

# CS553 - Cloud Computing

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## Configuration 1

Hadoop/Spark Cluster with 32K-cores, 256TB memory, 50PB HDD, and 10Gb/s Ethernet Fat-Tree network (each VM should be equivalent to the d2.8xlarge instance); in addition to the compute resources, a 100PB distributed storage shared across the entire cloud should be procured, with enough capacity for 100GB/sec throughput (for pricing comparison, see S3)

### d2.8xlarge configuration

vCPUS	36
Memory(GiB)	244
Storage(GB)	24*2000 HDD
ECU	116
Network Performance	10 Gigabit
Physical CPU	Intel Xenon E5- 2676 v3
Clock Speed	2.4 GHz

Amazon pricing - \$5.52/hour

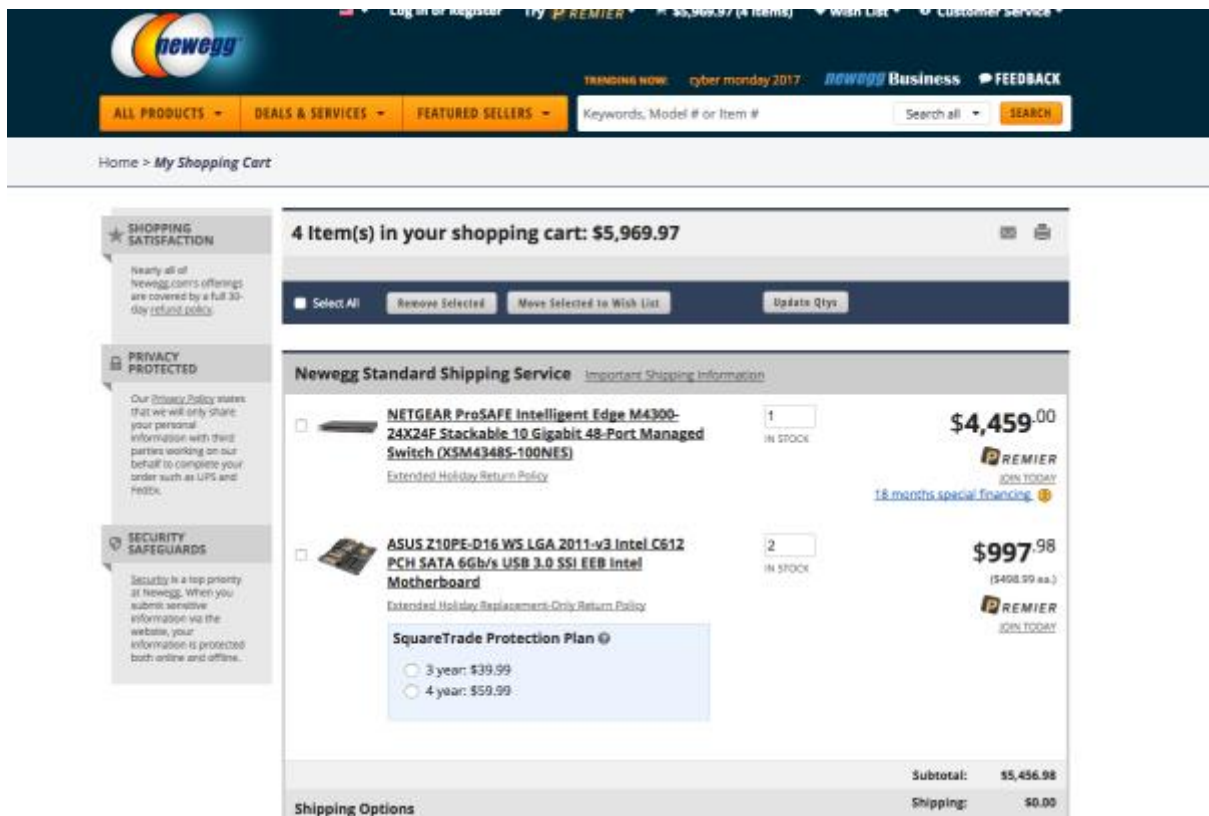
Private cloud

	Description	Price per Item	Quantity	Total Price
Compute Servers				
- Processor	E5-2676v3 Intel Xeon E5-2676 V3 12 Core 2.40GHz LGA2011 30 MB L3 Processor	\$2,197	2667	\$5859399
- Chassis	NORCO RPC-230 2U Rackmount Server Case 1 External 5.25" Drive Bays	\$59.99	1334	\$80026.66
	256 GB DDR4 – Kingston (16x16GB)			

- Ram (Memory)	ASUS Z10PE- ASUS Z10PE-D16 WS LGA 2011-v3	\$350	1000	\$350000
- Motherboard	Intel C612 PCH SATA 6Gb/s USB 3.0 SSI EEB Intel Motherboard	\$499	1334	\$665666
- Network Adapter	Intel E10G42BT X520-T2 10Gigabit Ethernet Card 10Gbps PCI Express x8 2 x RJ45	399.99	1334	533586.66
- HDD	Seagate IronWolf Pro ST10000NE0004 10TB 7200 RPM 256MB Cache SATA 6.0Gb/s 3.5" Hard Drive Bare Drive	\$369.99	5000	\$1849950
Network Switches	NETGEAR ProSAFE Intelligent Edge M4300-24X24F Stackable 10 Gigabit 48-Port Managed Switch (XSM4348S- 100NES)	\$4459	76	\$338884
Network Cables	SFP+ to SFP+ 10GB Active Optical Cable	\$38	(47*73) + 73 + 1	\$133190
Racks	Norco C-24U 24U Rack Cabinet  StarTech.com 2U 16in Universal	\$512.99	134	\$69253.65

