



## Vivek Rajendran

### Director – Software Engineering

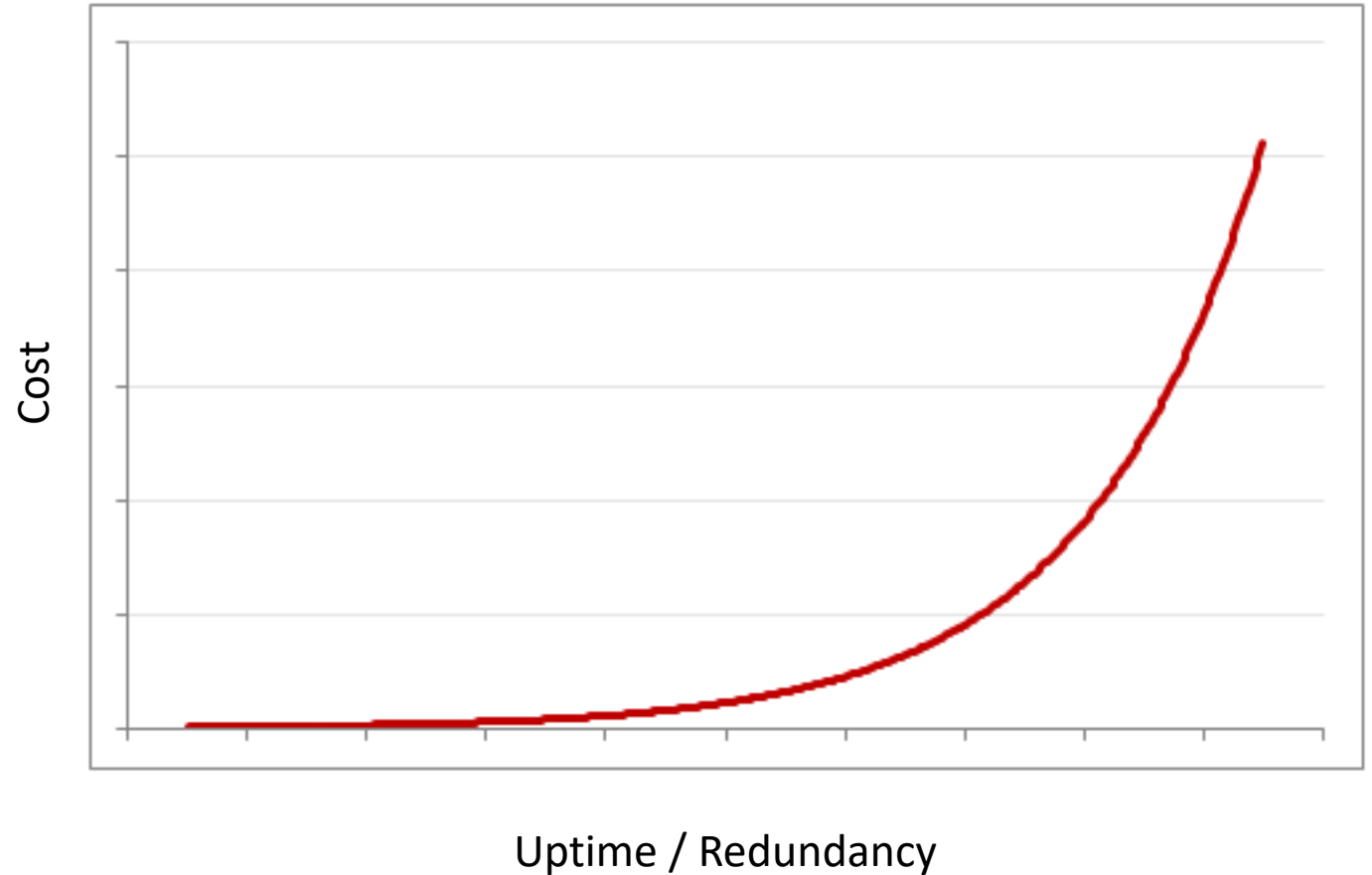
SIS - Systems Management Group  
Dell India R&D, Bangalore

Been in the Industry for over 30 years, always in control engineering. Spent the last 13+ years in Dell India R&D associated with the Server and Storage management products.

