

Session Number: [ITM 1.1](#)

Title:

*Executive Considerations for Data  
Center Enterprise Solutions in  
2016 and Beyond*

Mark Evanko – Principal

BRUNS-PAK

999 New Durham Road

Edison, NJ 08817

[www.bruns-pak.com](http://www.bruns-pak.com)

AFCOM Data Center Conference  
March 17, 2016



# Data Center World – Certified Vendor Neutral

Each presenter is required to certify that their presentation will be vendor-neutral.

As an attendee you have a right to enforce this policy of having no sales pitch within a session by alerting the speaker if you feel the session is not being presented in a vendor neutral fashion. If the issue continues to be a problem, please alert Data Center World staff after the session is complete.

# *Executive Considerations for Data Center Enterprise Solutions in 2016 and Beyond*

Learn about the major considerations of board and/or senior management when it comes to developing enterprise data center solutions. They include: total cost of ownership vs. risk, the role of cloud/colocation vs. build, the impact of network security vs. liability, and how to best utilize cloud. The presentation will deliver vendor-neutral best practices. Presentation is based on a vendor neutral component mix delivered with best practices.

# Agenda

- I. *Board/Trustee/Senior Management Considerations Regarding a Data Center Enterprise Solution*
- II. *Perceptions of Recent 2016 and Beyond Data Center Solution “Trends”*
- III. *The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk*
- IV. *Dominating Data Center Enterprise Impacts – 2015/2016/2017 – Cloud/Co-location/Network and Beyond*
- V. *Liability – Who, Why, Where – Does it Matter?*
- VI. *Recent 2015/2016 Cloud/Co-location/Network Announcements*
- VII. *Closing – Summary Recap*

# *Part I*

## *Board/Trustee/Senior Management Considerations Regarding a Data Center Enterprise Solution*

## Board/Trustee/Senior Management Considerations Regarding a Data Center Enterprise Solution

- 1) To deliver the most cost effective, technically proficient, scalable, risk “balanced” data processing solution to the enterprise.
- 2) Deliver a state of the art “2015 and Beyond” data center solution that optimizes/maximizes information technology delivery/solutions.
- 3) Meets all government and industry regulations now and in the future.
- 4) Quantifies and delivers a total cost of ownership vs. risk model that allows senior leadership to understand the options available before strategic data center solution is implemented – see “Sixteen Element Data Center Inputs”

# Board/Trustee/Senior Management Considerations Regarding a Data Center Enterprise Solution

- 5) Exceeds their competitors in delivery
- 6) Delivers a comprehensive vendor neutral analysis and subsequent recommendations that avoids “proprietary pitfalls”
- 7) Embodies the comprehensive information technology mission of the sixteen elements encompassing the summary visions of:

- ✓ **Computer hardware**
- ✓ **Computer software**
- ✓ **Network**
- ✓ **Data center facilities**
- ✓ **Disaster recovery**
- ✓ **Cloud/co-location**



# Board/Trustee/Senior Management Considerations Regarding a Data Center Enterprise Solution

8) Minimizes risk to the enterprise – before/during/after

9) Delivers project rollout on schedule

✓ **Minimizes “Beta/First on the Block” test sites**

10) In summary, after analysis, my experience with boards regarding data centers:

*A. What are you proposing?*

*B. Why are you proposing the solution (benefit, etc.)?*

*C. What is the cost?*

➤ **Opex**

➤ **Capex**

**Entotal**

*D. What is the schedule?*

*E. What is the risk to enterprise before, during, and after?*

*F. How are you managing risks?*



# *Part II*

## *Perceptions of Recent 2016 and Beyond Data Center Solution “Trends”*

# Perceptions of Recent 2016 and Beyond Data Center Solution “Trends”

- 1) Everything to the “cloud”
- 2) Data center operations are not our core business
- 3) Reduce Capex
- 4) Minimize personnel
- 5) Optimize Opex
- 6) Transfer responsibility/liability?
- 7) Data security – not us
- 8) Commodity purchase:
  - ✓ **Common platform?**
  - ✓ **Uniform software?**
  - ✓ **Liability fine print?**
- 9) Continuous quarter/year end results



# Perceptions of Recent 2016 and Beyond Data Center Solution “Trends”

- 10) Delivery of information technology – “Just in time/immediate”
- 11) The role of the information technology analysis
  - ❖ Gartner
  - ❖ Forrester
  - ❖ IDC
- 12) Avoid “hackers”!
  - ❑ *Avoid “the 6 PM news”!*
- 13) Immediate information technology solutions for application/hardware “pent up” planning issues
- 14) Maximize uptime
- 15) Avoid obsolescence

