

Yttibrium

Cool Solutions for a Warming World

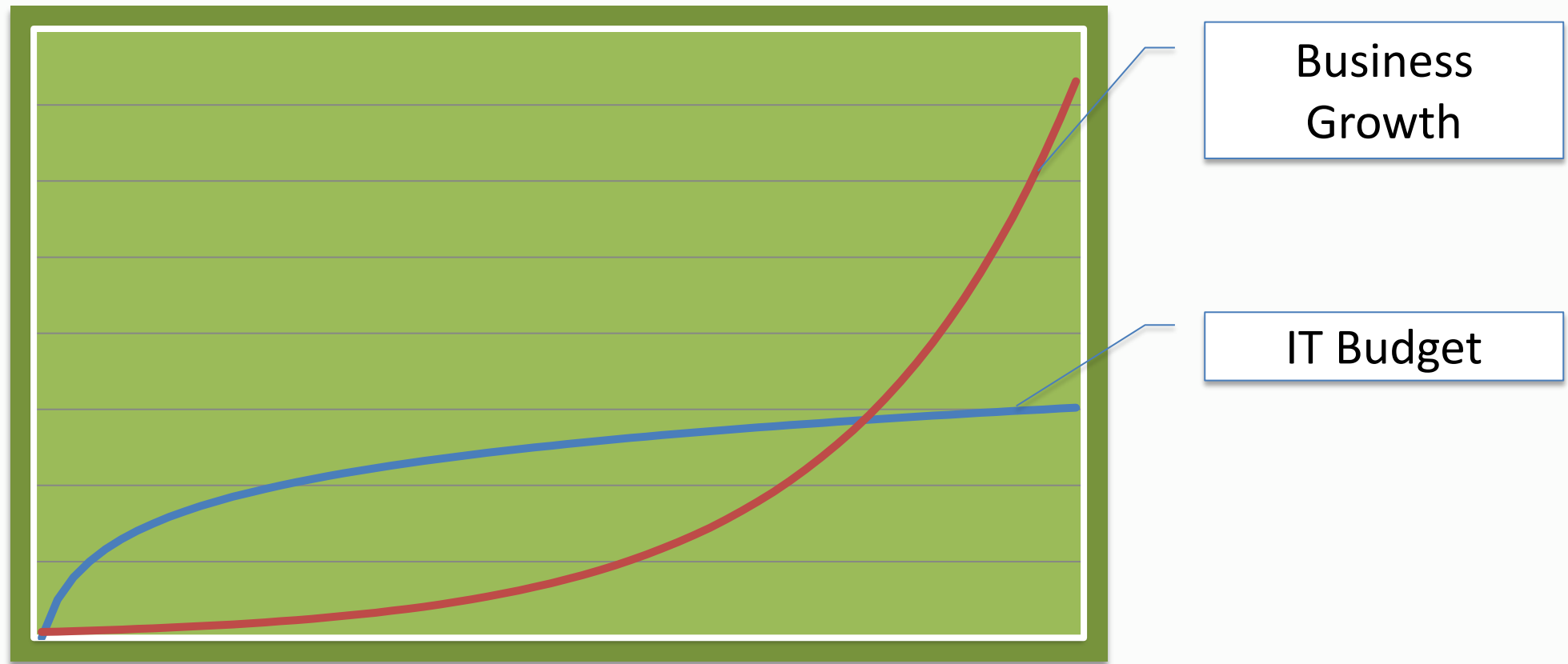
Who Does it and Why