	Vented Rack Mount Cantilever Shelf - Fixed Server Rack Cabinet Shelf - 50lbs / 22kg	\$30.99	1340	41526.6
Storage Server	Power Vault MD1200	\$7128.99	2084	\$14856815.2
Electric Power	(((120 W/hr * 2667 ) + (161w/hr *60) + (3300*70))/1000) * 5 * 365 * 24 = (320040 + 9660 + 231000 = 24558660 kw/hr Cost = 0.10(rate) * 24558660 =		5 Years	\$2,455,866.00
Cooling		\$10000	5 years	\$50000
Administration		\$100000/year (for 1000 instances)	5 Years for 1334 nodes	\$1000000
TOTAL				\$28284163.86

## Network switch and motherboard



A screenshot of the Newegg website's shopping cart. The cart contains two items: a NETGEAR ProSAFE Intelligent Edge M4300-24X24F Stackable 10 Gigabit 48-Port Managed Switch (XSM4348S-100NES) and an ASUS Z10PE-D16 WS LGA 2011-v3 Intel C612 PCH SATA 6Gb/s USB 3.0 SSI EEB Intel Motherboard. The total value of the items is \$5,969.97. The page shows shipping options, a subtotal of \$5,456.98, and a shipping cost of \$0.00. There are also links to 'Select All', 'Remove Selected', 'Move Selected to Wish List', and 'Update Qty's'.

Home > My Shopping Cart

4 Item(s) in your shopping cart: \$5,969.97

Select All Remove Selected Move Selected to Wish List Update Qty's

Newegg Standard Shipping Service [Important Shipping Information](#)

☐ **NETGEAR ProSAFE Intelligent Edge M4300-24X24F Stackable 10 Gigabit 48-Port Managed Switch (XSM4348S-100NES)** 1 IN STOCK **\$4,459.00** [Extended Holiday Return Policy](#) [18 months special financing](#)

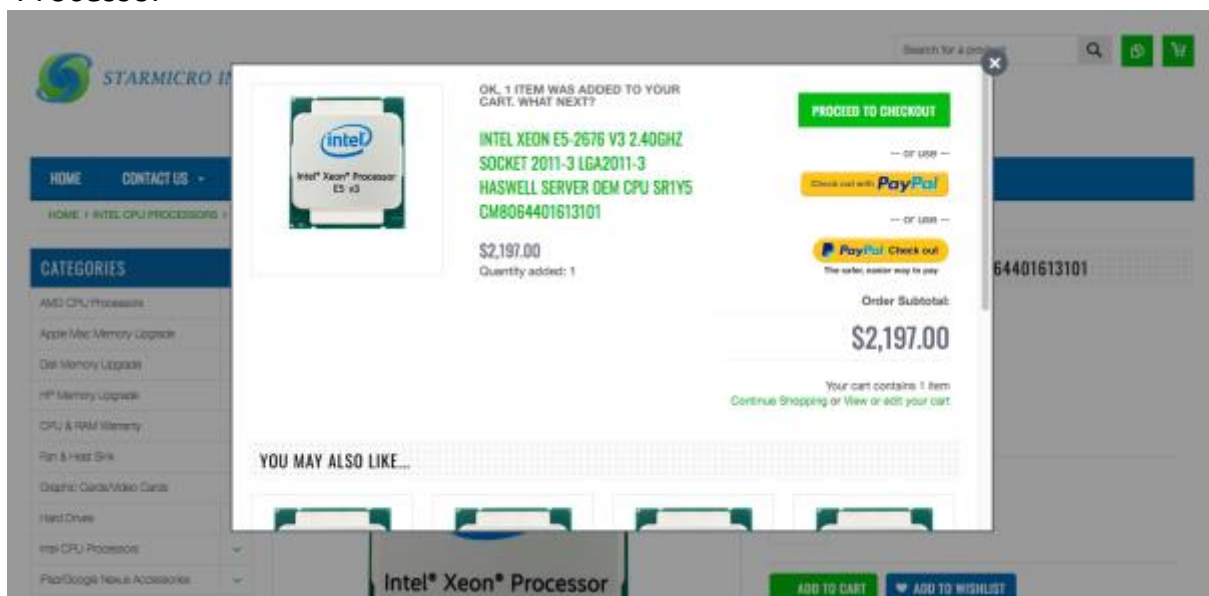
☐ **ASUS Z10PE-D16 WS LGA 2011-v3 Intel C612 PCH SATA 6Gb/s USB 3.0 SSI EEB Intel Motherboard** 2 IN STOCK **\$997.98** [Extended Holiday Replacement-Only Return Policy](#) [SquareTrade Protection Plan](#)

3 year: \$39.99  
4 year: \$59.99

Subtotal: \$5,456.98  
Shipping: \$0.00

Shipping Options

## Processor



A screenshot of the Starmicro website showing an Intel Xeon processor. The product is an Intel Xeon E5-2676 V3 2.40GHz Socket 2011-3 LGA2011-3 Haswell Server OEM CPU SR1Y5 CM8064401613101. The price is \$2,197.00. The page includes a 'PROCEED TO CHECKOUT' button, a 'PayPal' checkout option, and a 'YOU MAY ALSO LIKE...' section. The background shows a sidebar with categories like AMD CPU Processors, Apple Mac Memory Upgrade, Dell Memory Upgrade, HP Memory Upgrade, CPU & RAM Memory, Fan & Heat Sink, Graphic Cards/Video Cards, Hard Drive, Intel CPU Processors, and Pico/Google Nexus Accessories.

