

# What Keeps Me Up at Night The Data Center Edition

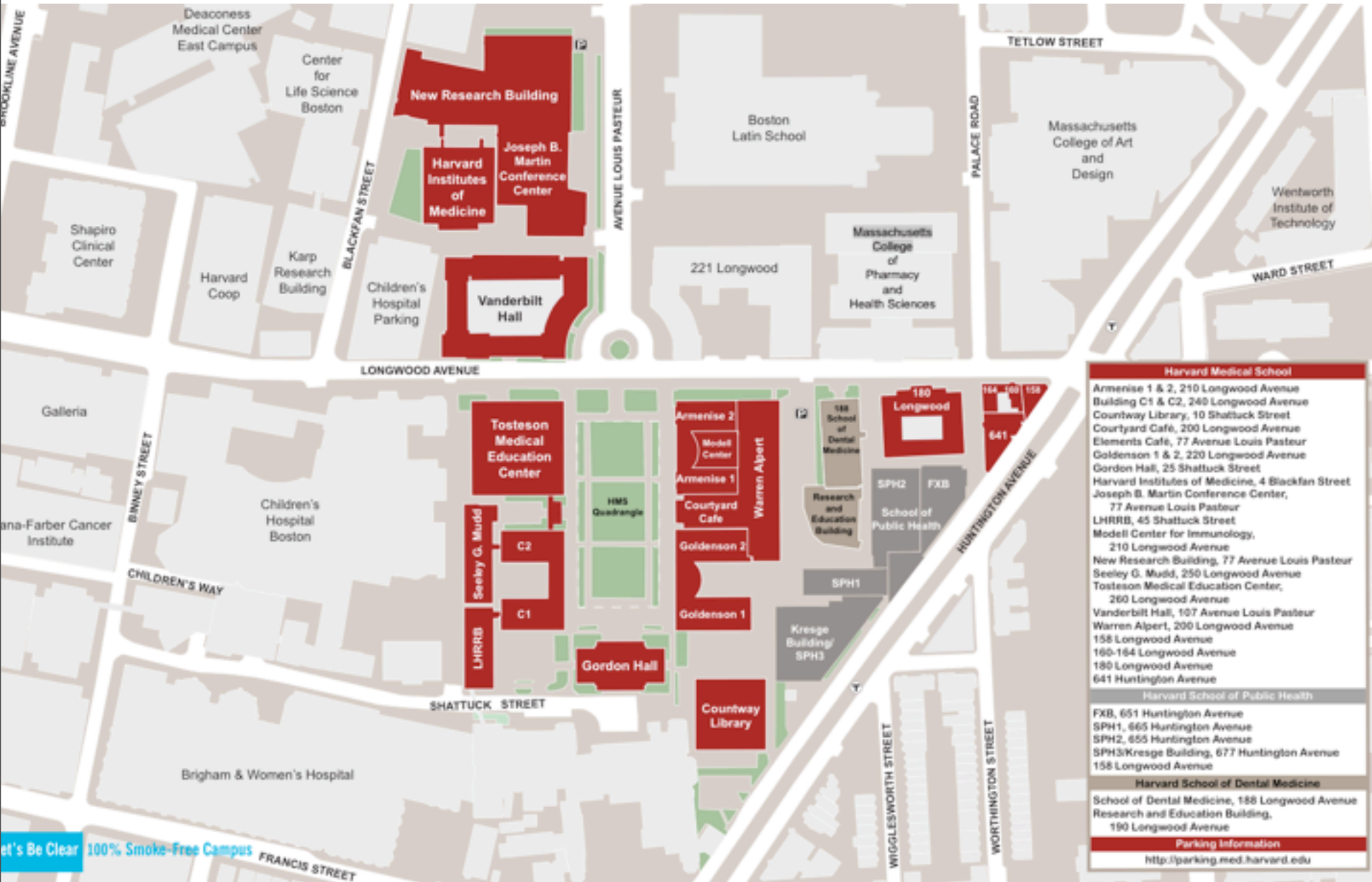
# The Issues

- Unpredictable demand constrained by fixed real estate and limited capital
- Zero tolerance for downtime in parallel with constantly changing technology
- Escalating power and cooling needs – virtualization helps, but high performance computing exceeds all energy expectations
- Storage growth to multi-petabyte scale
- Security/privacy regulatory and compliance pressures