TRENDS AFFECTING DISAGGREGATION

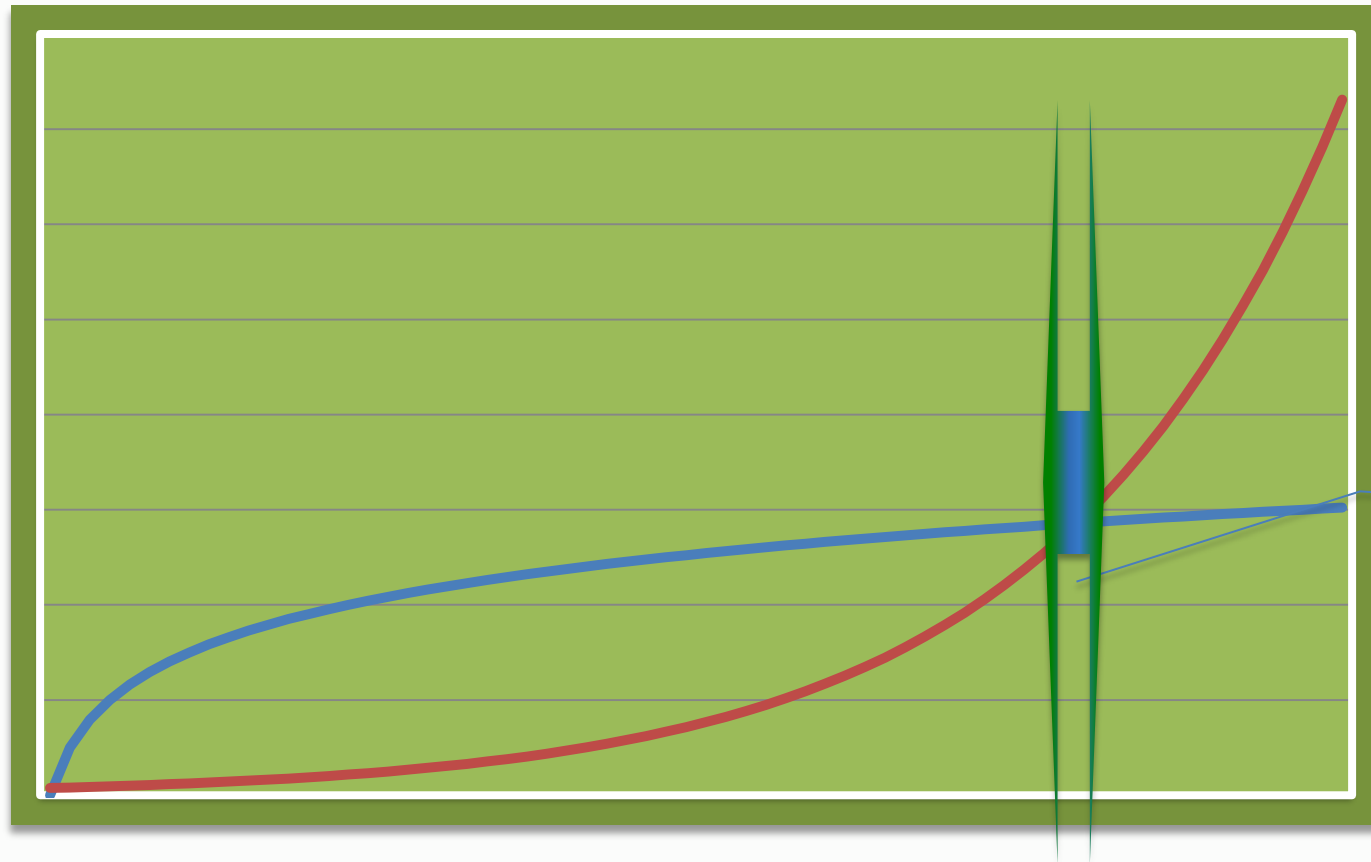


Revolution in Architecture

What Drives Major Behavior?