OK, 1 ITEM WAS ADDED TO YOUR CART. WHAT NEXT?

**INTEL XEON E5-2676 V3 2.40GHZ SOCKET 2011-3 LGA2011-3 HASWELL SERVER OEM CPU SR1Y5 CM8064401613101**

**\$2,197.00**  
Quantity added: 1

[PROCEED TO CHECKOUT](#)

— OR —

[Check out with PayPal](#)

— OR —

[PayPal Check out](#)  
The safer, easier way to pay

Order Subtotal: **\$2,197.00**

Your cart contains 1 item  
[Continue Shopping](#) or [View or edit your cart](#)

YOU MAY ALSO LIKE...

Intel® Xeon® Processor

[ADD TO CART](#) [ADD TO WISHLIST](#)

## Chasis

[Log in or Register](#)
[Try PREMIER](#)
\$572.98 (2 Items)
[Wish List](#)
[Customer Service](#)

TRENDING NOW: cyber monday 2017 **newegg Business** [FEEDBACK](#)

ALL PRODUCTS DEALS & SERVICES FEATURED SELLERS

Keywords, Model # or Item #  Search all

Home > [My Shopping Cart](#)

**SHOPPING SATISFACTION**

Nearly all of Newegg.com's offerings are covered by a full 30-day refund policy.

**PRIVACY PROTECTED**

Our Privacy Policy states that we will only share your personal information with third parties working on our behalf to complete your order such as UPS and FedEx.

**SECURITY SAFEGUARDS**

Security is a top priority at Newegg. When you submit sensitive information via the website, your information is protected both online and offline.

2 Item(s) in your shopping cart: \$572.98

☐ Select All

**Newegg Standard Shipping Service**
[Important Shipping Information](#)

☐ **NORCO RPC-230 2U Rackmount Server Case**

1

IN STOCK  
LIMIT 1

Extended Holiday Return Policy

**\$59.99**

**PREMIER**

JOIN TODAY

Subtotal:

\$59.99

Shipping:

\$0.00

**Shipping Options**

Please enter your Zip Code so we can show you the most relevant shipping options for your location.

Zip/Postal Code

Choose a delivery method

☐ APO/FPO-Military ONLY
 ☐ Newegg Economy (2-3 Bus. Days)

**Will Call Service**

Your products can be picked up from multiple locations.

You will be notified by E-mail once your products are ready for pick-up.

## Racks

[Log in or Register](#)
[Try PREMIER](#)
\$512.99 (1 Items)
[Wish List](#)
[Customer Service](#)

TRENDING NOW: cyber monday 2017 **newegg Business** [FEEDBACK](#)

ALL PRODUCTS DEALS & SERVICES FEATURED SELLERS

Keywords, Model # or Item #  Search all

Home > [My Shopping Cart](#)

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**SECURITY SAFEGUARDS**

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1 Item(s) in your shopping cart: \$512.99

☐ Select All

**Newegg Large Item Delivery Service**
[Important Shipping Information](#)

☐ **Norco C-24U 24U Rack Cabinet**

1

IN STOCK  
LIMIT 1

Extended Holiday Return Policy

**\$512.99**

Subtotal:

\$512.99

Shipping:

\$0.00

**Shipping Options**

Please enter your Zip Code so we can show you the most relevant shipping options for your location.

Zip/Postal Code

Choose a delivery method

☒ Large Item Delivery - Front Door (Adult Signature Required)
 ☐ Large Item Delivery - White Glove (Adult Signature)


**Will Call Service**

Your products can be picked up from multiple locations.

You will be notified by E-mail once your products are ready for pick-up.

## Cable

sign in / register / help support



1

Cart

2



Checkout


3

Success

Fiber optic solutionsHomeProductsAbout UsContact UsWarrantyFAQ

Your Shopping Cart (1 Item)












<input checked="" type="checkbox"/>	Item	Product Name	Model	Unit Price	Quantity	Total	
<input checked="" type="checkbox"/>		SFP+ to SFP+ 10GB Active Optical Cable Length(m): 10m Compatible Brand: Generic Application: Ethernet DOM/DOM: With DOM	CZT-SFP+AOC-1	US\$38.00	<div>- 1 +</div>	US\$38.00	







☒ ALL  Remove

Cart-Total: US\$38.00


Continue Shopping

Checkout





## Storage server

What can we help you find?


Search

Products

Solutions & Services

Support

Deals

During Cyber Monday, shop the lowest prices of the year on laptops, desktops, workstations, and more.  
[Shop Now](#) | [Have questions? Call 1-877-302-3355 or Click to Chat](#)

## Protect Your Purchases

Subtotal: **\$7,128.99**

Dell Business Credit  
As low as \$214/mo. | [Apply](#)

Next Step: Accessories

This product has been added to your cart. Next, explore available warranties and services.

### PowerVault MD1200



#### Support & Services

##### Warranty<sup>i</sup>

Get the most out of your investment and reduce IT complexity with the support expertise Dell is known for across the globe.

[Help Me Choose](#)

##### Basic Service Plan

- ☐ 3Yr Basic Hardware Repair, 5x10 NBD Onsite\$0.00
- ☒ 3Yr Basic Hardware Warranty Repair: 5x10 HW-Only, 5x10 NBD OnsiteIncluded in price

##### ProSupport Service Plan

## HDD

The screenshot shows the Newegg website's shopping cart page. The header includes the Newegg logo, navigation links (ALL PRODUCTS, DEALS & SERVICES, FEATURED SELLERS), a search bar, and a trending item 'cyber monday 2017'. The breadcrumb trail reads 'Home > My Shopping Cart'.

