Session Number: FOM 3.1 Title:

"Data Center Enterprise Trends 2016"

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September 14, 2016 @ 9:40AM Room: R209





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Data Center Enterprise Trends 2016

Learn about the most recent data center enterprise trends, which include: where to locate data centers, how to secure data and have provisions for financial and operational recovery in the event of a breach; "candidacy" of applications; total cost of ownership vs. risk; and updates to the 16 elements of a hybrid data center solution.





- I. The "2016 and Beyond" Data Center Enterprise Trends Being Observed Globally
- **II.** The Comprehensive Elements of the Data Center Solution Mix
- III. The Provisions and Considerations That Enterprises Are Making to "Protect and Provide" Recovery in the Event of Downtime and/or a Data Breach
- IV. The Exploration of Different Types of "Data" and The Impacts of Candidacy
- V. The Reason Why Data Security Is So Important
- VI. The Total Cost of Ownership vs. Risk Balance to Provide Best Practices for the Enterprise Data Center Solution

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VII. Closing - Summary - Recap

Part I

The "2016 and Beyond" Data Center Enterprise Trends Being Observed Globally



- 1) Data center enterprise solutions are trending more to comprehensive "hybrid" solutions encompassing:
 - Cloud Computing (external and internal)
 - Co-location
 - Data center maintained facilities
- "Non-critical" data center applications/data migrates to cloud/3rd party providers.
- 3) Significant focus on "data breaches" and the corresponding liability:
 - Where is data stored?
 - Who is liable?
 - What are the "liability" terms?





- 4) Impacts of government/regulatory agency laws associated with liability of data:
 - Healthcare
 - Banking/Finance
 - Retail
 - University
 - Non-Profit
 - Classified/Top Secret
 - Research
 - Military
 - Automotive/Electronics/Driverless Vehicles
 - Tax Returns/Social Security
- 5) Government/judiciary access to the "iPhones".





- 6) Continued pressure on enterprise data centers to reduce "CAPEX" and optimize "OPEX".
- 7) "Just in time" data processing expansion that minimizes delivery to enterprise.
- 8) Energy efficiency DCIM
- 9) Deployment of high performance computing.
- 10) Mergers
- 11) Data center consolidation



12) Growing: The focus of risk to the enterprise/brand.



- 13) Continued focus on "short term" financials.
- 14) Board/trustee increased involvement in the data center enterprise solution.
 - Liability

15) A scalable/flexible/modular data center enterprise solution.

16) A heightened awareness:

- Data center downtime
- Data security breaches
- Liability
- Brand impacts





17) Communication/data transfer:

- Immediate
- Voice
- Data
- Learning



- 18) Current 2016+ (Uptime Institute 2016 Survey)
 - 71%: Estimated percentage of all IT assets currently sitting in enterprise data centers.
 - 20%: Estimated percentage of all IT assets currently sitting in colocation data centers.
 - 9%: Estimated percentage of all IT assets currently deployed in cloud.

19) Synchronous data replication of critical systems.



- 20) "Internal" OPEX costs (30 year) of data center enterprise solutions.
- 21) The use of "all" with data analytics.
- 22) Enterprise analysis of "hybrid" data center solutions.





Part II

The Comprehensive Elements of the Data Center Solution Mix





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- 1) How do the "sixteen elements" combine to optimize the data center enterprise solution?
 - Total cost of ownership
 - Risk
 - Scalability
 - "Critical vs. non-critical" application data
 - Best Practices
- 2) The dominating theme of #10 Communications/Network and the repercussions of data security





- 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.