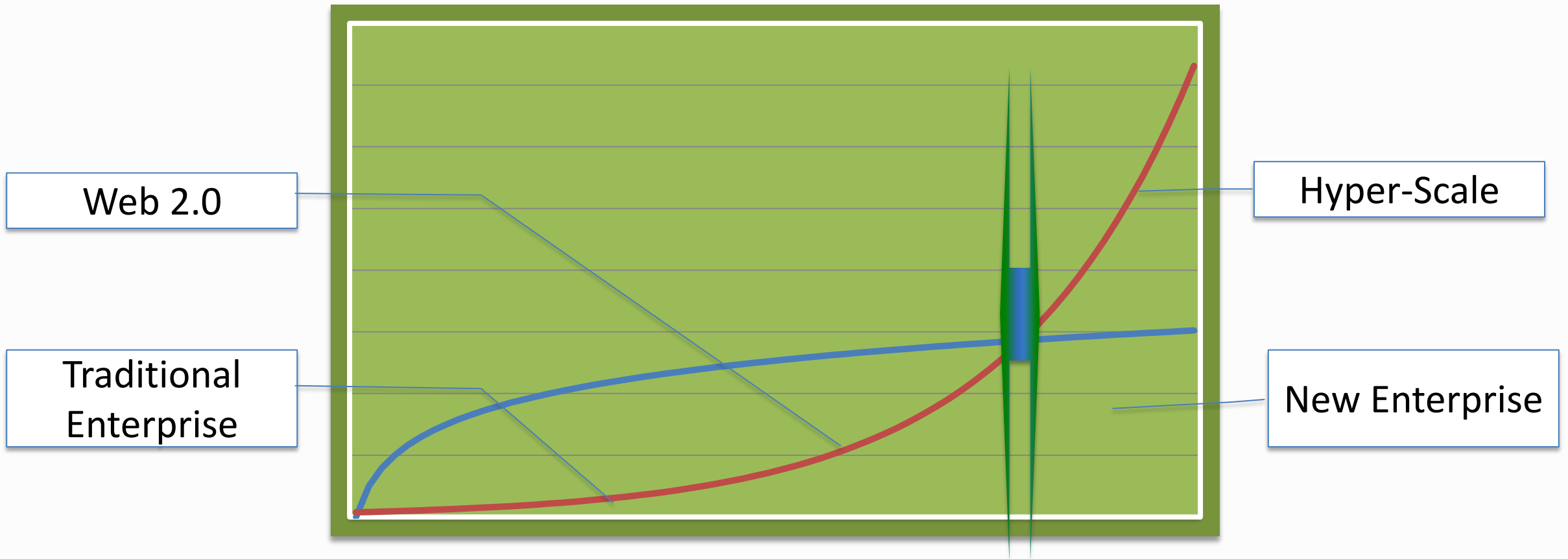


Implications of Crossing the Flip



"The Flip"