On the left sidebar, there are three sections: 'SHOPPING SATISFACTION' (mentioning a 30-day refund policy), 'PRIVACY PROTECTED' (stating that personal information is shared with third parties), and 'SECURITY SAFEGUARDS' (stating that sensitive information is protected).

The main content area shows '2 Item(s) in your shopping cart: \$882.98'. Below this is a summary bar with buttons: 'Select All', 'Remove Selected', 'Move Selected to Wish List', and 'Update Qty's'.

The first item is a 'Seagate IronWolf Pro ST10000NE0004 10TB 7200 RPM 256MB Cache SATA 6.0Gb/s 3.5" Hard Drive Bare Drive'. It is priced at \$369.99 (original price \$409.99, saving 9.76%). The item is in stock with a limit of 5. A 'SquareTrade Protection Plan' is offered for 3 years (\$49.99) or 4 years (\$69.99). There is also a 'Recover Your Data' link and a checkbox to 'Send this item as a gift'.

At the bottom right, the subtotal is \$369.99 and shipping is \$0.00. A 'Shipping Options' section is partially visible at the bottom left.

## Network Adapter

The screenshot shows the Newegg website's shopping cart page for a network adapter. The header is identical to the previous screenshot. The breadcrumb trail reads 'Home > My Shopping Cart'.

The left sidebar contains the same 'SHOPPING SATISFACTION', 'PRIVACY PROTECTED', and 'SECURITY SAFEGUARDS' sections.

The main content area shows '1 Item(s) in your shopping cart: \$399.99'. The summary bar has the same buttons: 'Select All', 'Remove Selected', 'Move Selected to Wish List', and 'Update Qty's'.

The item is an 'Intel E10G42BT 10Gbps PCI Express x8 X520-T2 10Gigabit Ethernet Card'. It is priced at \$399.99. It is sold by 'IT WHOLESALE' and is in stock. A 'SquareTrade Protection Plan' is offered for 3 years (\$49.99) or 4 years (\$69.99).

At the bottom right, the subtotal is \$399.99 and shipping is \$0.00. A 'Shipping Options' section is partially visible at the bottom left, which includes a prompt to enter a zip code to show relevant shipping options.

## Config 1: EC2 and S3

Instance type: d2.8xlarge

The screenshot shows the AWS Simple Monthly Calculator interface. The main heading is "Estimate of your Monthly Bill (\$ 10504221.62)". Below this, there is a table listing the services and their estimated costs. The services listed are Amazon EC2, Amazon S3, and AWS Support (Business). The total monthly payment is \$1,050,422.62. The interface also includes a sidebar with navigation links for various AWS services and a top navigation bar with the AWS logo and language settings.

Service	Estimated Monthly Cost
Amazon EC2	\$ 6480258.18
Amazon S3	\$ 3723315.20
AWS Support (Business)	\$ 312647.24
<b>Total Monthly Payment:</b>	<b>\$ 10504221.62</b>

Total Monthly payment= 10504221.62

For 5 years = Monthly Payment \* (5 years) = 10504221.62 \* 60 = 630253297.2



## Configuration 2

Support 1 million virtual machines (VM) where each VM requires 2-core, 15GB RAM, 32GB SSD storage, and 1Gb/s Fat-Tree network (each VM should be equivalent to the r3.large instances); in addition to the compute resources, a 10PB distributed storage shared across the entire cloud should be procured, with enough capacity for 10GB/sec throughput (for pricing comparison, see S3)

### r3.large configuration

vCPUS	2
Memory(GiB)	15.25
Storage(GB)	1*32
ECU	116
Network Performance	Moderate
Physical CPU	Intel Xeon E5-2670 v2 Ivy Bridge
Clock Speed	3.3GHz


Amazon pricing - \$0.166/Hour ( Linux On Demand Pricing)

### Private cloud

	Description	Price per Item	Quantity	Total Price
Compute Servers				
- Chasis	1. NORCO RPC-230 2U Rackmount Server Case 1 External 5.25" Drive Bays	\$59.99	200000	\$11998000
- Processor	2. Intel Xeon E5- 2670 v2 Ivy Bridge-EP 2.5 GHz 25MB L3 Cache LGA 2011 115W BX80635E52670V 2 Server Processor	\$1550	200000	\$31000000
- Memory	3. Kingston PC3- 8500R 16Gb SDRAM Memory	\$39.89	200000	\$797800

- Motherboard	4. Asus H110-A/M.2 Intel MotherBoard	\$59.00	200000	\$1180000
- Network Adapter	5. Intel E10G42BT X520-T2 10Gigabit Ethernet Card 10Gbps PCI Express x8 2 x RJ45	399.99	200000	\$7999800
- HDD	6. Sandisk 32GB mSATA Mini PCI-E Solid State SSD Drive	\$35.00	200000	\$700000
Network Switches	NETGEAR ProSAFE Intelligent Edge M4300-24X24F Stackable 10 Gigabit 48-Port Managed Switch (XSM4348S-100NES)	\$4459	426 + 10+ 1 + 6 (for 1 million instances ) = 443	\$1975337
Network Cables	SFP+ to SFP+ 10GB Active Optical Cable	\$38	20694	\$786372
Racks	Norco C-24U 24U Rack Cabinet	\$512.99	1725	\$884907.75
	StarTech.com 2U 16in Universal Vented Rack Mount Cantilever Shelf - Fixed Server Rack Cabinet Shelf - 50lbs / 22kg	\$30.99	20693	\$641276.07
Storage Servers	Power Vault MD200	\$7128.99	250	\$1782247.5
Electric Power	200000 nodes		5 Years	\$4000000
Cooling		\$10000	5 years	\$50000

Administration	System Administrator wage	\$100000/year (for 200000 nodes)	5 years	\$1000000000
TOTAL				\$163795740.25




[Sign In or Register](#)
[My Newegg](#)
[Product Listing](#)
[Wish List](#)
[Customer Service](#)


[All Products](#)
[Deals & Services](#)
[Featured Sellers](#)

Trending Now: [Cyber Monday 2017](#)
[Newegg Business](#)
[Feedback](#)


[Home](#) > [My Shopping Cart](#)


**SHOPPING SATISFACTION**

Nearly all of Newegg.com's offerings are covered by a full 30-day refund policy.


