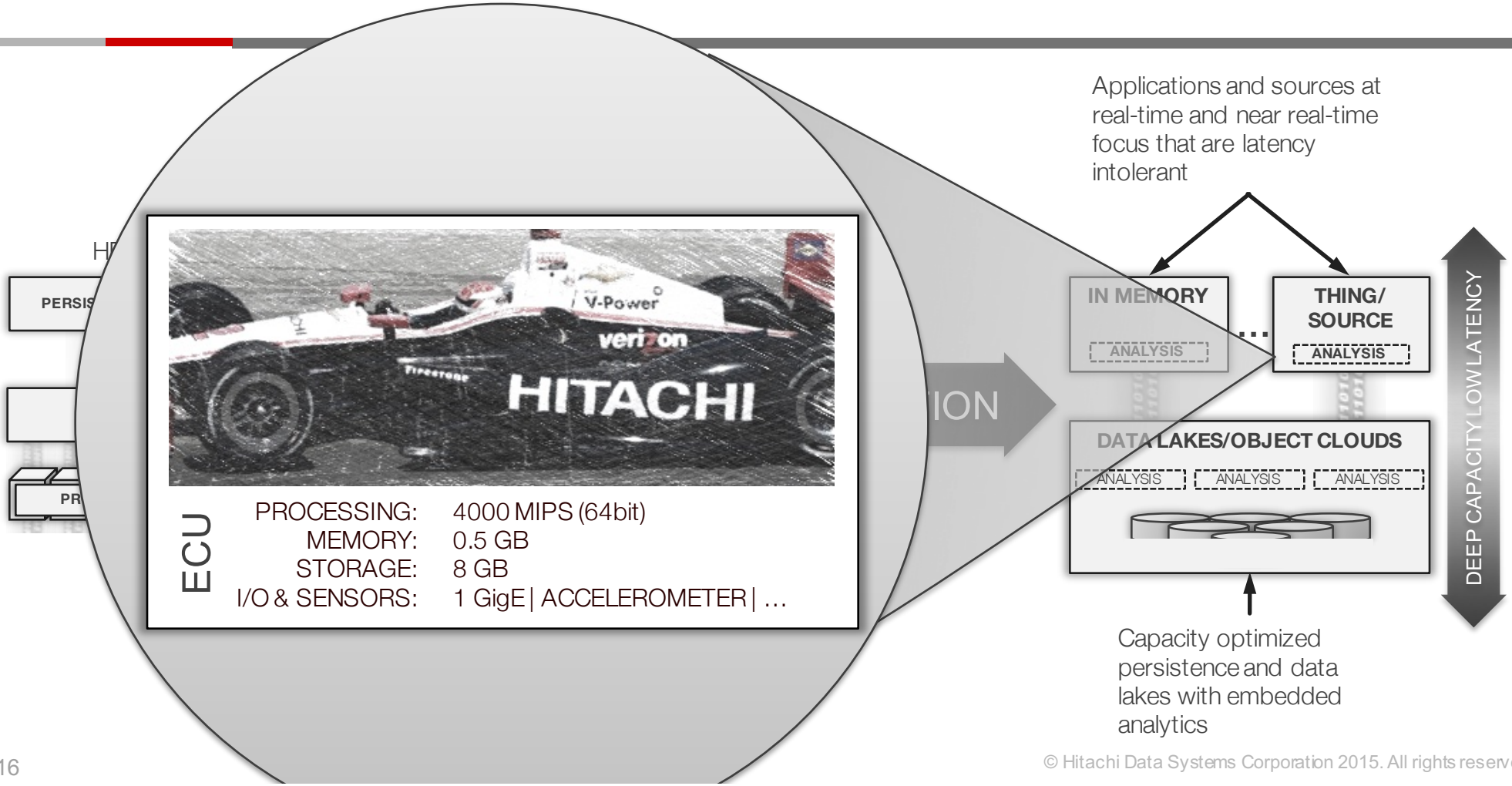

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