Defining the Market Segments



Different Strokes

- Process Oriented

- Dominated by CAPEX

- Some Sense of ROI

- Servers Have Names

- Tailored Servers

- Nameplates/Bezels

- Product Oriented

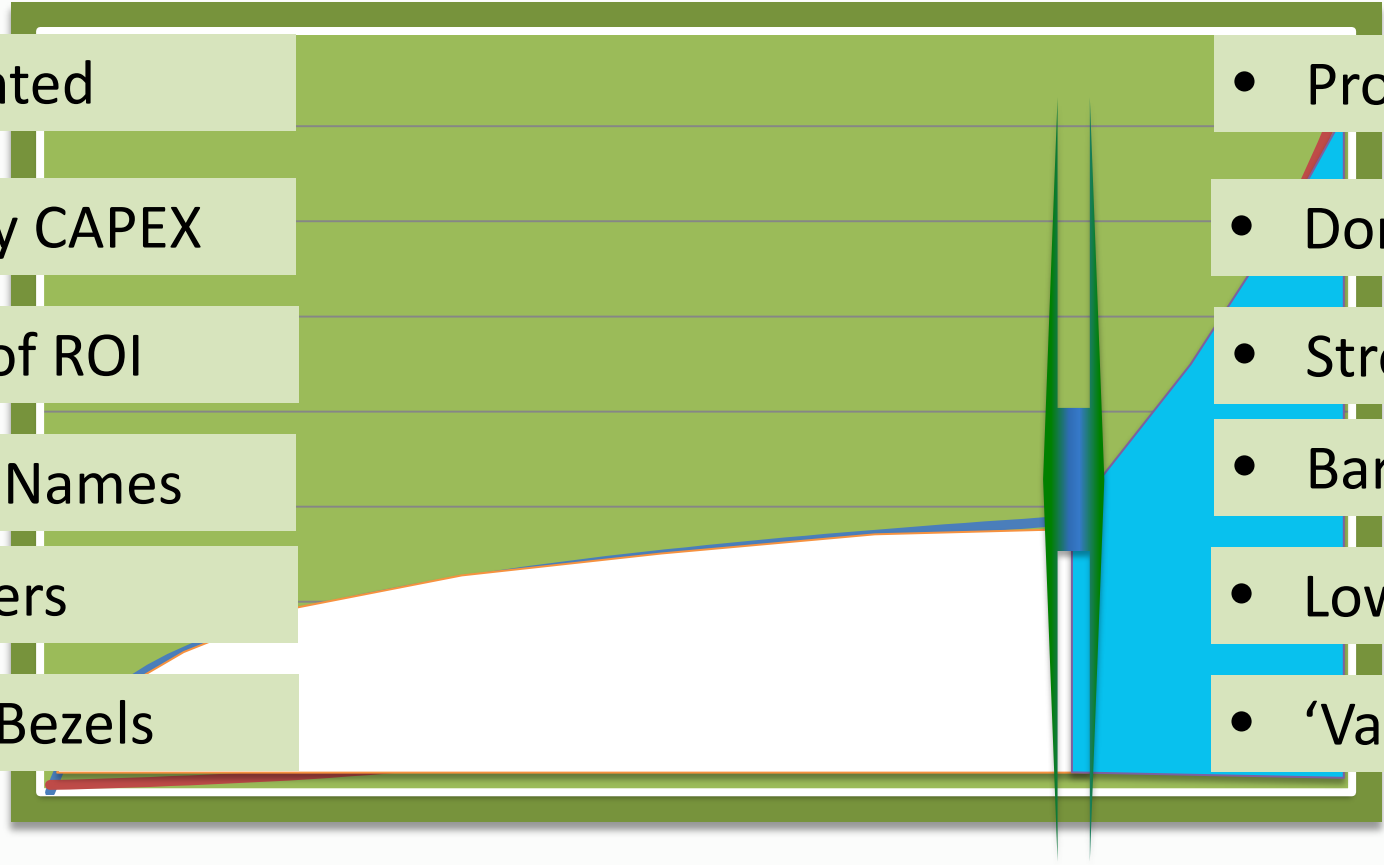
- Dominated by OPEX

- Strong TCO Modeling

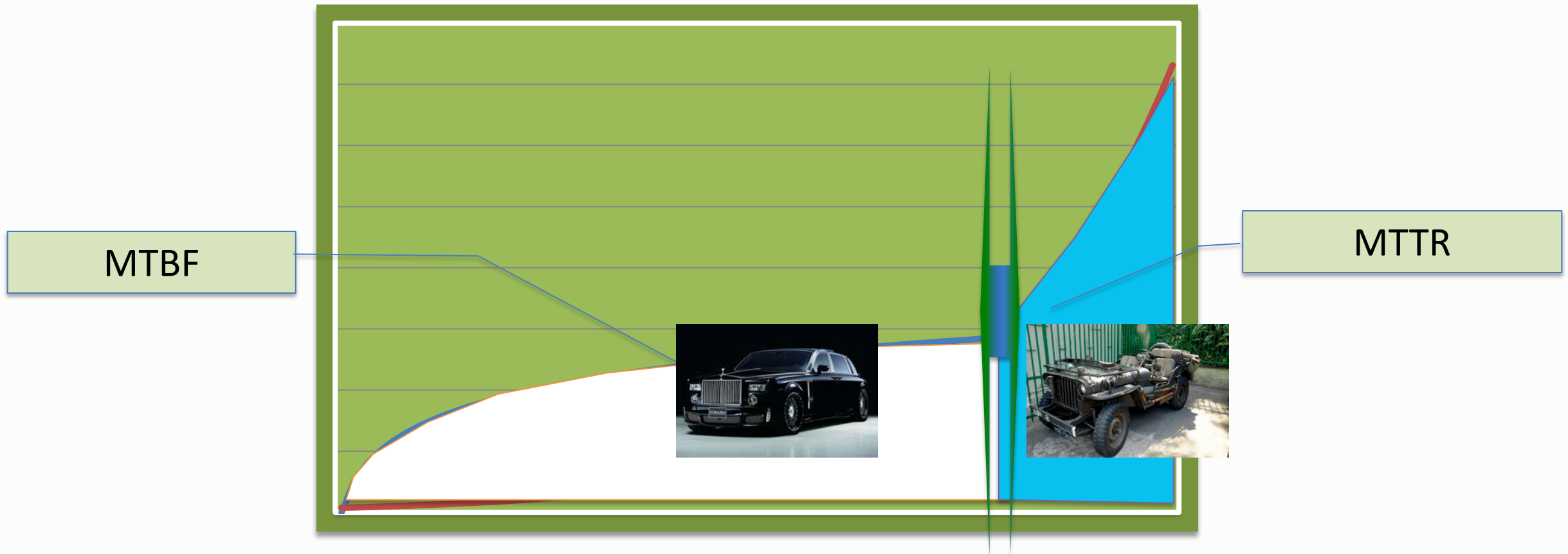
- Barcode is Host ID

- Low SKU Count

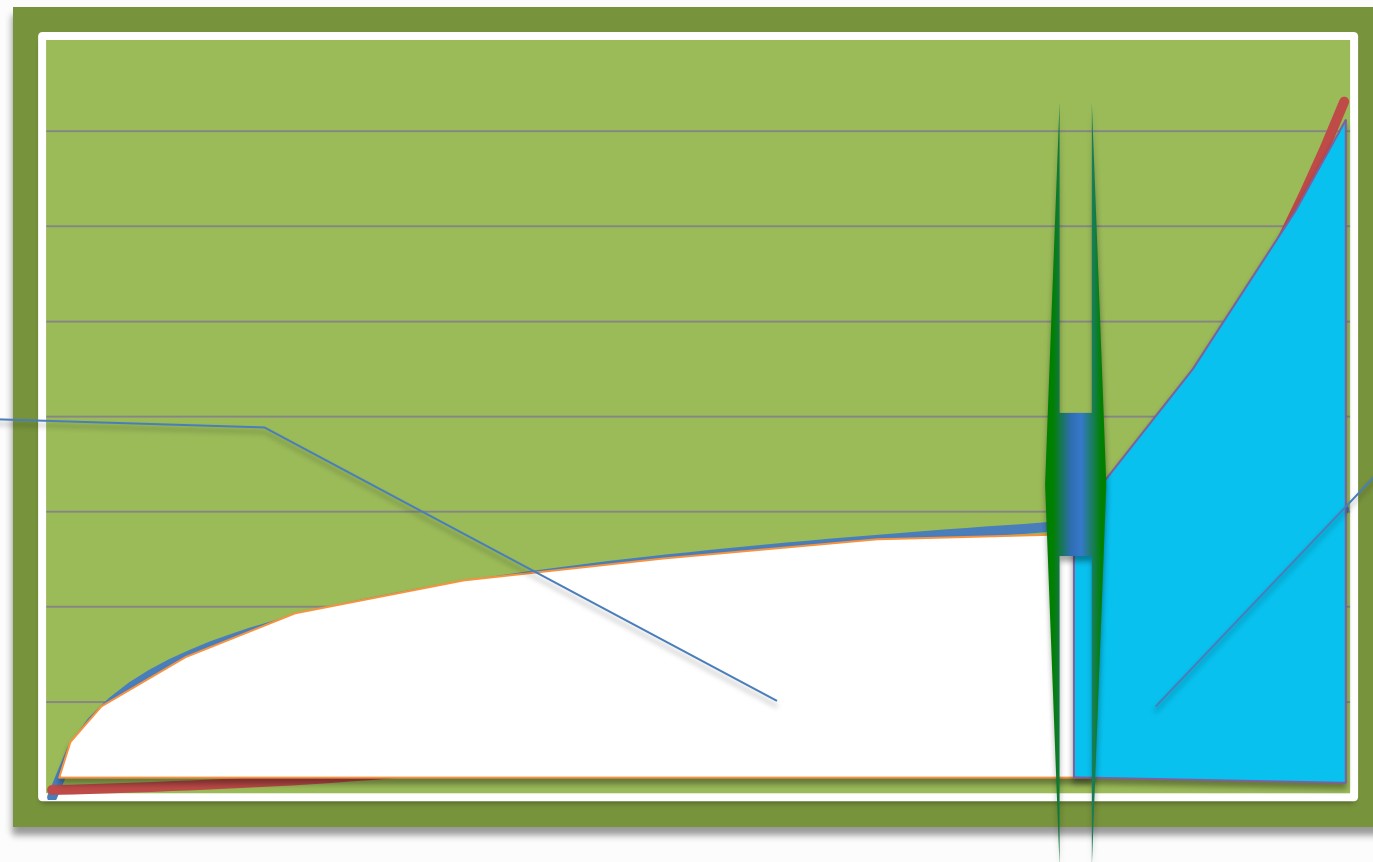
- 'Vanity Free'



