

# Total Cost of Ownership (TCO) Assessment

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*Prepared for:*

**Sample Customer**

*Project Name:*

**Existing x86 / EMC VNX Websphere Environment vs. Nutanix /  
IBM Node vs. Nutanix / x86 Node vs. AWS TCO Analysis**

*Provided by:*



*06/04/2018*

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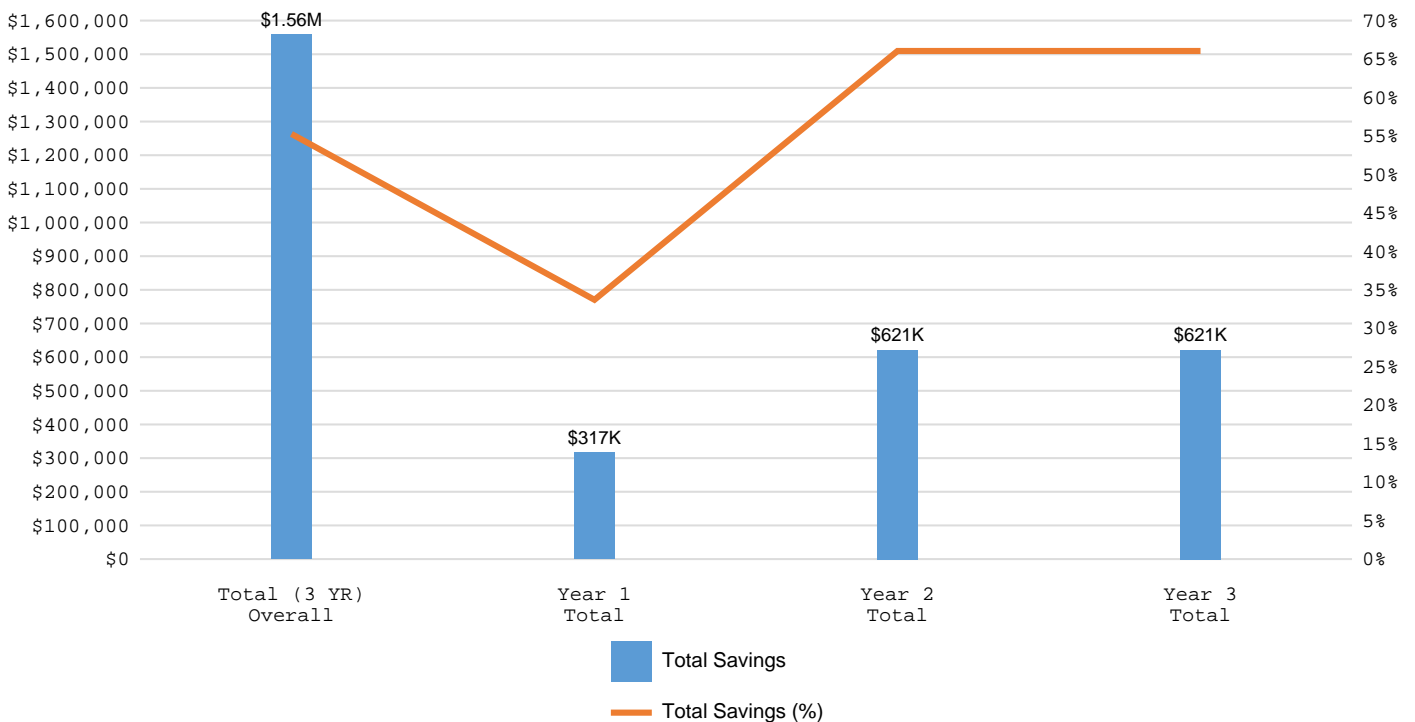
## Executive Summary

This TCO analysis was performed by analyzing Sample Customer's x86 / EMC VNX infrastructure outlined below:

<u>Existing Infrastructure</u>	vs.	<u>Target Infrastructure(s)</u>
(20) x86 / EMC VNX Servers	vs.	(4) Nutanix / IBM Node Servers (3) Nutanix / x86 Node Servers (30) AWS VMs

It is projected that Sample Customer can reduce its Existing 3-year x86 / EMC VNX TCO up to **\$1,558,940** and reduce its Existing 3-year average operating expense up to **55%** by migrating to a(n) *Nutanix / IBM Node* solution.