Extensive experience and knowledge in Systems Management of Server's in the Data Center

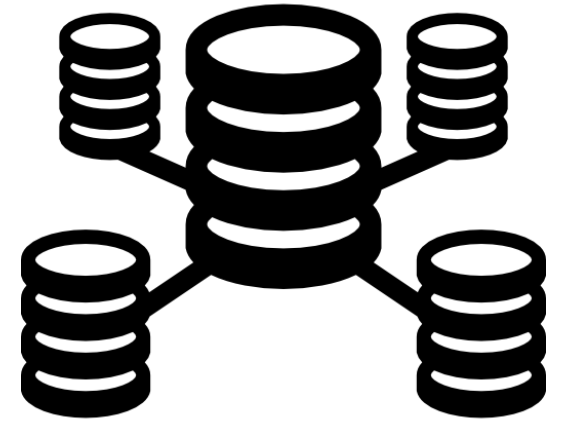
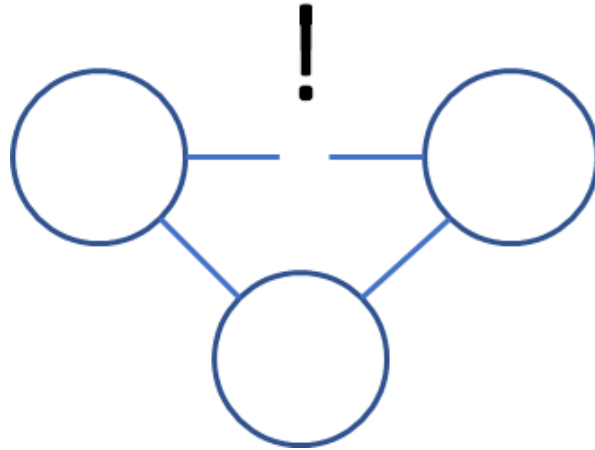
Prior to DellEMC, I was part of the Office of the CTO at CA

# Non linear cost of Redundancy



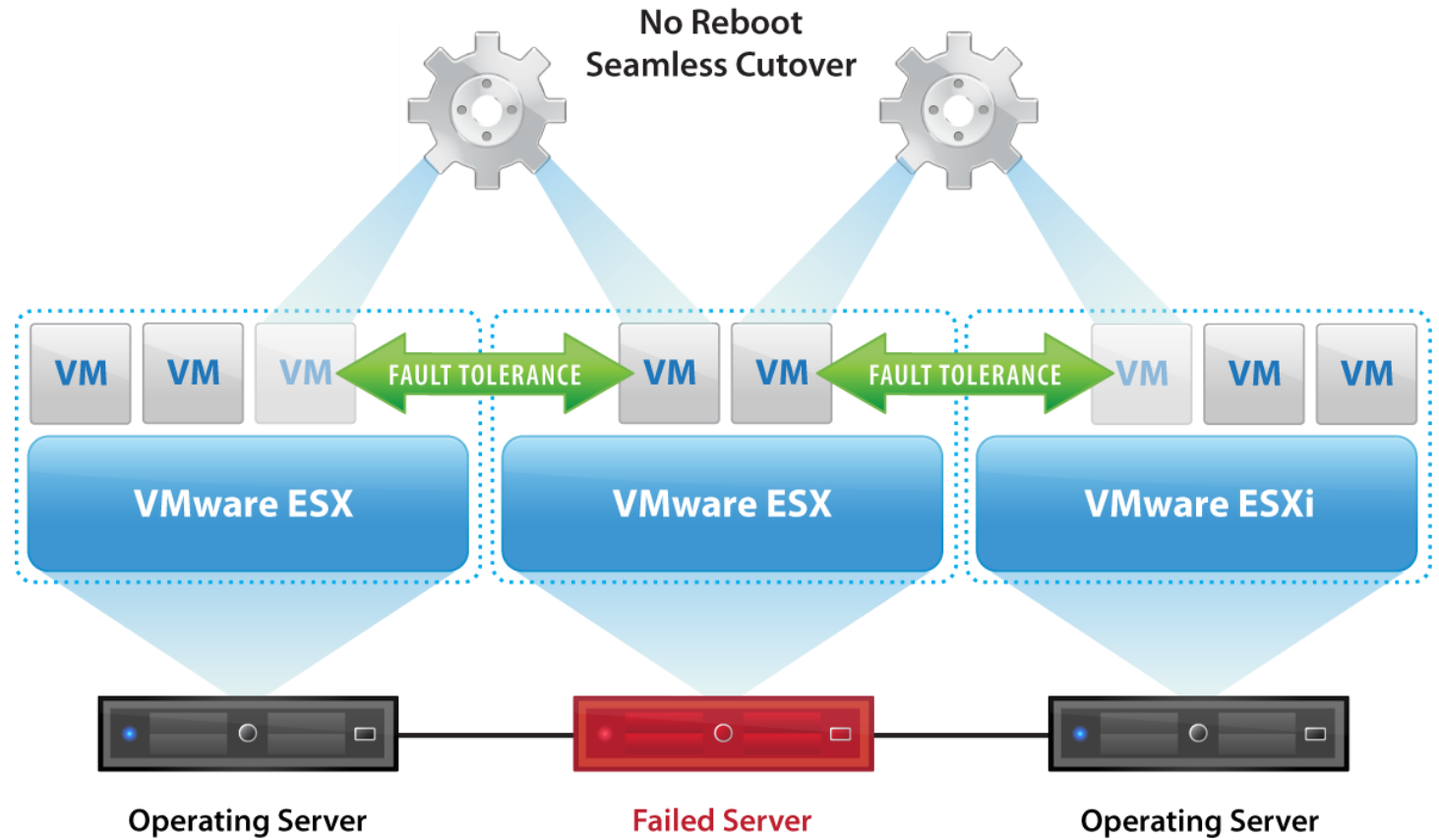
- \*\* Availability levels include data from the hardware:
- **Tier 1** – 99.671% Guaranteed availability
  - **Tier 2** – 99.741% Guaranteed availability
  - **Tier 3** – 99.982% Guaranteed availability
  - **Tier 4** – 99.995% Guaranteed availability