# The Answer

- Private clouds
- Markley provides Harvard Medical School with low density and high density “elastic data centers”
- Another example – BIDMC Electronic Health Record Software as a Service Data Center

# Quad Buildings



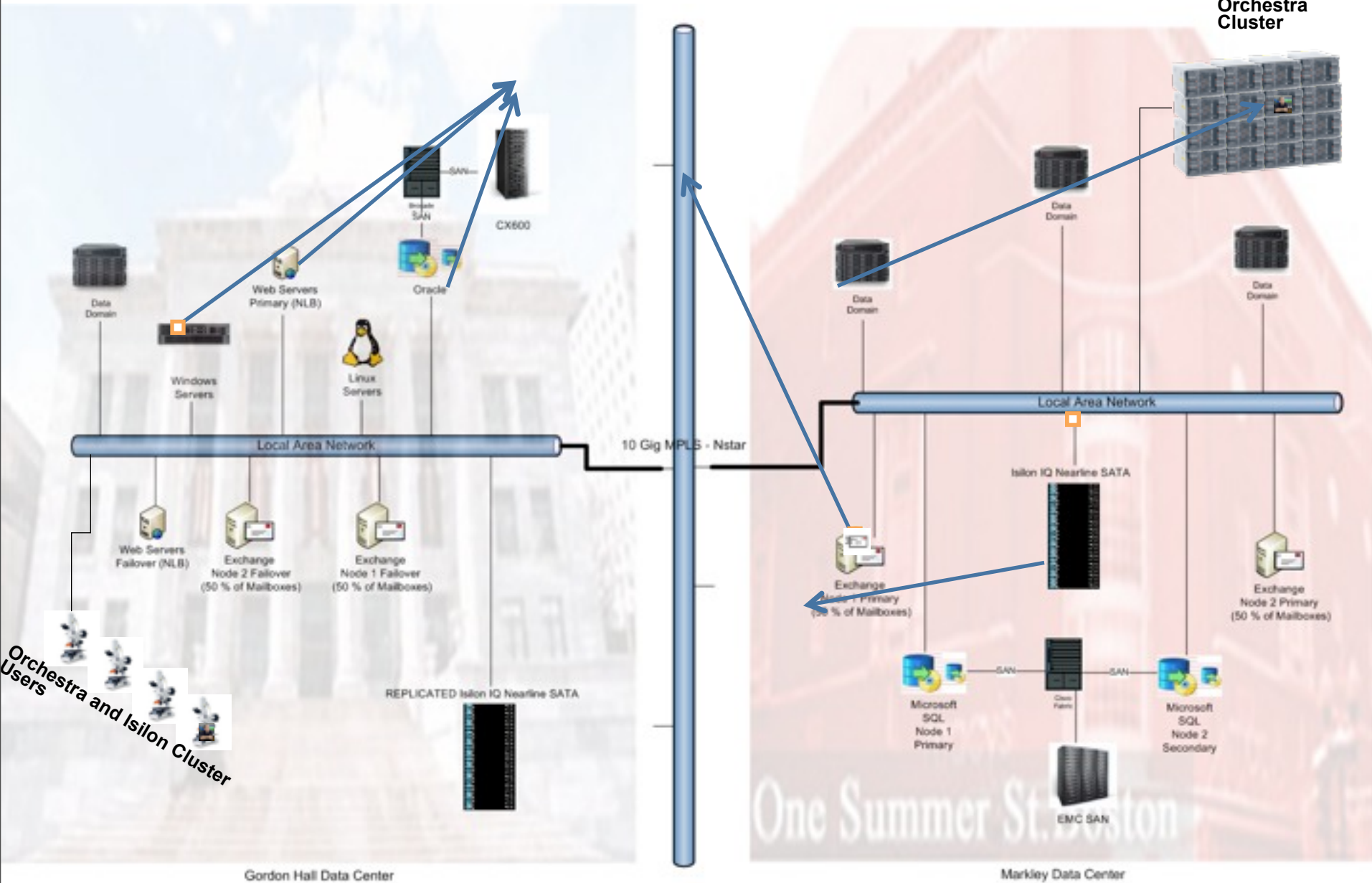
# Replication Across Data Centers



## Gordon Hall Data Center

## Markley Data Center

## Orchestra Cluster



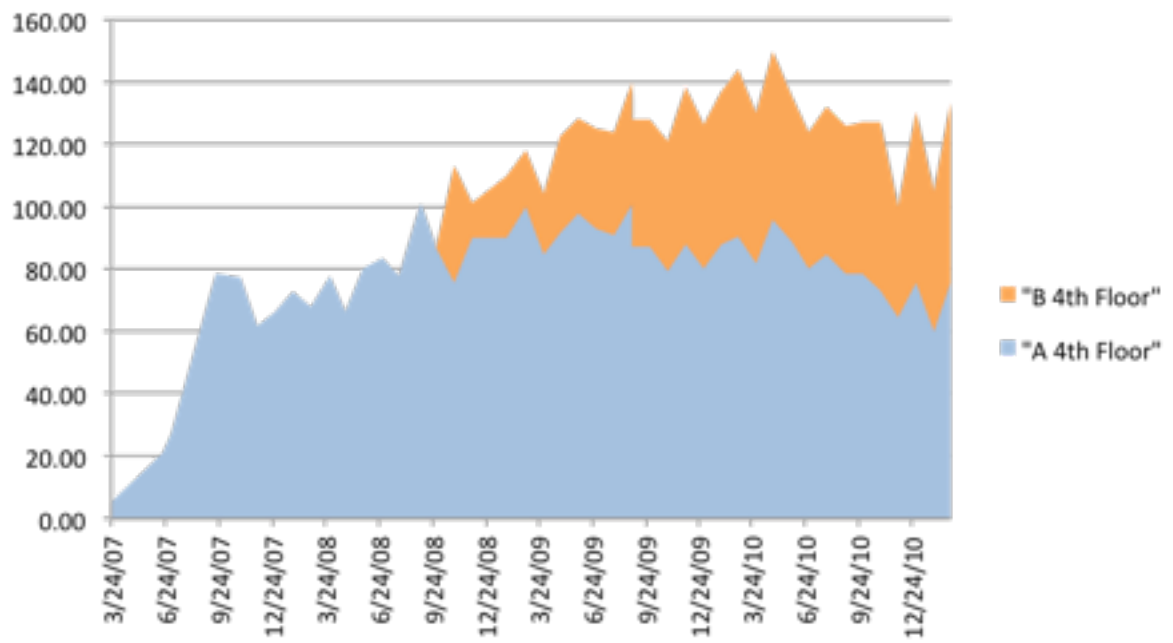
Gordon Hall Data Center

Markley Data Center

# Markley Data Center (4<sup>th</sup> Floor LD)



Cabinets	Cabinets Free	kW Capacity	kW in Use	kW Average per Cabinet	Data Center Square Feet
39	8	170 kW	133.11 kW	4.36 kW	975
4 <sup>th</sup> Floor (Low Density)					
Contract Signed	Contract Expiration	Agreement			
October 2010	February 28 <sup>th</sup> 2021	HMS has the option during the term of the contract to re-locate our Low Density Offering to a new space that may be between 500 - 5,000 square feet.			