### Total Savings

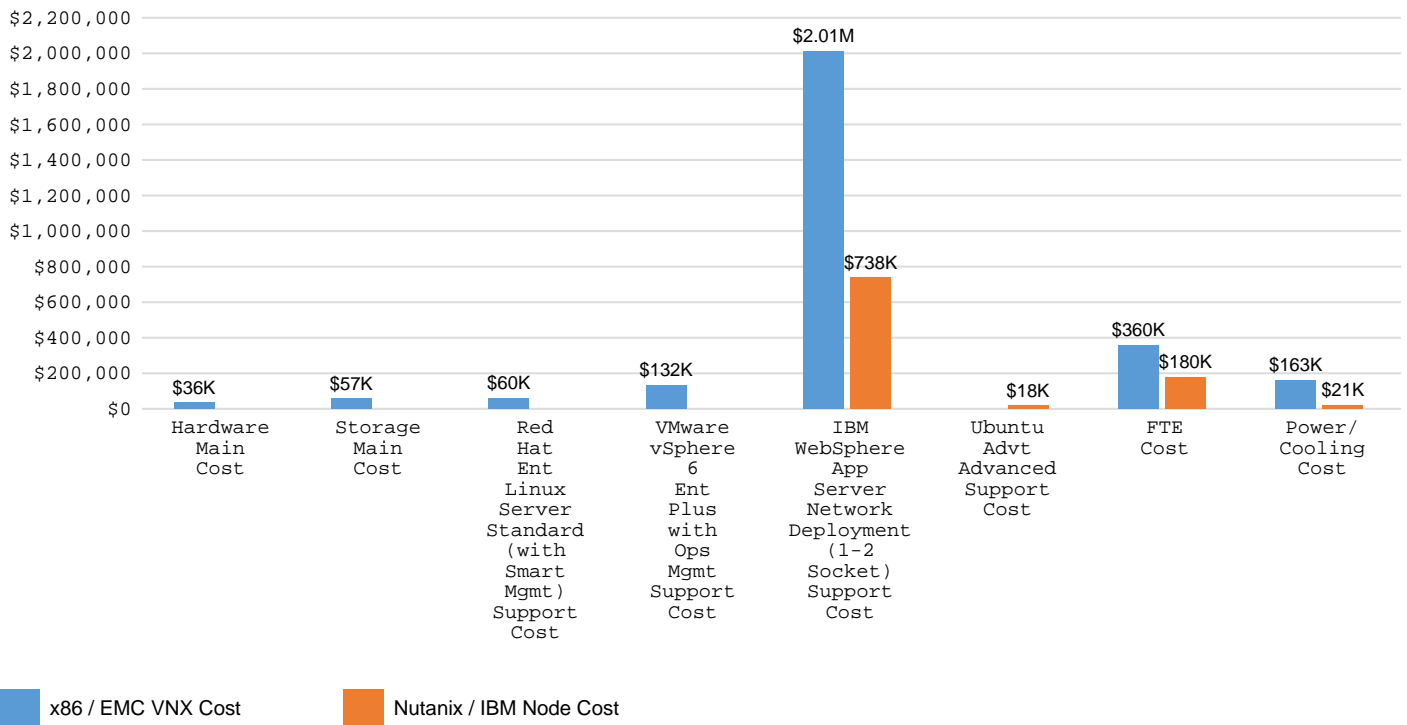


# TCO Assessment

## 3-year Costs by Category

Category	Existing x86 / EMC VNX Cost	Nutanix / IBM Node Cost	Savings	% Reduction
Hardware Maintenance Cost	\$36,000	\$0	\$36,000	100%
Storage Maintenance Cost	\$57,000	\$0	\$57,000	100%
Red Hat Enterprise Linux Server Standard (with Smart Management) Support Cost	\$59,520	\$0	\$59,520	100%
VMware vSphere 6 Enterprise Plus with Operations Management Support Cost	\$131,880	\$0	\$131,880	100%
IBM WebSphere Application Server Network Deployment (1-2 Socket) Support Cost	\$2,013,480	\$738,276	\$1,275,204	63%
Ubuntu Advantage Advanced Support Cost	\$0	\$18,000	(\$18,000)	(100%)
FTE Cost	\$360,000	\$180,000	\$180,000	50%
Power/Cooling Cost	\$162,820	\$21,384	\$141,436	87%

## Costs by Category



# TCO Assessment

## 3-year TCO Details

	Existing x86 / EMC VNX Environment	Nutanix / IBM Node Environment	Nutanix / x86 Node Environment	AWS Environment
Servers/Nodes/Instances	20	4	3	30
Cores/vCPUs	240	88	120	160
Processors	40	8	6	N/A
Compute Performance Metric (CPM) – Existing Env. @ 31% CPU Utilization	21,260	34,916	36,885	N/A
Total Memory (GB)	2,144	2,048	3,072	2,593
CPU Architecture	Various	POWER8	Xeon Gold 6138	Various
Processor Speed (GHz)	Various	2.89	2	2.3
Useable Storage (TB)	10	23.04	18	10
Hardware/Lease Purchase Price	N/A	\$269,100	\$210,338	\$214,887
Hardware Maintenance (3-year)	\$36,000	N/A	\$124,619	\$19,749
Storage Cost	N/A	N/A	N/A	\$36,000
Storage Maintenance (3-year)	\$57,000	N/A	N/A	\$3,600
Red Hat Enterprise Linux Server Standard (with Smart Management) Support Cost (3-year)	\$59,520	N/A	N/A	N/A