**PRIVACY PROTECTED**


Our Privacy Policy states that we will only share your personal information with third parties working on our behalf to complete your order such as UPS and FedEx.


**SECURITY SAFEGUARDS**

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2 Item(s) in your shopping cart: \$882.98

**Newegg Standard Shipping Service**
[Important Shipping Information](#)

☐


**Seagate IronWolf Pro ST10000NE0004 10TB**  
**7200 RPM 256MB Cache SATA 6.0Gb/s 3.5"**  
**Hard Drive Bare Drive**  
[Extended Holiday Return Policy](#)

**SquareTrade Protection Plan**

☐ 3 year: \$49.99  
☐ 4 year: \$69.99

☐ **Recover Your Data** [View Details](#)

☐ Send this item as a gift


1

IN STOCK  
LIMIT 5

\$409.99

**\$369.99**

Save: 9.76%


**PREMIER**  
[JOIN TODAY](#)

Shipping Options

Will Call Service


Your products can be

Subtotal:

\$369.99

Shipping:

\$0.00


[Log In or Register](#)
[Try PREMIER](#)
[\\$512.99 \(1 Item\)](#)
[Wish List](#)
[Customer Service](#)

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[ALL PRODUCTS](#)
[DEALS & SERVICES](#)
[FEATURED SELLERS](#)

[Home](#) > [My Shopping Cart](#)

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**1 Item(s) in your shopping cart: \$512.99**

☐ Select All

**Newegg Large Item Delivery Service** [Important Shipping Information](#)

<input type="checkbox"/>  <b>Norco C-24U 24U Rack Cabinet</b> <a href="#">Extended Holiday Return Policy</a>	<input type="text" value="1"/> IN STOCK LIMIT 1	<b>\$512.99</b>
--	---	-----------------

**Shipping Options**

Please enter your Zip Code so we can show you the most relevant shipping options for your location.

**Will Call Service**

Your products can be picked up from multiple locations.

You will be notified by E-mail once your products are ready for pick-up.

**Subtotal:** \$512.99

**Shipping:** \$0.00

**Choose a delivery method**

☒ Large Item Delivery - Front Door (Adult Signature Required)

☐ Large Item Delivery - White Glove (Adult Signature

## Cables

ALBANY, NY (AP) — The United States has a long history of being a global leader in the development and use of fiber optic technology. This is due to the fact that the United States was the first to develop the technology and has since been a major force in its advancement.


sign in / register help support

# Cozlink

1 Cart 2 Checkout 3 Success

Fiber optic solutions Home Products About Us Contact Us Warranty FAQ

### Your Shopping Cart (1 Item)

<input checked="" type="checkbox"/>	Item	Product Name	Model	Unit Price	Quantity	Total
<input checked="" type="checkbox"/>		SFP+ to SFP+ 10GB Active Optical Cable Length(m): 10m Compatible Brand: Generic Application: Ethernet DOM/DOM: With DOM	CZT-SFP+AOC-1	US\$38.00	<input type="text" value="1"/>	US\$38.00

☒ ALL ☐ Remove

Cart-Total: US\$38.00

[Continue Shopping](#) [Checkout](#)

VISA MasterCard PayPal American Express Discover FedEx FedEx Express UPS

## storage server

DELL What can we help you find? Search Sign In Cart

Products Solutions & Services Support Deals

During Cyber Monday, shop the lowest prices of the year on laptops, desktops, workstations, and more.  
[Shop Now](#) | [Have questions? Call 1-877-302-3355 or Click to Chat](#)


## Protect Your Purchases

Subtotal: **\$7,128.99** [Next Step: Accessories](#)

Dell Business Credit  
As low as \$214/mo. | [Apply](#)

This product has been added to your cart. Next, explore available warranties and services.

### PowerVault MD1200



[Support & Services](#)

#### Warranty<sup>i</sup>

Get the most out of your investment and reduce IT complexity with the support expertise Dell is known for across the globe.

[Help Me Choose](#)

Basic Service Plan

☐ 3Yr Basic Hardware Repair, 5x10 NBD Onsite \$0.00

☒ 3Yr Basic Hardware Warranty Repair: 5x10 HW-Only, 5x10 NBD Onsite Included in price

ProSupport Service Plan

chasis

The screenshot shows the Newegg website's shopping cart. The top navigation bar includes the Newegg logo, links for 'Log in or Register', 'Try PREMIER', a cart icon with '\$572.98 (2 Items)', 'Wish List', and 'Customer Service'. Below this is a secondary navigation bar with 'TRENDING NOW: cyber monday 2017', 'NEWegg Business', and a 'FEEDBACK' link. The main header contains 'ALL PRODUCTS', 'DEALS & SERVICES', 'FEATURED SELLERS', and a search bar. The breadcrumb trail reads 'Home > My Shopping Cart'.

On the left, there are three informational boxes: 'SHOPPING SATISFACTION' (mentioning a 30-day refund policy), 'PRIVACY PROTECTED' (mentioning a privacy policy), and 'SECURITY SAFEGUARDS' (mentioning secure information handling).