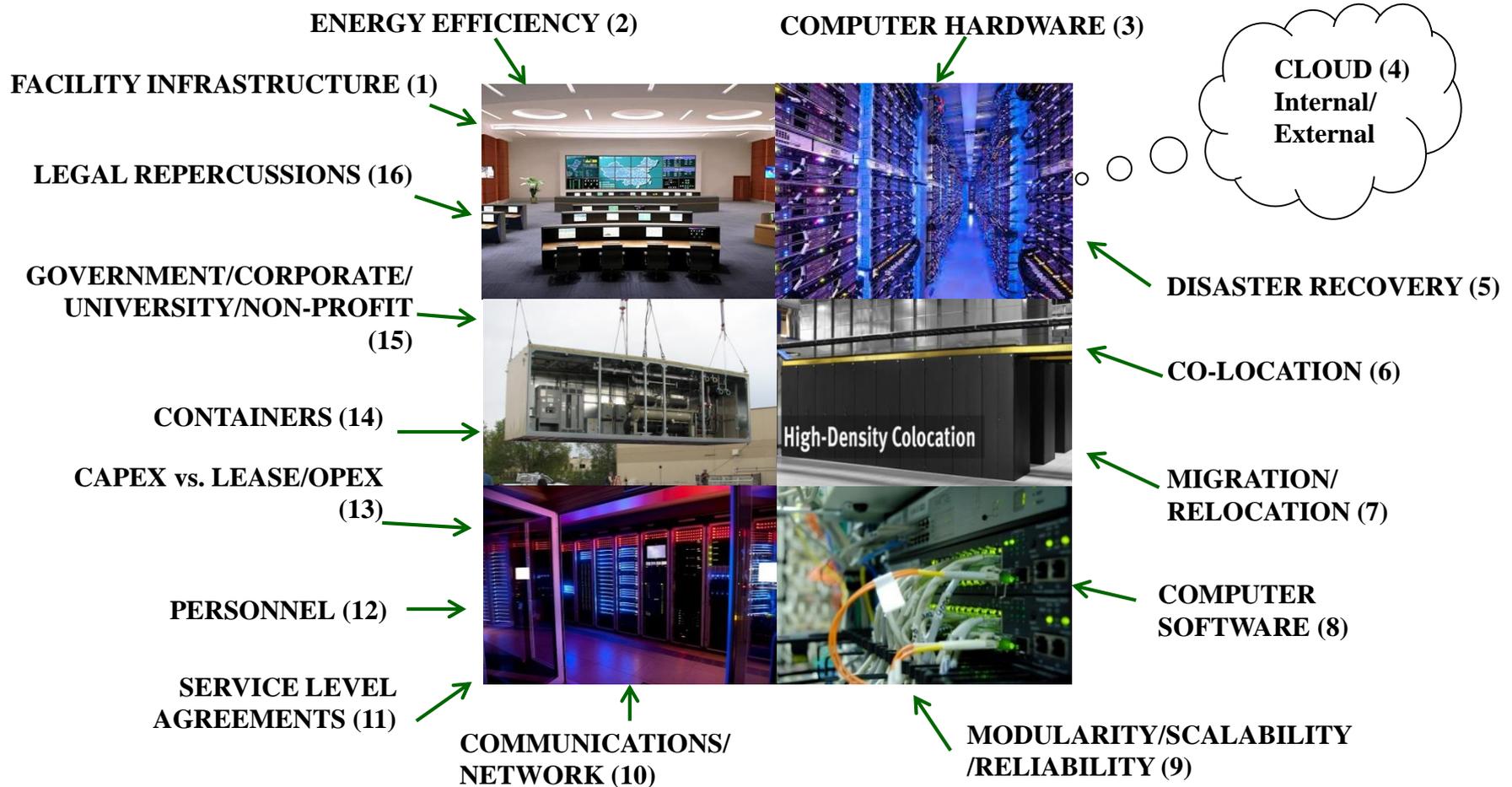


# *Part III*

*The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk*

# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

## The Hybrid “2016 Transformation” Efficient Data Center Elements



# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

## 1) Facility Infrastructure

- A. Architectural*
- B. Civil*
- C. Electrical*
- D. Fire Protection (EPO Code Change) – Update NEC/NFPA vs. Factory Mutual*
- E. Mechanical – CFD Models*
- F. Security*
- G. Site*
- H. Structural*
- I. Geographic Regional Considerations... i.e. southwest hurricanes, west earthquakes, etc.*



# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

## 2) Energy Efficiency

### A. ASHRAE 9.9 – Higher Inlet Temperatures

- ✓ 80° F
- ✓ 90° F
- ✓  $\Delta t$  of 20-25° F

### B. Containment

- ✓ Hot Aisle
- ✓ Cold Aisle

### C. DCIM

- ✓ Gartner “Magic Quadrant”
- ✓ Avoiding common pitfalls of evaluation and implementation
- ✓ DCIM Solutions – Gartner wp 170

### D. CFD Models

- ✓ Why
- ✓ Updates



# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

## *E. Submerged Data Center Solutions*

- ✓ **Microsoft**

## *F. Outside Air to Cool Data Centers*

## *G. Virtualization of Servers*

## *H. LEED – New Data Center Guidelines*

- ✓ **Written to save “dollars” and be more green**
- ✓ **Office of Management and Budget to create a strategy**
- ✓ **DOE and EPA to study server and data center efficiency trends**
- ✓ **New “data center energy practitioner program”**
- ✓ **New “metrics”**
- ✓ **Data center LEED guidelines – New – LEED v4 – October 2014  
US Green Building Council (USGBC)**

## *I. Unity (close to) Power Factors on UPS Systems*





# LEED v4 for BD+C: Data Centers

## Project Checklist



Y	?	N			
			Credit	Integrative Process	1
<b>0 0 0 Location and Transportation 16</b>					
			Credit	LEED for Neighborhood Development Location	16
			Credit	Sensitive Land Protection	1
			Credit	High Priority Site	2
			Credit	Surrounding Density and Diverse Uses	5
			Credit	Access to Quality Transit	5
			Credit	Bicycle Facilities	1
			Credit	Reduced Parking Footprint	1
			Credit	Green Vehicles	1
<b>0 0 0 Sustainable Sites 10</b>					
Y			Prereq	Construction Activity Pollution Prevention	Required
			Credit	Site Assessment	1
			Credit	Site Development - Protect or Restore Habitat	2
			Credit	Open Space	1
			Credit	Rainwater Management	3
			Credit	Heat Island Reduction	2
			Credit	Light Pollution Reduction	1
<b>0 0 0 Water Efficiency 11</b>					
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
			Credit	Outdoor Water Use Reduction	2
			Credit	Indoor Water Use Reduction	6
			Credit	Cooling Tower Water Use	2
			Credit	Water Metering	1
<b>0 0 0 Energy and Atmosphere 33</b>					
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
			Credit	Enhanced Commissioning	6
			Credit	Optimize Energy Performance	18
			Credit	Advanced Energy Metering	1
			Credit	Demand Response	2
			Credit	Renewable Energy Production	3
			Credit	Enhanced Refrigerant Management	1
			Credit	Green Power and Carbon Offsets	2

Project Name:

Date:

0	0	0			
<b>0 0 0 Materials and Resources 13</b>					
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
			Credit	Building Life-Cycle Impact Reduction	5
			Credit	Building Product Disclosure and Optimization - Environmental Product Decla	2
			Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
			Credit	Building Product Disclosure and Optimization - Material Ingredients	2
			Credit	Construction and Demolition Waste Management	2

0	0	0			
<b>0 0 0 Indoor Environmental Quality 16</b>					
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
			Credit	Enhanced Indoor Air Quality Strategies	2
			Credit	Low-Emitting Materials	3
			Credit	Construction Indoor Air Quality Management Plan	1
			Credit	Indoor Air Quality Assessment	2
			Credit	Thermal Comfort	1
			Credit	Interior Lighting	2
			Credit	Daylight	3
			Credit	Quality Views	1
			Credit	Acoustic Performance	1

0	0	0			
<b>0 0 0 Innovation 6</b>					
			Credit	Innovation	5
			Credit	LEED Accredited Professional	1

0	0	0			
<b>0 0 0 Regional Priority 4</b>					
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1

0	0	0	<b>TOTALS</b>		Possible Points: 110
<b>Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110</b>					

# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

## 3) Computer Hardware

*A. Higher Efficiency*

*B. High Performance Computing (HPC) Continues to Dominate*

*C. New Flash Storage*

*D. Water Cooled to the Chip in 2015 and Beyond*

*E. 52” Deep by 30” Rack!!!*

*F. Non-Uniform Cabinet Distribution*



# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

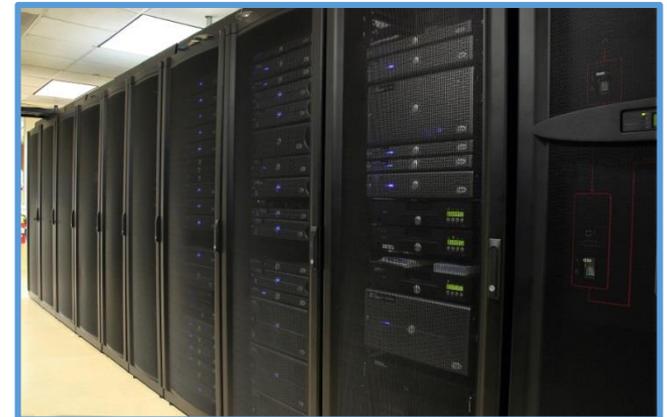
## 4) Cloud

- A. Managed services*
- B. Internal vs. external*
- C. Migration to the cloud*
- D. Migration Back?*
- E. Moves/adds/changes*
- F. Trouble shooting*
- G. True “partner” of equal financial stability*
- H. Downtime: Who Pays?*
- I. Security Breach: Who Pays?*
- J. Terms and conditions (Legal Beagles!!!) 2016+ in motion*
- K. Production vs. Test/Development*



# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

- L. Applications Conducive to Cloud – General Common Platform – Candidacy*
- M. Where is My Data? Who Manages? Do You Care?*
- N. “New” 2016 United States Legislation – “Company” Liability for Data*
- O. Speed to delivery of applications*
- P. The 2016 / 2017 contract language for cloud contracts*
- Q. Critical vs. non-critical data*
- R. Moves/adds/changes*
- S. Amazon, Microsoft, Google, etc.  
If Interruption – What is Impact?*



# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

## 5) Disaster Recovery

### A. *Downtime Tolerance*

- ✓ **None**
- ✓ **2 Hour**
- ✓ **8 Hour**
- ✓ **24 Hour**
- ✓ **2 Days**



### B. *Synchronous Data Replication*

- ✓ **Impact to Data Center Facility Infrastructures**
- ✓ **Hardware, Software, Network, and Personnel Consideration**

### C. *“100 Mile” Disaster Recovery vs. Multiple “Regional” Recovery Centers*

### D. *Testing*

### E. *Testing of Disaster Recovery Plan*

### F. *Government Regulations for Uptime*

# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

## 6) Co-Location

- A. Leased data center constructed space*
- B. Capex schedule of delivery minimized*
- C. ROI – see total cost of ownership – 4+?*
- D. Other tenants? – Impact of security - Dominating 2016/2017*
- E. Downtime: Who pays? - Dominating 2016/2017*
- F. Security Breach: Who pays? - Dominating 2016/2017*
- G. Terms and conditions (Legal Beagles 2016!!!)*
- H. “New” 2015 United States Legislation*
- I. Financial strength of service providers – see Cushman Wakefield survey of “economics” 2015 report – **DANGER!***
- J. Moves/add/changes*
- K. New 2015/2016 “Internal” Self Funded Co-location “Lease” Data Center Solutions*



# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

## 7) Migration / Relocation

- A. Move existing or buy/lease new?*
- B. Asset swap outs – seed equipment*
- C. General hardware life cycle  $\pm$  3-4 years?*
- D. Maximize uptime*
- E. Multiple phases*
- F. Consolidation strategies*
- G. Physical cost vs. planning costs (Larger)*
- H. Impacts of the network*
- I. Move it? – Plan to migrate back? – Resume update!!*  
***DANGER!!** – Bowling tournaments - Fly Fishing?*
- J. Risk of Move*
  - ✓ **Exiting**
  - ✓ **Co-location**
  - ✓ **Cloud**



# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

## 8) Computer Software

**A.** *Continues emphasizes on large scale corporate “procurement” effort to leverage one (1) license where possible*

**B.** *Production (Critical) vs. Non-Production Software*

**C.** *SPOF Consideration*

**D.** *Examples:*

- ✓ **Patient Care**
- ✓ **Pharmacy**
- ✓ **Surgical**
- ✓ **Banking**
- ✓ **Stock Trading**
- ✓ **Grading**
- ✓ **Diagnostics**