VMware vSphere 6 Enterprise Plus with Operations Management Support Cost (3-year)	\$131,880	N/A	N/A	N/A
IBM WebSphere Application Server Network Deployment (1-2 Socket) Support Cost (3-year)	\$2,013,480	\$738,276	\$1,006,740	\$1,579,200
Ubuntu Advantage Advanced Support Cost (3-year)	N/A	\$18,000	N/A	N/A
Red Hat Enterprise Linux Server Premium (with Smart Management) Support Cost (3-year)	N/A	N/A	\$13,428	N/A
Implementation/Migration Services	N/A	\$35,000	\$35,000	\$40,000
FTE Cost (3-year)	\$360,000	\$180,000	\$180,000	\$90,000
Power/Cooling Cost (3-year)	\$162,820	\$21,384	\$35,925	N/A
<b>Total 3-year Costs</b>	<b>\$2,820,700</b>	<b>\$1,261,760</b>	<b>\$1,606,049</b>	<b>\$1,983,436</b>

# TCO Assessment

## Environment Details

### Nutanix / IBM Node Node Detail

Node Qty	Proc Type	GHz	# of Procs	Cores / Proc	Total Cores	RAM (GB)	Storage Type	Drive Capacity (TB)	Drive Qty	Raw Storage (TB)	Useable Storage (TB)
2	POWER8	2.89	2	11	22	512	SSD	0.96	8	7.68	3.84
2	POWER8	2.89	2	11	22	512	SSD	1.92	8	15.36	7.68

### Nutanix / x86 Node Node Detail

Node Qty	Proc Type	GHz	# of Procs	Cores / Proc	Total Cores	RAM (GB)	Storage Type	Drive Capacity (TB)	Drive Qty	Raw Storage (TB)	Useable Storage (TB)
1	Xeon Gold 6138	2	2	20	40	1024	SSD	2	6	12	6

Red Hat Enterprise Linux Server Standard (with Smart Management) Support Cost = Support cost \* discount \* # of processors \* # of years

**x86 / EMC VNX** Red Hat Enterprise Linux Server Standard (with Smart Management) Support Cost = \$496 \* 0% discount \* 40 processors \* 3 years = \$59,520