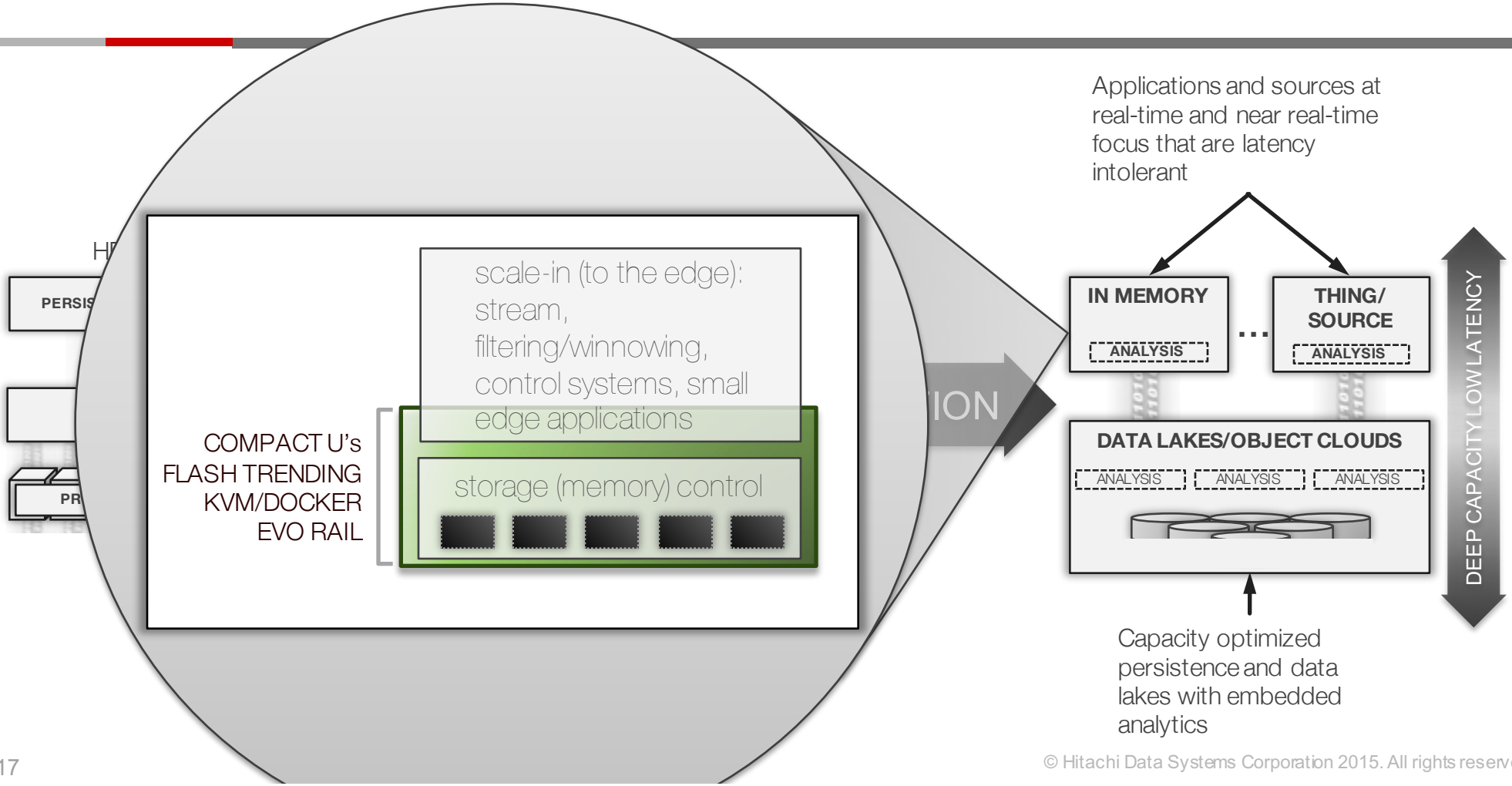

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