**E.** *Data Analytics – **TREMENDOUS!** 2016 and Beyond*



# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

## 9) Modularity / Scalability / Reliability

### A. Optimize

- ✓ Computer hardware
- ✓ Computer software
- ✓ Telecommunication (network)
- ✓ Facilities
- ✓ Service level agreements
- ✓ Disaster Recovery
- ✓ Cloud/Co-location/Container

*Scale with growth!*

*B. Defray CAPEX/OPEX dollars until needed across the board*

*C. Scale without interruption*

*D. Reliability past/present/future*

*E. In house vs. outsource*



# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

## 10) Communications / Network – Dominating 2016 and Beyond - #1 Factor Dominating

- A. Redundant / isolated paths?*
- B. Multiple carriers*
- C. Data breach? Who pays? Significant dominant focus 2016 / 2017*
- D. Data security? Who is responsible?*
- E. Hillary Clinton Server – “Chinese and Russians have everything anyhow” – **WOW!** – Classified Top Secret Emails?*
- F. The power of the cloud – iPhone®*
- G. Impact of network loss*
- H. Who manages the network?*
- I. Dominating the news media 2016/2017*



# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

## 11) Service Level Agreements

- A. *Internal vs. external (client) based***
- B. *Government imposed guidelines/performance (i.e. HIPPA, etc.)***
- C. *Co-Location / Cloud – 2016 transformation – fine print – who pays? – how much? – damages (Legal Beagles 2016!!)***
- D. *What does 99.999 availability mean to me when “I go down?”***
- E. *Moves/adds/changes without interruption!***
- F. *New “fines/penalties” by external agencies being processed 2015 / 2016***
- G. *Example – 3<sup>rd</sup> Party Provider – Contract 99.999 (32 seconds?) – What if I go down – Your Risk!!!***



# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

## 12) Personnel

- A. Employee vs. contract personnel*
- B. Data Breaches*
- C. The Staffing Costs*
- D. Why Not Outsource*
  - ✓ **Share Personnel Costs with Others**
  - ✓ **Share Benefits**
- E. Wiki Leaks*



# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

## 13) CAPEX vs. OPEX

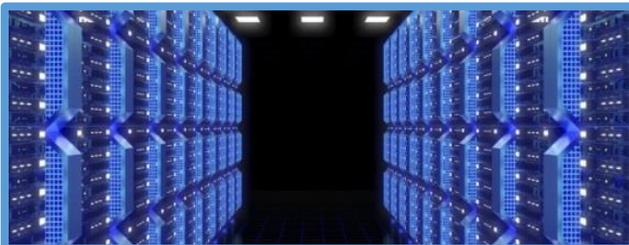
- A.** *CAPEX – Capital dollars spent to build/deploy data center across (16) elements*
- B.** *OPEX – Operating dollar “expense” to financial statements – very attractive*
- C.** *New trend of internal “OPEX” data center solution 2015 / 2016 / 2017*
- D.** *Cloud/Co-location OPEX?*
- E.** *Migration Cost – OPEX*
- F.** *Relocation Cost – OPEX*
- G.** *Network (Recurring) Cost – OPEX*
- H.** *Seed Equipment – CAPEX or OPEX*



# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

## 14) Containers

- A. *Speed to Market?*
- B. *Regulatory Agency Review – AHJ*
  - Temporary**
  - vs.**
  - Permanent**
- C. *Cost of Pre-Fabricated vs. “Stick Build”*
- D. *ADA Compliance*
- E. *Remove World Quality Control Issues*
- F. *High Performance Compute vs. Work Flow*



# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

## 15) Government/Corporate/University/Non-Profit

*A. Data Center Global Initiatives*

*B. The Impact/Goal of Being “Green”*

*C. Government Regulations to Continue to Roll-Out Regarding “Data”*

✓ **Safety**

✓ **Security**

✓ **Liability**

✓ **Storage**

*D. The Role of Downtime*

*E. Parallel – The “Drone” Legislation*

*F. “In the News”*

✓ **Highlights each evening**



# The Data Center Solution Mix – “The Sixteen Element Data Center Inputs” – Total Cost of Ownership vs. Risk

## 16) Legal Repercussions

- A.** *The most dominant theme of 2016 / 2017 data center optimization impacting in house vs. outsource*
- B.** *The 2016 “Reaction” of 3<sup>rd</sup> Party Provider “Contracts” (i.e. Cloud/Co-location Companies) to the Liability Issue – Example: \$35 per sq. ft. per month to \$350 per sq. ft. per month*
- C.** *Government fines – No More “Life Lock” – Good Luck!*
- D.** *Stockholder lawsuits*
- E.** *Individual lawsuits*
- F.** *Fiduciary responsibility*
- G.** *“Non-disclosed” trends*
- H.** *Mark Evanko – Data “permanently borrowed” – see limited law school” – disqualified mortgage?*