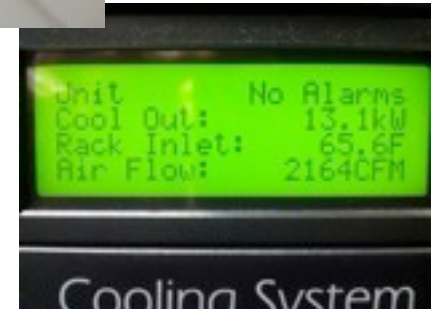
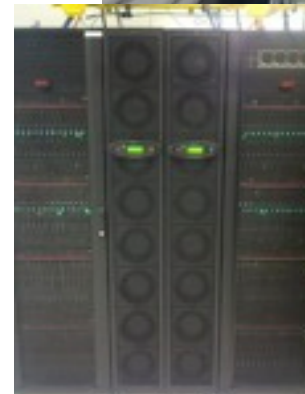
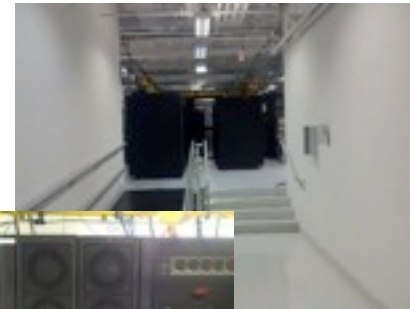
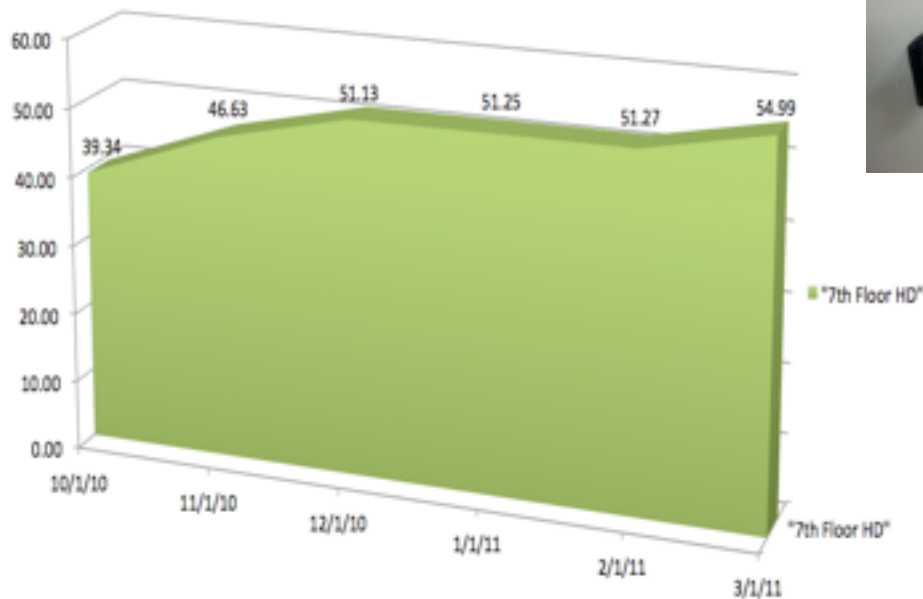
# Markley Data Center (7<sup>th</sup> Floor HD)



Cabinets	Cabinets Available	kW Capacity	kW in Use	Useable kW Capacity	Data Center Square Feet
12	Unlimited	192 kW	54.99 kW	16 kW	Unlimited

## 7<sup>th</sup> Floor (High Density) Markley Agreement

Contract Signed	Contract Expiration	Agreement
October 2010	February 28 <sup>th</sup> 2021	Licensee shall have the option to add additional, non-contiguous 30kW or 20 kW cabinets at any time before the nine (9) year anniversary of the Completion Date. Licensor shall deliver the additional non-contiguous cabinets within ninety (90) days after written request from the Licensee of its election to take the additional non-contiguous cabinets.