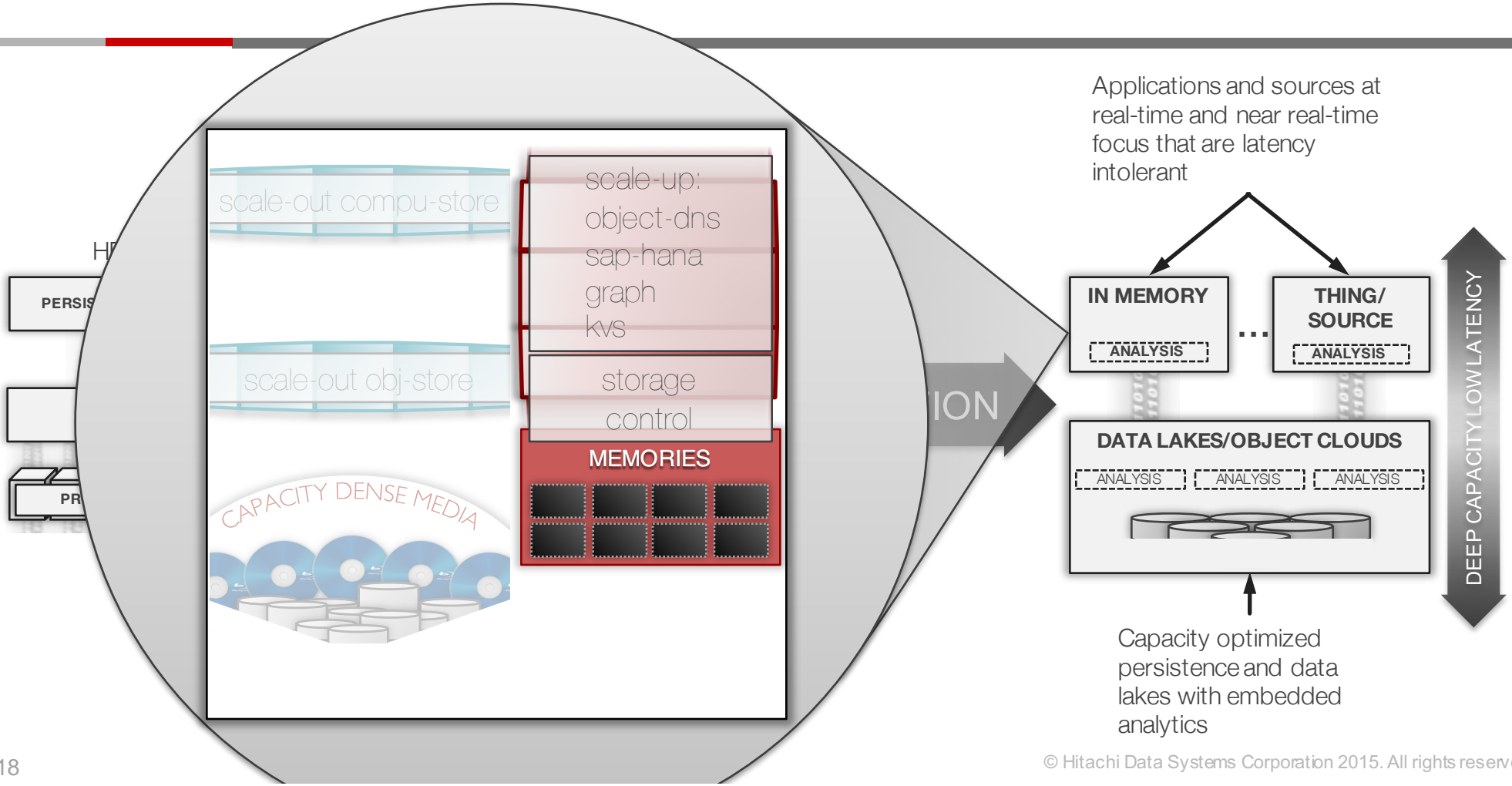

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