VMware vSphere 6 Enterprise Plus with Operations Management Support Cost = Support cost \* discount \* # of processors \* # of years

**x86 / EMC VNX** VMware vSphere 6 Enterprise Plus with Operations Management Support Cost = \$1,099 \* 0% discount \* 40 processors \* 3 years = \$131,880

IBM WebSphere Application Server Network Deployment (1-2 Socket) Support Cost = Support cost \* discount \* # of cores \* core multiplier or PVU \* # of years

**x86 / EMC VNX** IBM WebSphere Application Server Network Deployment (1-2 Socket) Support Cost = \$47 \* 15% discount \* 240 cores \* 70 \* 3 years = \$2,013,480

**Nutanix / IBM Node** IBM WebSphere Application Server Network Deployment (1-2 Socket) Support Cost = \$47 \* 15% discount \* 88 cores \* 70 \* 3 years = \$738,276

**Nutanix / x86 Node** IBM WebSphere Application Server Network Deployment (1-2 Socket) Support Cost = \$47 \* 15% discount \* 120 cores \* 70 \* 3 years = \$1,006,740

**AWS** IBM WebSphere Application Server Network Deployment (1-2 Socket) (AWS) Support Cost = \$47 \* 0% discount \* 160 cores \* 70 \* 3 years = \$1,579,200

Ubuntu Advantage Advanced Support Cost = Support cost \* discount \* # of servers \* # of years

**Nutanix / IBM Node** Ubuntu Advantage Advanced Support Cost = \$1,500 \* 0% discount \* 4 servers \* 3 years = \$18,000

# TCO Assessment

Red Hat Enterprise Linux Server Premium (with Smart Management) Support Cost = Support cost \* discount \* # of processors \* # of years

**Nutanix / x86 Node** Red Hat Enterprise Linux Server Premium (with Smart Management) Support Cost = \$746  
\* 0% discount \* 6 processors \* 3 years = \$13,428

Compute Power/Cooling Cost = Max power consumption (kW) \* metered cost per kWh \* 24 hrs/day \* 30 days/mo \* 12 mo/yr \* # of years

**x86 / EMC VNX** Power/Cooling Cost = 56kW \* 0.11 kWh \* 24 hrs/day \* 30 days/mo \* 12 mo/yr \* 3 years = \$159,667

**Nutanix / IBM Node** Power/Cooling Cost = 7.5kW \* 0.11 kWh \* 24 hrs/day \* 30 days/mo \* 12 mo/yr \* 3 years = \$21,384

**Nutanix / x86 Node** Power/Cooling Cost = 12.6kW \* 0.11 kWh \* 24 hrs/day \* 30 days/mo \* 12 mo/yr \* 3 years = \$35,925

Storage Power/Cooling Cost = Power ((\$/kWh \* kWh/yr/drive) + Cooling (\$/kWh \* kWh/yr/drive)) \* 1TB drive factor \* # of Raw TBs \* # of years for analysis

**x86 / EMC VNX** HDD 15k Power/Cooling Cost = Power ((0.11 \* 143.32 kWh/yr/600GB drive) + Cooling (0.11 \* 143.29 kWh/yr/600GB drive)) \* 1.667 TB drive factor \* 20TB \* 3 years = \$3,153

## **AWS - EC2, EBS Storage and Business Level Support Costs (3-year) - On-Demand and Reserved Instances**

Amazon EBS General Purpose SSD Cost = (Price per GB-Month \* provisioned storage (GB)) \* Utilization \* 12 mo/yr \* # of years

**AWS** Amazon EBS General Purpose SSD Cost = (\$0.1/GB/month \* 10,000 GB) \* 100% \* 12 mo/yr \* 3 years = \$36,000

### **AWS Storage Business Level Support Cost**

Storage Monthly Cost = \$0/GB/month \* 10,000 GB) \* 100% = \$1,000 months = \$36,000