Major Architectures on Each Side



What Does This All Add Up To?



“Converged”
/
“Scale-Up”

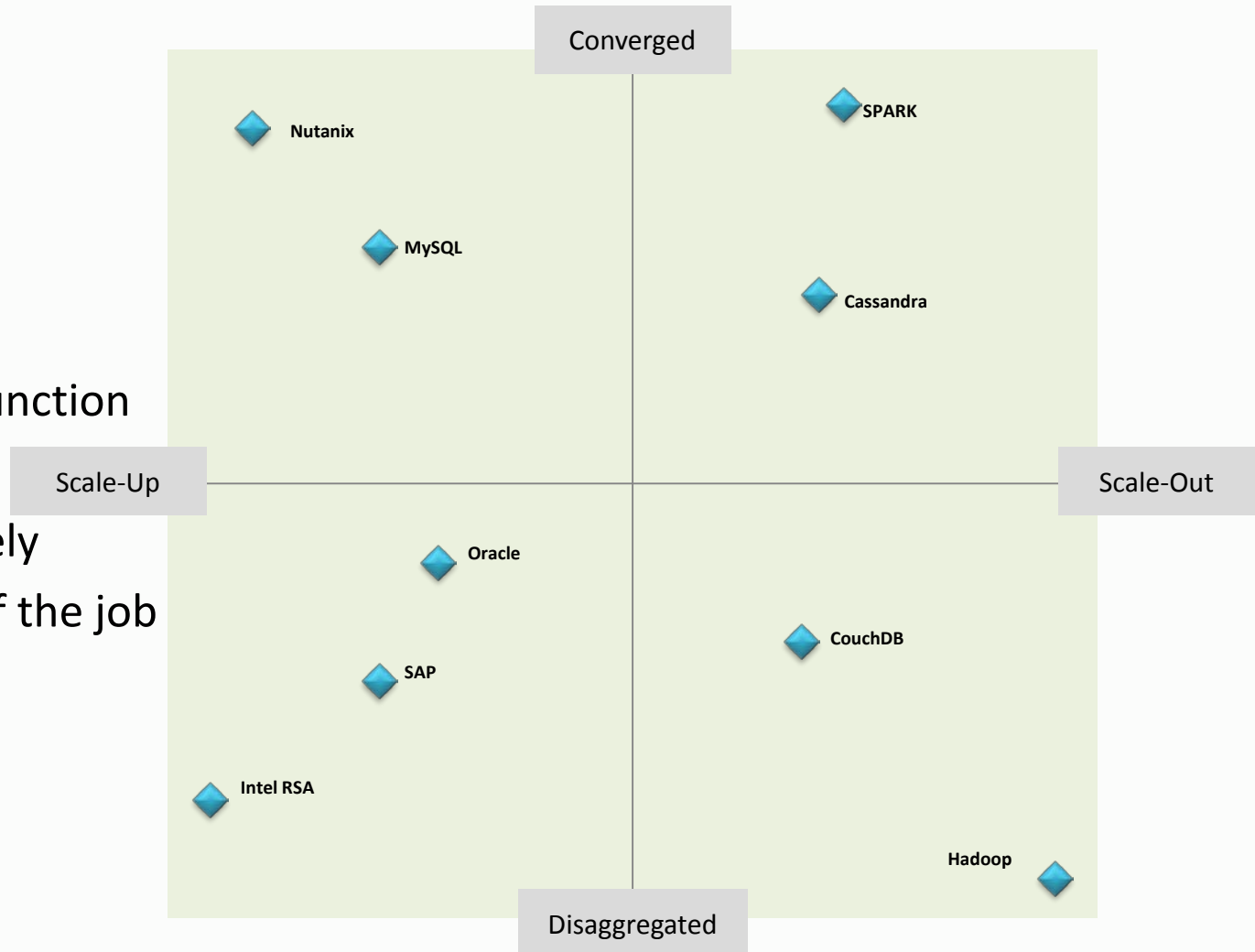
“Disaggregated”
/
“Scale-Out”