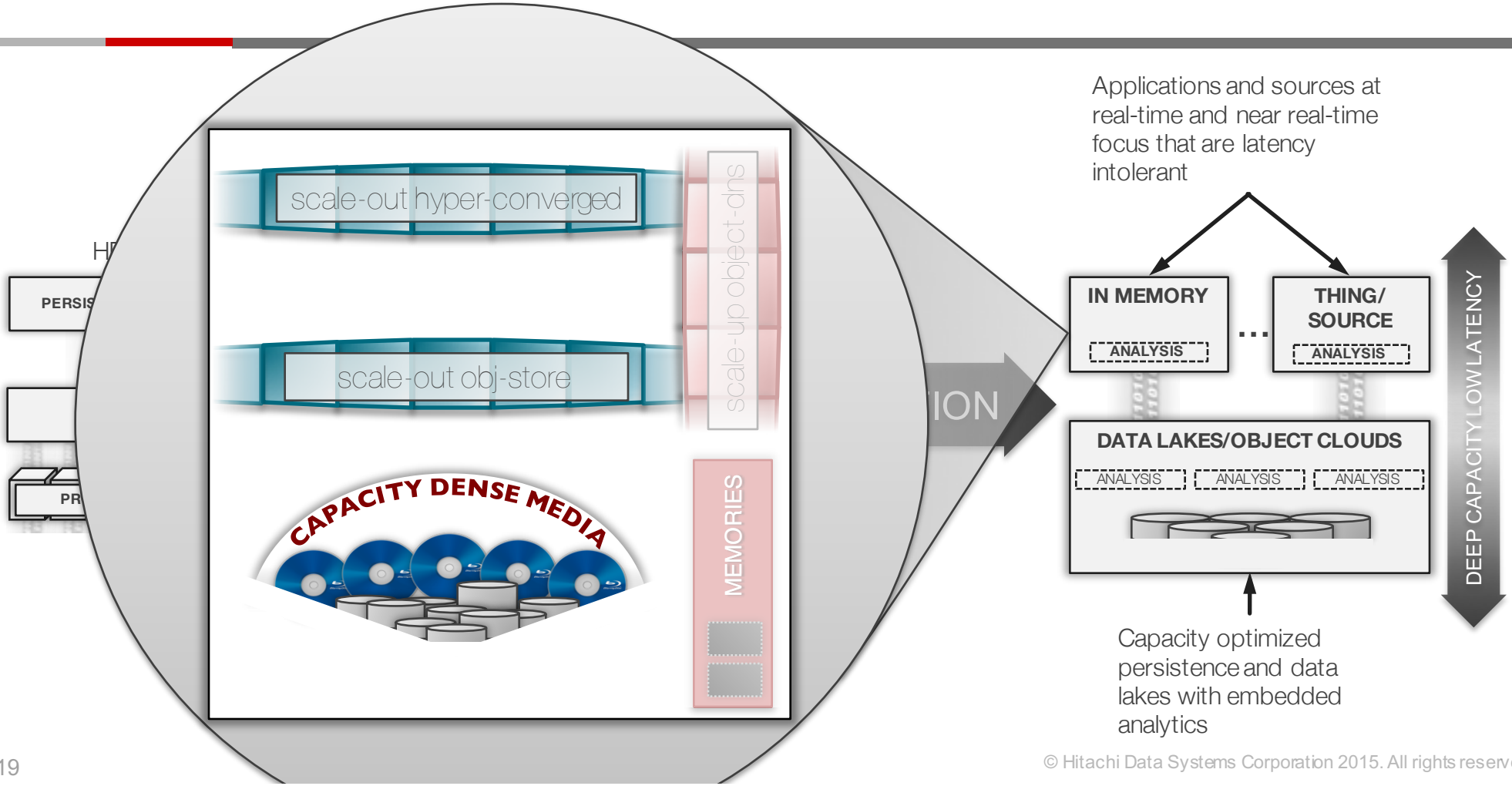

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