The main cart area displays '2 Item(s) in your shopping cart: \$572.98'. Below this is a control bar with 'Select All', 'Remove Selected', 'Move Selected to Wish List', and 'Update Qty's' buttons. The first item is the 'NORCO RPC-230 2U Rackmount Server Case' priced at \$59.99, marked as 'IN STOCK' with a 'LIMIT 1'. It includes an 'Extended Holiday Return Policy' and a 'PREMIER JOIN TODAY' badge. The subtotal is \$59.99 and shipping is \$0.00.

The 'Shipping Options' section prompts the user to enter a 'Zip/Postal Code' to show relevant shipping options. It also offers to 'Choose a delivery method' with options for 'APO/FPO-Military ONLY', 'Newegg Economy (2-3 Bus. Days)', and 'Newegg 3 Business Days'. A 'Will Call Service' section explains that products can be picked up from multiple locations and offers a 'Use Will-Call' button.


Network Switch

This screenshot shows the Newegg shopping cart with a total of \$4,858.99 for 2 items. The interface is similar to the previous one, with the same top navigation and left sidebar. The main cart area shows the 'NETGEAR ProSAFE Intelligent Edge M4300-24x24F Stackable 10 Gigabit 48-Port Managed Switch (XSM4348S-100NES)' priced at \$4,459.00, marked as 'IN STOCK'. It also features an 'Extended Holiday Return Policy' and a '18 months special financing' offer. The subtotal is \$4,459.00 and shipping is \$0.00.

The 'Shipping Options' section is identical to the previous screenshot, prompting for a 'Zip/Postal Code' and offering delivery methods including 'Newegg 3 Business Days' and 'Newegg 2 Business Days'. The 'Will Call Service' section is also present.

At the bottom of the page, a status bar indicates 'Waiting for secure checkout via card...'.

## Processor



Log In or RegisterTry PREMIER\$1,550.00 (1 Items)Wish ListCustomer Service

TRENDING NOW: cyber monday 2017newegg BusinessFEEDBACK

ALL PRODUCTSDEALS & SERVICESFEATURED SELLERSKeywords, Model # or Item #Search allSEARCH

Home > My Shopping Cart

★ SHOPPING SATISFACTION

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SECURITY SAFEGUARDS


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1 Item(s) in your shopping cart: \$1,550.00

Select AllRemove SelectedMove Selected to Wish ListUpdate Q'tys

Newegg Marketplace Direct Delivery ServiceImportant Shipping Information

☐



Intel Xeon E5-2670 v2 Ivy Bridge-EP 2.5 GHz LGA 2011 115W BX80635E52670V2 Server Processor

# of Cores: 10-Core / Operating Frequency: 2.5 GHz

Sold by E.Q.I. Tech Inc.

1

IN STOCK

\$1,550.00

Subtotal: \$1,550.00

Shipping: \$0.00

Shipping Options

Please enter your Zip Code so we can show you the most relevant shipping options for your location.


Zip/Postal Code

Update

Choose a delivery method

Standard Shipping (5-7 business days)

## Motherboard



Log In or RegisterTry PREMIER\$1,550.00 (1 Items)Wish ListCustomer Service

TRENDING NOW: cyber monday 2017newegg BusinessFEEDBACK

ALL PRODUCTSDEALS & SERVICESFEATURED SELLERSKeywords, Model # or Item #Search allSEARCH

Home > My Shopping Cart

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1 Item(s) in your shopping cart: \$1,550.00

Select AllRemove SelectedMove Selected to Wish ListUpdate Q'tys

Newegg Marketplace Direct Delivery ServiceImportant Shipping Information

☐



Intel Xeon E5-2670 v2 Ivy Bridge-EP 2.5 GHz LGA 2011 115W BX80635E52670V2 Server Processor

# of Cores: 10-Core / Operating Frequency: 2.5 GHz

Sold by E.Q.I. Tech Inc.

1

IN STOCK

\$1,550.00

Subtotal: \$1,550.00

Shipping: \$0.00

Shipping Options

Please enter your Zip Code so we can show you the most relevant shipping options for your location.

Zip/Postal Code

Update

Choose a delivery method

Standard Shipping (5-7 business days)

Config 2: EC2 & S3  
Instance type: r3.large  
On Demand

The screenshot shows the AWS Simple Monthly Calculator interface. At the top, the AWS logo and 'SIMPLE MONTHLY CALCULATOR' are displayed. A language dropdown is set to 'English'. Below the header, a navigation bar includes links for 'Get Started with AWS', 'Learn more about our Free Tier', and 'Sign up for an AWS Account'. The main content area is titled 'Estimate of your Monthly Bill (\$ 151183208.33)'. It features a sidebar on the left with a list of services: Amazon EC2, Amazon S3, Amazon Route 53, Amazon CloudFront, Amazon RDS, Amazon DynamoDB, Amazon ElastiCache, and Amazon CloudWatch. The 'Amazon S3' service is currently selected. The main panel displays the 'Estimate of Your Monthly Bill' section, which includes a checkbox for 'Show Free Monthly Bill (include all one-time fees, if any)' and a 'Save and Share' button. Below this, a table lists the services and their estimated monthly costs:

Service	Estimated Monthly Cost
Amazon EC2 Service (GovCloud-US)	\$ 14840000.00
Amazon S3 Service (GovCloud-US)	\$ 373114.00
AWS Support (Business)	\$ 4418093.45
<b>Total Monthly Payment:</b>	<b>\$ 151183208.33</b>

On the right side of the calculator, there is a 'Common Customer Samples' section with links to 'Free Website on AWS', 'AWS Elastic Beanstalk Default', 'Marketing Web Site', 'Large Web Application (All On-Demand)', and 'Media Application'.