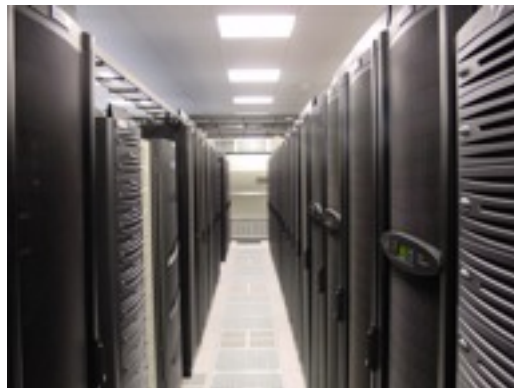


# Gordon Hall (5<sup>th</sup> Floor DR)



Cabinets	Cabinets Free	kW Capacity	kW in Use	Average kW per Cabinet	DC Sq Feet
42	DR only – 8	120 kW	90 kW	2.8 kW	1,000

Gordon Hall contains our failover for any replicated services that are located in Markley. Additionally, it contains our Core Network Infrastructure and Fiber.



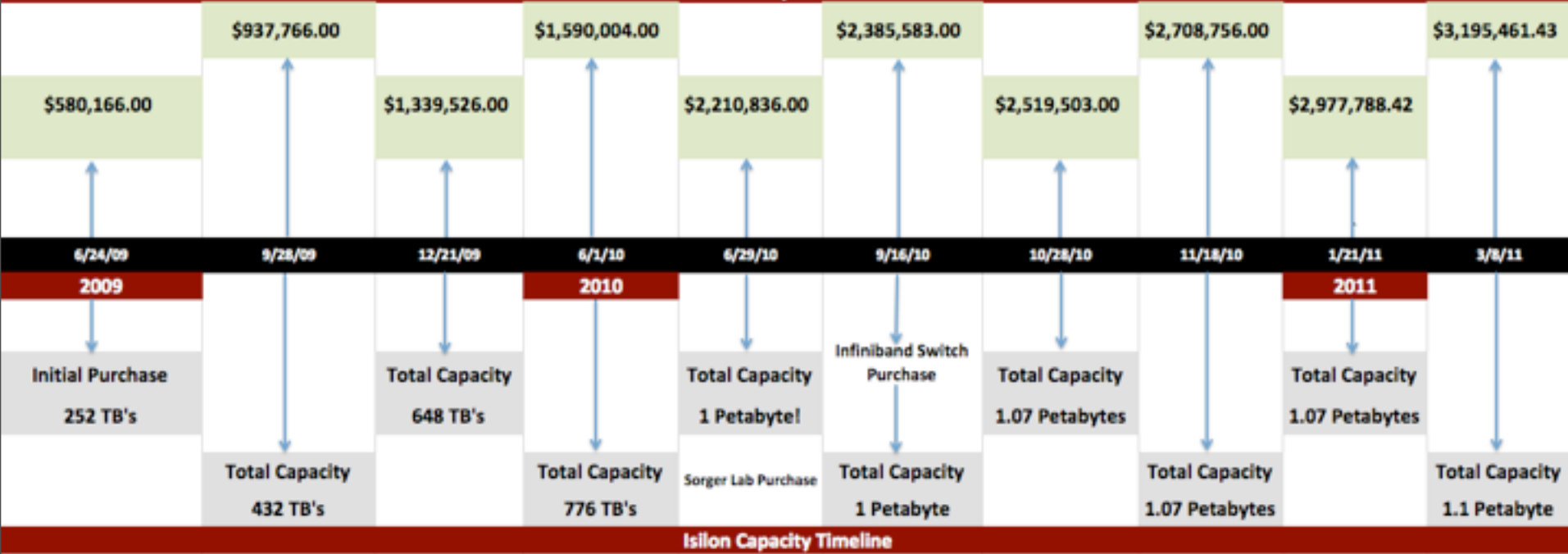