10% of monthly AWS usage for the first \$0-\$10k = \$100/mo

7% of monthly AWS usage from \$10k-\$80k

5% of monthly AWS usage from \$80k-\$250k

3% of monthly AWS usage over \$250k

AWS Storage Business Level Support per Month = \$100

AWS Storage Business Level Support (3 years) = \$3,600

### **AWS On-Demand Cost**

r4.xlarge Total Cost = (hourly cost \* 8,760 hrs/yr \* 3 years \* utilization) \* # of instances

(\$0.396/hr \* 8,760 hrs/yr \* 3 years \* 100%) \* 5 = \$52,035

### **AWS On-Demand Business Level Support Cost**

On-Demand Monthly Cost = \$52,035 / 36 months = \$1,445

10% of monthly AWS usage for the first \$0-\$10k = \$145/mo

# TCO Assessment

7% of monthly AWS usage from \$10k-\$80k

5% of monthly AWS usage from \$80k-\$250k

3% of monthly AWS usage over \$250k

AWS Business Level Support per Month = \$145

*AWS Business Level Support (3 years) = \$5,220*

## **AWS Reserved Instance - Partial Upfront Cost**

r4.xlarge Total Cost = (upfront cost + (hourly cost \* 8,760 hrs/yr \* 3 years) \* # of instances (Applied to the whole term whether or not you're using the Reserved Instance)

$(\$1,398 + (0.113/\text{hr} * 8,760 \text{ hrs/yr} * 3 \text{ years}) * 5 = \$21,837$

## **AWS Reserved Instance - Partial Upfront Business Level Support Cost**

Upfront Cost = (Upfront Cost \* # of Instances) = \$1,398 \* 5 = \$6,990

10% of upfront AWS usage for the first \$0-\$10k = \$699/mo

7% of upfront AWS usage from \$10k-\$80k

5% of upfront AWS usage from \$80k-\$250k

3% of upfront AWS usage over \$250k

*Upfront Business Level Support = \$699*

Monthly Cost = (hourly cost \* 8,760 hrs/yr / 12 mos/yr) \* # of instances = (\$0.113 \* 8,760 hrs/yr / 12 mos) \* 5 instances = \$412

10% of upfront AWS usage for the first \$0-\$10k = \$41/mo

7% of upfront AWS usage from \$10k-\$80k

5% of upfront AWS usage from \$80k-\$250k

3% of upfront AWS usage over \$250k

AWS Business Level Support per Month = \$41/mo

*AWS Business Level Support (3 years) = \$1,476*

*TOTAL 3 year Business Level Support = \$699 + \$1,476 = \$2,175*

## **AWS On-Demand Cost**

r4.2xlarge Total Cost = (hourly cost \* 8,760 hrs/yr \* 3 years \* utilization) \* # of instances

$(\$0.662/\text{hr} * 8,760 \text{ hrs/yr} * 3 \text{ years} * 100\%) * 10 = \$173,973$

## **AWS On-Demand Business Level Support Cost**

On-Demand Monthly Cost = \$173,973 / 36 months = \$4,833

10% of monthly AWS usage for the first \$0-\$10k = \$483/mo

7% of monthly AWS usage from \$10k-\$80k

5% of monthly AWS usage from \$80k-\$250k

3% of monthly AWS usage over \$250k

AWS Business Level Support per Month = \$483

# TCO Assessment

*AWS Business Level Support (3 years) = \$17,388*

## **AWS Reserved Instance - Partial Upfront Cost**

r4.2xlarge Total Cost = (upfront cost + (hourly cost \* 8,760 hrs/yr \* 3 years) \* # of instances (Applied to the whole term whether or not you're using the Reserved Instance)

$(\$2,796 + (0.166/hr * 8,760 hrs/yr * 3 years) * 10 = \$71,586$

## **AWS Reserved Instance - Partial Upfront Business Level Support Cost**

Upfront Cost = (Upfront Cost \* # of Instances) = \$2,796 \* 10 = \$27,960

10% of upfront AWS usage for the first \$0-\$10k = \$1,000/mo

7% of upfront AWS usage from \$10k-\$80k = \$1,257/mo

5% of upfront AWS usage from \$80k-\$250k

3% of upfront AWS usage over \$250k

*Upfront Business Level Support = \$2,257*

Monthly Cost = (hourly cost \* 8,760 hrs/yr / 12 mos/yr) \* # of instances = (\$0.166 \* 8,760 hrs/yr / 12 mos) \* 10 instances = \$1,212