- 2) Energy Efficiency
 - A. ASHRAE 9.9 Higher Inlet Temperatures
 - ✓ 80° F
 - ✓ 90° F
 - ✓ △t of 20-25° F
 - **B.** Containment
 - ✓ Hot Aisle
 - ✓ Cold Aisle
 - ✓ Impact to people
 - C. DCIM
 - ✓ Gartner "Magic Quadrant"
 - ✓ Per data centre (UK)
 - a. Reduction in costs
 - b. Integration
 - c. Valuable insights
 - d. Increased productivity
 - e. Environmental benefits



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- **D.** CFD Models
 - ✓ Why
 - ✓ Updates
- 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

- Integrative Process Credit

0	0	0	Loca	Location and Transportation		
			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	

0 0 0 Sustainable Sites

-	-			
		Prereq	Construction Activity Pollution Prevention	Required
		Credit	Site Assessment	1
		Credit	Site Development - Protect or Restore Habitat	2
		Credit	Open Space	1
		Credit	Rainw ater Management	3
		Credit	Heat Island Reduction	2
		Credit	Light Pollution Reduction	1
		-		

0	0	0	Water	Efficiency	11
Υ			Prereq	Outdoor Water Use Reduction	Required
Υ			Prereq	Indoor Water Use Reduction	Required
Υ			Prereq	Building-Level Water Metering	Required
			Credit	Outdoor Water Use Reduction	2
			Credit	Indoor Water Use Reduction	6
			Credit	Cooling Tow er Water Use	2
			Credit	Water Metering	1

0	0	0	Energ	y and Atmosphere	33
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y	1		Prereq	Building-Level Energy Metering	Required
Y	1		Prereq	Fundamental Refrigerant Management	Required
			Credit	Enhanced Commissioning	6
			Credit	Optimize Energy Performance	18
			Credit	Advanced Energy Metering	1
			Credit	Demand Response	2
			Credit	Renew able Energy Production	3
			Credit	Enhanced Refrigerant Management	1
			Credit	Green Pow er and Carbon Offsets	2
	-		-		

Project Name: Date:

0 0 Υ Y

Y

1

10

0	Materia	Materials and Resources				
	Prereq	Storage and Collection of Recyclables	Required			
	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 Indoor Environmental Quality Υ Pr

Prereq	Minimum Indoor Air Quality Performance	Required
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	Innovation		6
			Credit	Innovation	5
			Credit	LEED Accredited Professional	1

0	0	0	Region	Regional Priority		
			Credit	Regional Priority: Specific Credit	1	
			Credit	Regional Priority: Specific Credit	1	
			Credit	Regional Priority: Specific Credit	1	
			Credit	Regional Priority: Specific Credit	1	

Possible Points:

0 0 0 TOTALS

Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110



16

110

- 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 2016 and Beyond
 - E. 52" Deep by 30" Rack!!!
 - F. Non-Uniform Cabinet Distribution





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





- 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?





- 5) **Disaster Recovery**
 - A. Downtime Tolerance critical
 - None to 2 days
 - **B.** Synchronous Data Replication
 - **Impact to Data Center Facility Infrastructures**
 - Hardware, Software, Network, and Personnel Consideration \checkmark
 - С. "100 Mile" Disaster Recovery vs. Multiple "Regional" Recovery **Centers**
 - *Testing* D.
 - Testing of Disaster Recovery Plan *E*.
 - **F**. Government Regulations for Uptime





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" 2016 report DANGER!
- J. Moves/add/changes
- K. New 2015/2016 "Internal" Self Funded Co-location "Lease" Data Center Solutions





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-General Retirement?
- A. Risk of Move
 - ✓ Existing
 - ✓ Co-location
 - ✓ Cloud





- 8) Computer Software
 - A. Continues emphases 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
- F. Tier I-IV Applications Candidacy



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



- 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?
 - "Pokémon"
- F. The power of the cloud iPhone®
- G. Impact of network loss
- H. Who manages the network?
- I. Dominating the news media 2016/2017



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. Example 3rd Party Provider Contract 99.999 (32 seconds?) – What if I go down – Your Risk!!!
- F. See Part III