# Fault Tolerance



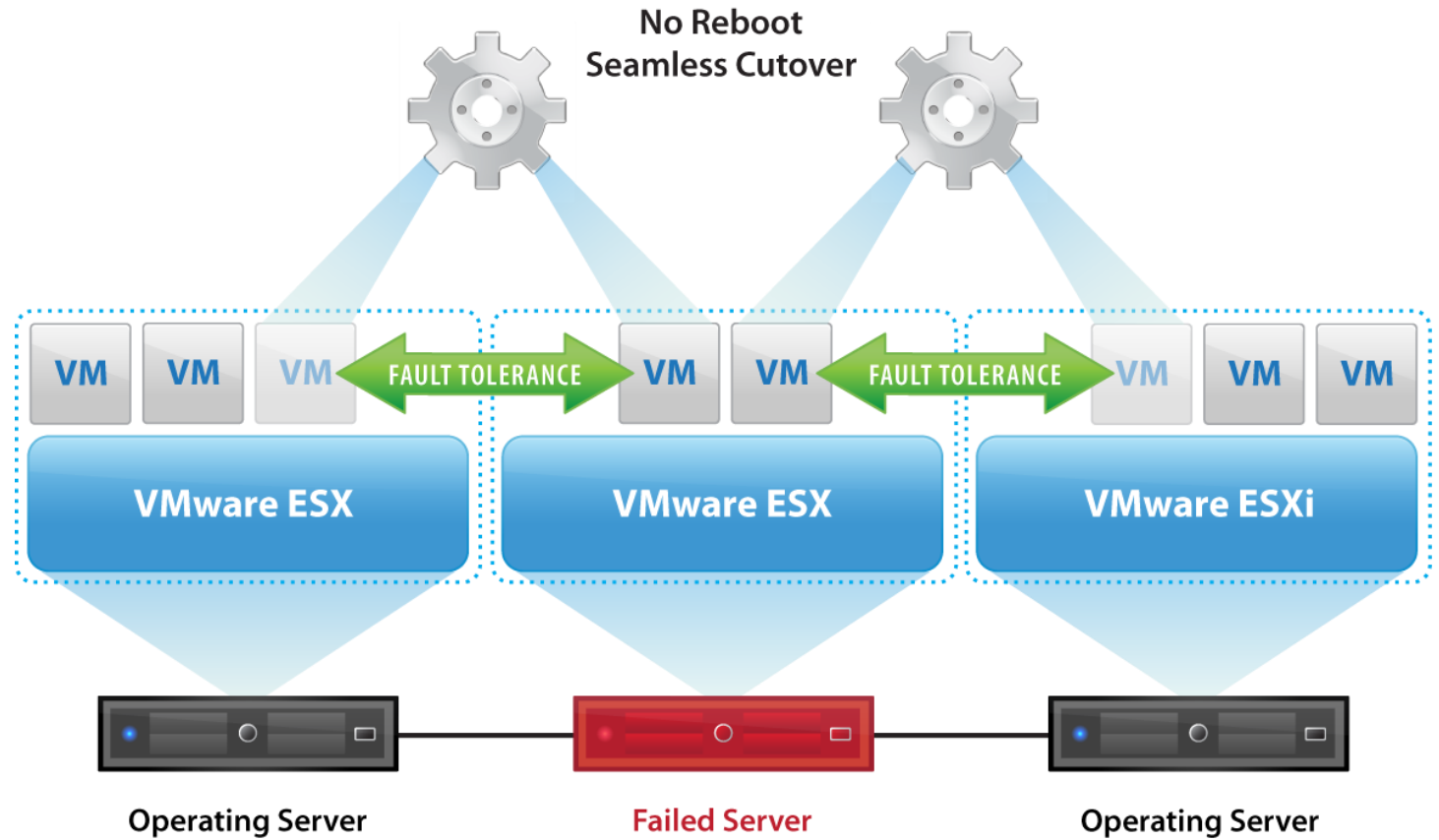
- Not all workloads are the same
- Fault tolerance means different things in the new workload world
- Driving fault tolerance in hardware is an expensive route
- Driving fault tolerance in software needs planning and partnership