10% of upfront AWS usage for the first \$0-\$10k = \$121/mo

7% of upfront AWS usage from \$10k-\$80k

5% of upfront AWS usage from \$80k-\$250k

3% of upfront AWS usage over \$250k

AWS Business Level Support per Month = \$121/mo

*AWS Business Level Support (3 years) = \$4,356*

*TOTAL 3 year Business Level Support = \$2,257 + \$4,356 = \$6,613*

## **AWS On-Demand Cost**

x1e.xlarge Total Cost = (hourly cost \* 8,760 hrs/yr \* 3 years \* utilization) \* # of instances

$(\$0.894/hr * 8,760 hrs/yr * 3 years * 100%) * 15 = \$352,416$

## **AWS On-Demand Business Level Support Cost**

On-Demand Monthly Cost = \$352,416 / 36 months = \$9,789

10% of monthly AWS usage for the first \$0-\$10k = \$979/mo

7% of monthly AWS usage from \$10k-\$80k

5% of monthly AWS usage from \$80k-\$250k

3% of monthly AWS usage over \$250k

AWS Business Level Support per Month = \$979

*AWS Business Level Support (3 years) = \$35,244*

## **AWS Reserved Instance - Partial Upfront Cost**

x1e.xlarge Total Cost = (upfront cost + (hourly cost \* 8,760 hrs/yr \* 3 years) \* # of instances (Applied to the whole term whether or not you're using the Reserved Instance)



# TCO Assessment

$$(\$3,262 + (0.184/\text{hr} * 8,760 \text{ hrs/yr} * 3 \text{ years}) * 15 = \$121,464$$

## **AWS Reserved Instance - Partial Upfront Business Level Support Cost**

$$\text{Upfront Cost} = (\text{Upfront Cost} * \# \text{ of Instances}) = \$3,262 * 15 = \$48,930$$

10% of upfront AWS usage for the first \$0-\$10k = \$1,000/mo

7% of upfront AWS usage from \$10k-\$80k = \$2,725/mo

5% of upfront AWS usage from \$80k-\$250k

3% of upfront AWS usage over \$250k

$$\text{Upfront Business Level Support} = \$3,725$$

$$\text{Monthly Cost} = (\text{hourly cost} * 8,760 \text{ hrs/yr} / 12 \text{ mos/yr}) * \# \text{ of instances} = (\$0.184 * 8,760 \text{ hrs/yr} / 12 \text{ mos}) * 15 \text{ instances} = \$2,015$$

10% of upfront AWS usage for the first \$0-\$10k = \$201/mo

7% of upfront AWS usage from \$10k-\$80k

5% of upfront AWS usage from \$80k-\$250k

3% of upfront AWS usage over \$250k

AWS Business Level Support per Month = \$201/mo

$$\text{AWS Business Level Support (3 years)} = \$7,236$$

$$\text{TOTAL 3 year Business Level Support} = \$3,725 + \$7,236 = \$10,961$$

## **AWS On-Demand Total Cost**

$$\text{On-Demand Purchase Cost} = \$52,035 + \$173,973 + \$352,416 = \$578,424$$

$$\text{On-Demand Support Cost} = \$5,220 + \$17,388 + \$35,244 = \$57,852$$

## **AWS Partial Upfront Total Cost**

$$\text{Partial Upfront Purchase Cost} = \$21,837 + \$71,586 + \$121,464 = \$214,887$$

$$\text{Partial Upfront Support Cost} = \$2,175 + \$6,613 + \$10,961 = \$19,749$$

## **AWS Lowest Priced Instance**

$$3 \text{ year Partial Upfront Reserved Instance} = \$214,887$$

+

$$3 \text{ year Partial Upfront Reserved Instance Business Level Support} = \$19,749$$