Total Monthly payment= 151183208.33

For 5 years = Monthly Payment \* (5 years) = 151183208.33 \* 60 = 9070992499.8  
207100.28 per hr.



## Configuration 3

Support deep learning with 1 exaflop of mixed precision performance (hint: each VM should be equivalent to p3.16xlarge instances; you will want to use the NVIDIA V100 GPUs (8 GPUs per node), and allocate 8-cores per GPU (64-cores per node) with 8GB of memory per core (512GB per node); the network to use is at least 10Gb/s per GPU (100Gb/s should work), and should be organized in a Fat-Tree network; in addition to the compute resources, a 1PB distributed storage shared across the entire cloud should be procured, with enough capacity for 10GB/sec throughput (for pricing comparison, see S3)

- p3.16xlarge configuration

GPUs	8
vCPUS	64
Memory(GiB)	128
Storage(GB)	EBS only
Networking performance	25 Gigabit
Physical CPU	Intel Xeon E5-2686 v4
Clock speed	2.3 (base) 2.7 (turbo)

- Private cloud pricing

Tesla V100 delivers industry-leading floating-point and integer performance. Peak computation rates (based on GPU Boost clock rate) are (Referred from <https://devblogs.nvidia.com/paralleforall/inside-volta/>):

- 7.8 TFLOP/s of double precision floating-point (FP64) performance;
- 15.7 TFLOP/s of single precision (FP32) performance;
- 125 Tensor TFLOP/s of mixed-precision matrix-multiply-and-accumulate.

Therefore, 8 GPUs would have performance =  $125 \times 8$  TFLOP/s (for mixed-precision).

To get 1 exaflop performance we would require,  $(10^{18}) / (125 \text{TFLOPS} \times 8) = 1000$  VMs (each equivalent to p3.16xlarge instance).

A server can use approximately 850 Watts/hour. Average cost for electricity in US is about 12 cents per kilowatt-hour. Cooling power is approximately third of watts/hour.

Total price per component is listed in table below:

	Description	Price per Item	Quantity	Total Price
Compute Servers	<b>NVIDIA CORP <u>8-GPU/512GB DGX-1 DL WITH V100</u></b>	\$154766.06	1000	\$154766060
Network Switches	NETGEAR ProSAFE Intelligent Edge M4300-24X24F Stackable 10 Gigabit 48-Port Managed Switch (XSM4348S-100NES	\$4459	22 + 1 + 1	\$107016
Network Cables	SFP+ to SFP+ 10GB Active Optical Cable	\$38	1048	\$39824
Racks	Norco C-24U 24U Rack Cabinet	\$512.99	100 + 2 + 1	\$52837.97
	StarTech.com 2U 16in Universal Vented Rack Mount Cantilever Shelf - Fixed Server Rack Cabinet Shelf - 50lbs / 22kg	\$30.99	1025 + 24	32508.51
Storage Servers	PowerVault MD1200	\$7128.99	25	178224.75
Electric Power	1000 nodes		5 years	\$1200000
Cooling		\$150000	5 years	\$750000

Administration	System Administrator wage	\$100000/year (for 1000 nodes)	5 years	\$500000
TOTAL				\$157953628.01

- Amazon pricing - \$26.44/hour
- Shopping cart for configuration 3

Pricing information is obtained from sites whose screenshots given below

### 1) Network switch cost

The screenshot shows the Newegg website's shopping cart interface. At the top, the Newegg logo is on the left, and navigation links like 'Log in or Register', 'Try PREMIER', and a cart summary '\$4,971.99 (2 Items)' are on the right. Below the header, there are tabs for 'ALL PRODUCTS', 'DEALS & SERVICES', and 'FEATURED SELLERS', along with a search bar. The main content area shows '2 Item(s) in your shopping cart: \$4,971.99'. A sidebar on the left contains sections for 'SHOPPING SATISFACTION', 'PRIVACY PROTECTED', and 'SECURITY SAFEGUARDS'. The cart item is a 'NETGEAR ProSAFE Intelligent Edge M4300-24X24F Stackable 10 Gigabit 48-Port Managed Switch (XSM43485-100NES)' priced at \$4,459.00. Below the item, there are 'Shipping Options' and a 'Choose a delivery method' section with radio buttons for 'APO/FPO-Military ONLY' and 'Newegg Economy (2-3 Bus. Days)'. The subtotal is \$4,459.00 and shipping is \$0.00.


## 2. Compute server

**NextWarehouse**  [Categories](#) [Water Solution](#) [Cart](#) [Contact Us](#) [Account](#)

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### Your Shopping Cart

[Continue Shopping](#) [Checkout](#)







**NVIDIA CORP 8-GPU/512GB DGX-1 DL WITH V100**  
Part Number: 920-22787-2510-000, Item #: 2707240  
☐ \$17,024.27/unit for Hot Swap Warranty

\$154,766.06

[Remove](#)

Select a Destination Country: United States  
(Including Guam, US Territory)


**US\$ Sub-Total: \$154,766.06**  
[Continue Shopping](#) [Update](#) [Checkout](#)

Sales tax will be collected for CA,MA,MD,TN,DC customers.  
We Accept     , PO and Wire.