Plotting the Landscape



Definitions:

- Converged – node level customization
- Disaggregated – node serves generic function
- Scale-Up – node performs job exclusively
- Scale-Out – node performs a portion of the job



Different Supply Chain



Datacenter Segment
Compare

Traditional Enterprise

Enterprise-Scale: "Services to Thousands"

Usage Scale



Architecture
&
Applications

"Scale-Up" = Fewer @ Faster
Closed Source & MTBF Focus (RAID 5→6)
Purchased OS & Aps & Solutions



Standards Based Platform



Engineered Platform



Storage Platform

THE
FLIP

Modern Enterprise

Web-Scale: "Services to Millions"



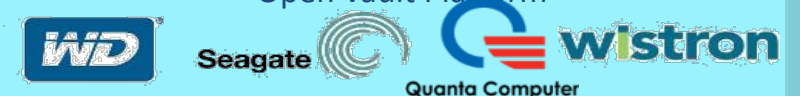
"Scale-Out" = More @ Cheaper
Open Source & MTTR Focus (Replication)
Build OS & Aps & Solutions



Buy Components & ODMs Build
"Open Compute Platform"



Buy Components & ODMs Build
"Open Vault Platform"



The World is About to Change, Again



- End of Moors law implications
 - NAND density
 - Power/Heat Dissipation
 - MHz
 - Size
- End of Aerial density for HDDs, will that EOL the HDD?
 - Device level hybrid was a bad idea, emergence of server-level hybridization
 - SMR is exotic
 - HAMR is likely never to work
 - BPM is just as expensive as NAND
- New Old players
 - Tape has a runway yet
 - Optical could break free
 - Provisioning and management tools growing into their own, not just a vendor-silo
 - 5D storage, aka holographic storage, aka cold fusion

Trends Affecting Disaggregation



- Storage
 - JBOD is cool again
 - NAND gets cheap, and learning to be fast, emergence of NVMe fabric attached
 - Erasure coding went 3-d, what is next
- Server
 - Micro-servers not so micro; Xeon-D took out ARM in the DC
 - Motherboard virtualization
 - Blast-zone containment implications
- Network
 - Fighting over speeds
 - Emergence of understanding transport vs. protocol
 - New topologies to decrease latency and over subscription being drive by SDN
- Applications
 - Data integrity moves away from the data
 - Wide-stripe vs. scale-up, not every workload is embarrassingly parallel
- Data-flows
 - Data processing through to cold and potentially recycle
 - Data governance implications for some data types



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Thank You