# *Part IV*

*Dominating Data Center Enterprise Impacts –  
2015/2016/2017 – Cloud/Co-location/Network  
and Beyond*

# Dominating Data Center Enterprise Impacts – 2015/2016/2017 – Cloud/Co-location/Network and Beyond

- 1) Network breaches
- 2) Downtime
- 3) Unresolved liability and who is responsible



- **Data stolen**
  - a. *Banks pay?*
  - b. *Credit cards pay?*
  - c. *Credit damage?*
  - d. *Your pending mortgage application?*
  - e. *Life Lock \$99 good luck? Changing*
- **My health records?**
- **Top Secret**
  - a. *Lives at risk*
  - b. *Government policies*



# Dominating Data Center Enterprise Impacts – 2015/2016/2017 – Cloud/Co-location/Network and Beyond

## 4) Upcoming and in progress

- **Tax returns**
- **Medical coverage**

## 5) Data analytics

## 6) On-line purchasing

- **Amazon vs. “brick & mortar”**

## 7) Education

- **On-line vs. university**

## 8) Medical

- **Remote treatment (in house or clinics via nurse practitioner)**

## 9) Vehicles without drivers

## 10) Diagnostic medical

- **Watson**



# *Part V*

*Liability – Who, Why, Where – Does it Matter?*

# Liability – Who, Why, Where – Does it Matter?

- 1) General trends 2016 and beyond is that changing times – direct liability and fines will be imposed
- 2) Board's responsibility
  - **To stockholders**
  - **Fiduciary liability - see Target results**
    - ✓ *CIO – out*
    - ✓ *President – out*
    - ✓ *7 of 11 board - out*



# Liability – Who, Why, Where – Does it Matter?

## 3) If you have prior knowledge of risk and do not act:

- Healthcare / transplants
- Banking / financial
- Government / top secret
- Insurance / patient records
- Automotive / data analytics
- Consumer / credit cards
- Manufacturing / defects



*Definition of negligence – personal responsibility*

## 4) Exposure to the brand:

- Food service
- Healthcare / hospital
- Banking / financial
- Retailer
- Automotive
- Government? See our political system?????
- Insurance
- Universities



# Liability – Who, Why, Where – Does it Matter?

## 5) Who pays if breach:

- Stops your mortgage
- Stops your hiring
- Kills the patient
- Impugns your reputation
- Cancels your application
- Publicizes wrong data
- Causes an accident.....future driveways/vehicles
- Causes the stock to drop “20%”....billions
- Impacts brand



# *Part VI*

## *Recent 2015/2016 Cloud/Co-location/Network Announcements*

# Recent 2015/2016 Cloud/Co-location/Network Announcements

## 1) Co-location

- **CenturyLink – December 2015 - announces ±65 data center United States – looking for a buyer?**
- **Verizon – January 2016 – looking to remove from co-location market**
- **Steel Orca – December 2015 – Chapter 11**
- **DuPont Fabros – January 2016 – looking to “sell” Piscataway, New Jersey**
- **Windstream – 2015 existing – co-location market**

## 2) Cloud

- **Gartner article on “data security considerations” 2015**
- **Amazon vs. Microsoft “common platform”**
- **Outage impacts**



# Recent 2015/2016 Cloud/Co-location/Network Announcements

## 3) 2015/2016 examples

- **60 Minutes** – “Chinese focus on stealing innovation from United States companies”
- **US government agency – BRUNS-PAK – CIO** – “we seem defenseless and will react as best as possible when breach happens”
- **Co-lo provider (smaller) response to large potential client (60% of space) on liability – AGREED TO TOTAL UNLIMITED LIABILITY!!!** What does that mean?



# *Part VII*

*Closing – Summary Recap.*

## 3 Key Things You Have Learned During this Session

1. The major considerations of board and senior management when it comes to developing data center solutions.
2. The 16 elements to be considered in developing a short/long term enterprise data center solution.
3. Data center enterprise...Unresolved liability, who is responsible?



*Thank You!*

*Mark Evanko – Principal*

*BRUNS-PAK*

*999 New Durham Road*

*Edison, NJ 08817*

*Ph: 732-248-4455*

*www.bruns-pak.com*