**Please Select Your Service Level:** [Show Shipping Options for AKHI/PRVI and APO/FPO](#)  
**Service Level**  
☒ Free 8-10 Business Days (**Free Ground Shipping**)  
[Continue](#) [Update](#) [Checkout](#)

All the above arrival dates and tracking available dates are based upon stock availability.  
\* Occasionally, some tracking numbers are not always available as some of the warehouses' data system are not able to fully integrate and be synchronized with our system.  
*Please note that business and weather conditions may cause delivery delays.*

## 3)Network cable cost





[1 Cart](#) [2 Checkout](#) [3 Success](#)

[Fiber optic solutions](#) [Home](#) [Products](#) [About Us](#) [Contact Us](#) [Warranty](#) [FAQ](#)




























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### Your Shopping Cart (1 Item)

<input checked="" type="checkbox"/>	Item	Product Name	Model	Unit Price	Quantity	Total	
<input checked="" type="checkbox"/>		SFP+ to SFP+ 10GB Active Optical Cable Length(m): 10m Compatible Brand: Generic Application: Ethernet DDM/DDM: With DDM	CZT-SFP+AOC-1	US\$38.00	<input type="text" value="1"/>	US\$38.00	

☒ ALL ☐ Remove

**Cart-Total: US\$38.00**  
[Continue Shopping](#) [Checkout](#)

## 4)Internal hard drive cost

**SHOPPING SATISFACTION**

Nearly all of Newegg.com's offerings are covered by a full 30-day refund policy.

**PRIVACY PROTECTED**

Our Privacy Policy states that we will only share your personal information with third parties working on our behalf to complete your order such as UPS and FedEx.


**SECURITY SAFEGUARDS**

Security is a top priority at Newegg. When you submit sensitive information via the website, your information is protected both online and offline.

**2 Item(s) in your shopping cart: \$882.98**

Select All Remove Selected Move Selected to Wish List Update Qty's

**Newegg Standard Shipping Service** Important Shipping Information

☐  **Seagate IronWolf Pro ST10000NE0004 10TB** 1 ~~\$499.99~~ **\$369.99** Save: 9.76% PREMIER JOIN TODAY

7200 RPM 256MB Cache SATA 6.0Gb/s 3.5" Hard Drive Bare Drive

Extended Holiday Return Policy

**SquareTrade Protection Plan**

☐ 3 year: \$49.99

☐ 4 year: \$69.99

**Recover Your Data** View Details

☐ Send this item as a gift

**Shipping Options** **Will Call Service** **Subtotal: \$369.99** **Shipping: \$0.00**

Please enter your Zip Code so we can show you the most relevant shipping options for your location.

Zip/Postal Code Update

Choose a delivery method

☒ Large Item Delivery - Front Door (Adult Signature Required)

☐ Large Item Delivery - White Glove (Adult Signature)

Use Will-Call

5)Rack cost

**SHOPPING SATISFACTION**

Nearly all of Newegg.com's offerings are covered by a full 30-day refund policy.

**PRIVACY PROTECTED**

Our Privacy Policy states that we will only share your personal information with third parties working on our behalf to complete your order such as UPS and FedEx.


**SECURITY SAFEGUARDS**

Security is a top priority at Newegg. When you submit sensitive information via the website, your information is protected both online and offline.

**1 Item(s) in your shopping cart: \$512.99**

Select All Remove Selected Move Selected to Wish List Update Qty's

**Newegg Large Item Delivery Service** Important Shipping Information

☐  **Norco C-24U 24U Rack Cabinet** 1 **\$512.99**

Extended Holiday Return Policy

**Shipping Options** **Will Call Service** **Subtotal: \$512.99** **Shipping: \$0.00**

Please enter your Zip Code so we can show you the most relevant shipping options for your location.

Zip/Postal Code Update

Choose a delivery method

☒ Large Item Delivery - Front Door (Adult Signature Required)

☐ Large Item Delivery - White Glove (Adult Signature)

Use Will-Call

Your products can be picked up from multiple locations.

You will be notified by E-mail once your products are ready for pick-up.

Config 2: EC2 & S3

Instance type: p3.16xlarge

On Demand:

Instance	GPUs	GPU Memory	vCPUs	Main Memory	Link	Cost (On Demand)
p2.xlarge	1	12 GiB	4	61 GiB		\$0.90
p3.2xlarge	1	16 GiB	8	61 GiB		\$3.06
p2.8xlarge	8	96 GiB	32	488 GiB		\$7.20
p3.8xlarge	4	64 GiB	32	244 GiB	NVLink	\$12.24
p2.16xlarge	16	192 GiB	64	732 GiB		\$14.40
p3.16xlarge	6	128 GiB	64	488 GiB	NVLink	\$24.48

On Demand: 24.48\$ per hour for one instance.

For 5 years =  $24.48 * (5 * 12 * 30 * 24) = \$ 1057536$

For 1000 instances= \$ 1057536000

**CONCLUSION :**

	<b>Config 1</b>	<b>Config 2</b>	<b>Config 3</b>
<b>Public Cloud (including EC2 and S3) Cost over 5 years, 24/7 operation, with 100% usage</b>	\$630253297.2	\$9070992499.8	\$1057536000
<b>Private Cloud cost over 5 years, 24/7 operation, with 100% usage</b>	\$28284163.86	\$163795740.25	\$157953628.01
<b>What utilization must be achieved with the private cloud to make the private cloud option more attractive than the public cloud?</b>	The cost in private setup is one third of the public one in configuration one. So private cloud is more attractive by default unless the utilization reduces to 50% If this happens then the public cloud will be preferred over private.	The public cloud is very costly in this configuration as well say by 9 times than the private one. SO it is advisable to stick to the private setup in this type of environment as well.	The difference between the public and the private cloud setup is one tenth in this case, so any kind of utilization won't affect much and the private cloud will always be better than the public one no matter what.