# Fault Tolerance in VMWare



Server #1	Server #2	Server #3	Server #4	Spare
66%	66%	66%	66%	0%
66%	66%	66%	0%	66%
88%	88%	0%	0%	88%

# Fault Tolerance in VMWare

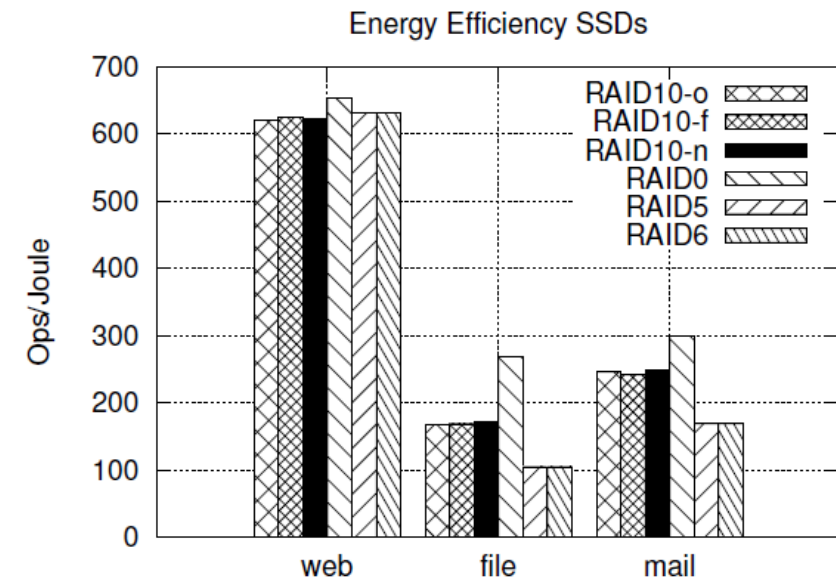
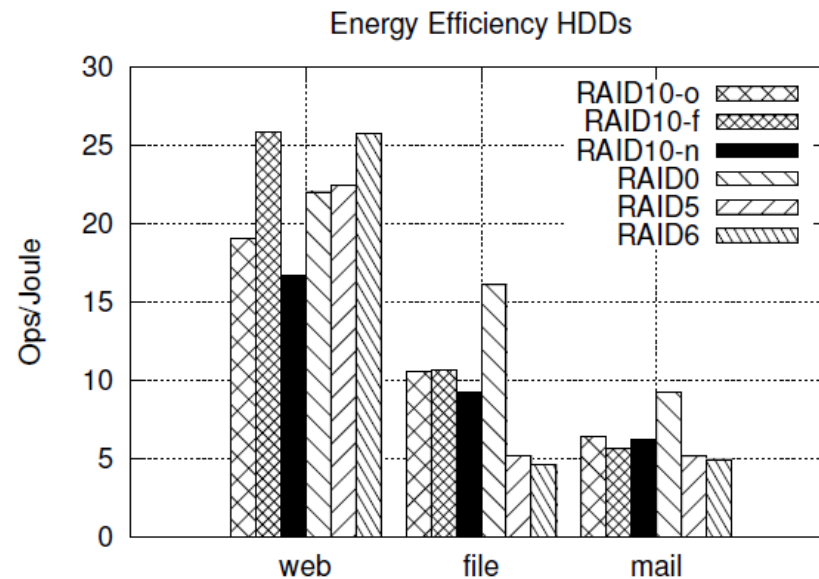