# Storage Infrastructure



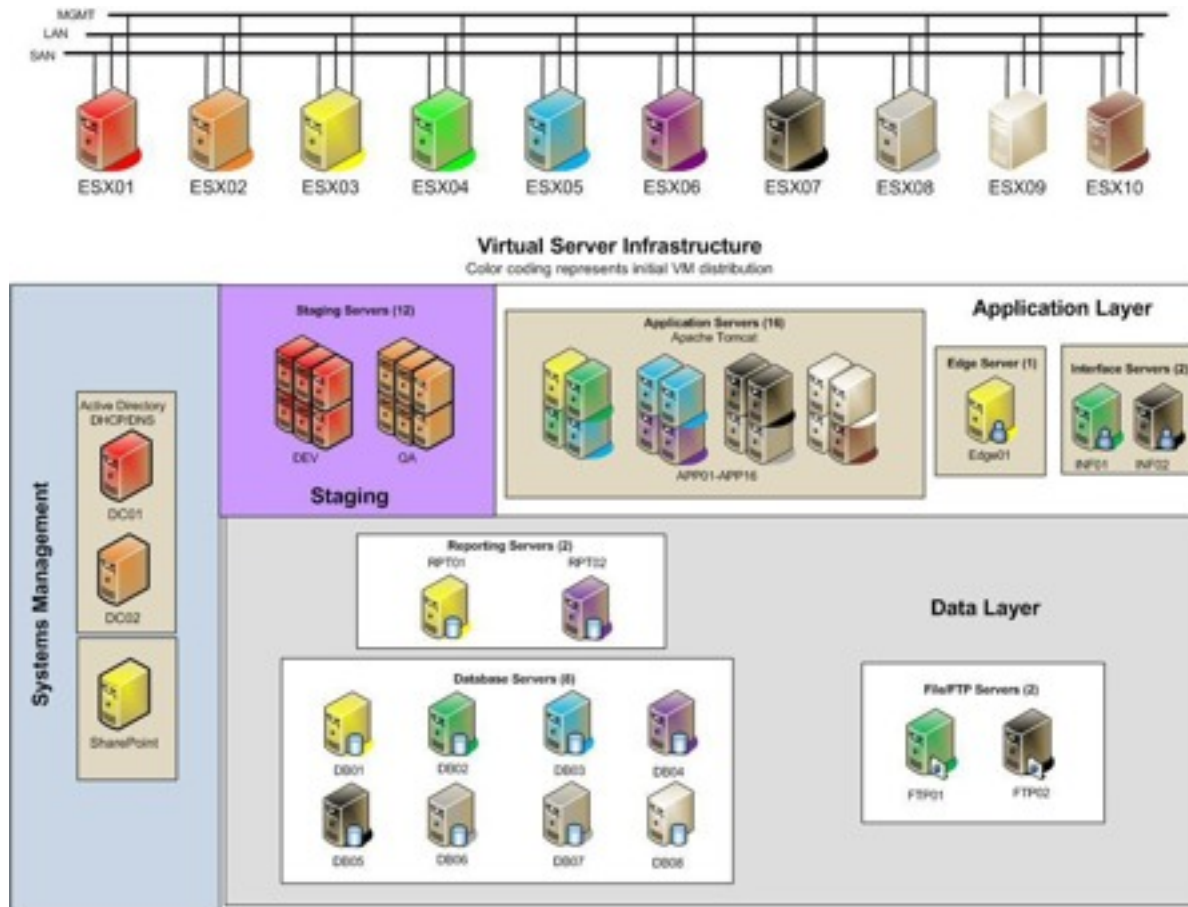
Elapsed Time	TB Growth	Growth Per Day	TB's Remaining	Days Remaining
1 year, 8 months, 12 days	848	1.36 TB's	256.72	188.76

## Isilon Total Spend Timeline



## Isilon Capacity Timeline

# EHR Systems Overview



# The future

- On Demand Storage and Processing
- Clusters and Grids
- Green Data Centers with Power Usage Effectiveness less than 1.50
- HIPAA compliant private clouds
- Real estate constraints