Server #1	Server #2	Server #3	Server #4	Spare
66%	66%	66%	66%	0%
88%	88%	88%	0%	0%
134%	134%	0%	0%	88%

# Couple of Pointers

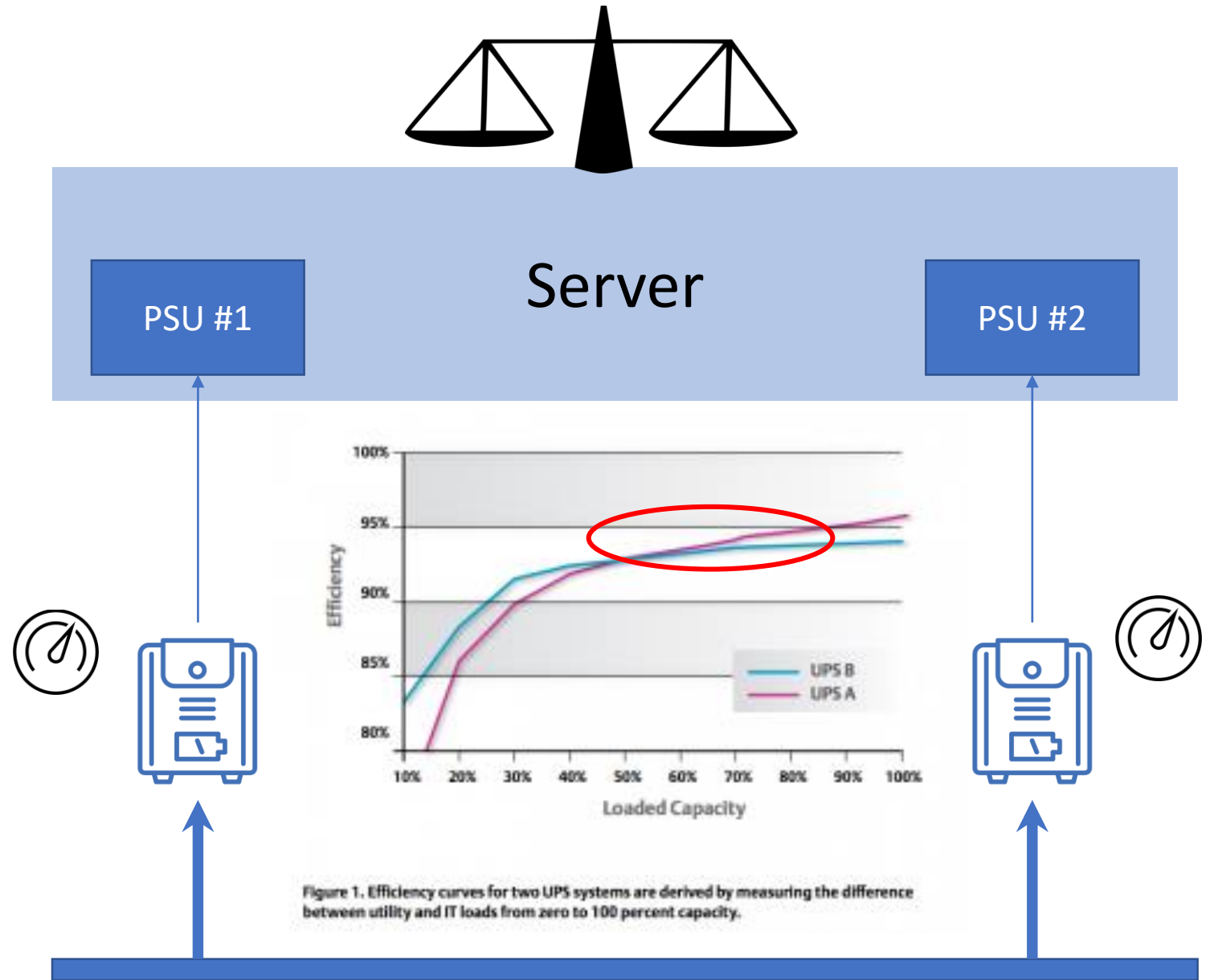
# SSD vs HDD Power Consumption patterns

Tomes, Erica & Altiparmak, Nihat. (2017). A Comparative Study of HDD and SSD RAID's Impact on Server Energy Consumption. 625-626. 10.1109/CLUSTER.2017.103.



By 2024, HDD remains the dominant storage technology regardless of use case, with 54% of total stored data captured on spinning platters, per IDC's projections.

# PSU Configuration





Q & A