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





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 2016 / 2017 / 2018
- **D.** Cloud/Co-location OPEX?
- E. Migration Cost OPEX
- F. Relocation Cost OPEX
- G. Network (Recurring) Cost OPEX
- H. Seed Equipment CAPEX or OPEX





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





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





16) Legal Repercussions

- A. The most dominant theme of 2016 / 2017 data center optimization impacting in house vs. outsource
- B. The 2016 "Reaction" of 3rd 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 - Trend
- 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 III

The Provisions and Considerations That Enterprises Are Making to "Protect and Provide" Recovery in the Event of Downtime and/or a Data Breach



The Provisions and Considerations That Enterprises Are Making to "Protect and Provide" Recovery in the Event of Downtime and/or a Data Breach

- 1) Picking up tremendous focus in 2016 and beyond.
- 2) Two Main focuses:
 - Downtime
 - Data breaches
- 3) Poll for audience...



- What would be your employees reaction to you for:
- A. Downtime unplanned 2 hrs. 12 hrs. 48 hrs.?
- B. Data breach that calls for "ABC News" announcement.
- C. What are your thoughts?
- 4) Provisions to "Protect and Provide" recovery
 - Stronger/more defined SLA's for cloud and 3rd party providers
 - Disaster recovery testing
 - Synchronous replication of Tier I applications



The Provisions and Considerations That Enterprises Are Making to "Protect and Provide" Recovery in the Event of Downtime and/or a Data Breach

- 5) SunGuard article 2016 "Uptime in the Cloud: It's All About the Asterisk"
 - *"…turns out, many guarantees stated in the cloud service contracts may not be as strong as they appear"*
 - SLA's
 - a) Infrastructure issues
 - b) Problem resolve issues
 - c) Site related issues
 - d) Procedural issues
 - e) Staffing issues
 - f) Security issues
 - FOCUS: How does the enterprise stay in business?





Part IV

The Exploration of Different Types of "Data" and The Impacts of Candidacy



The Exploration of Different Types of "Data" and The Impacts of Candidacy

- 1) Tier I most critical
- 2) Tier II/III/IV descending level of criticality to enterprise
- 3) Segregation of plans for various Tiers
 - Uptime
 - Data breach



- 4) The evaluation process of "Tiers" interprets to identifying the "candidacy" process of analysis.
- 5) The "candidacy" process will optimize the data center enterprise strategy combining the "sixteen (16) elements" in delivering a best practice vendor neutral solution.



Part V

The Reason Why Data Security Is So Important



- 1) Financial impacts to the enterprise
- 2) Brand impacts to the enterprise
- 3) Security impacts
 - Patients
 - Employees
 - National security



- 4) Exposure of the board/trustees to gross negligence
- 5) The ability for the enterprise to survive
- 6) Recent examples:
 - 60 Minutes (2016) iPhone Security Analyst Two (2) types of consumers: a) Ones that know they have been hacked (about 50%) and b) Ones that do not know they have been hacked (other 50%) but already have!



- 60 Minutes (2016) Chinese access to United States patent work and duplication
- Cyber terrorism globally Russia and others
- Peak Hosting, July 2016, filed for bankruptcy after legal dispute with Machine Zone (Game of War and Mobile Strike).
 ...Peak sues 100 million
 ...Machine Zone sues 23 million and leaves
- Home Depot Breach settlement: Frequently Asked Questions:
 - 1. Why is there a notice?
 - 2. What is this lawsuit about?
 - 3. Why is this a class action?
 - 4. Why is there a settlement?
 - 5. How do I know if I am part of the settlement?
 - 6. What does the settlement provide?
 - 7. What can I get from the settlement?







- 8. What do "out-of-pocket losses" "unreimbursed charges" and "documented time" include?
- 9. What benefits does Identity Guard® Essentials provide?
- 10. How do I enroll in Identity Guard® Essentials for free?
- 11. How do I get a payment?
- 12. When will I receive my payment?
- 13. What am I giving up to stay in the Settlement Class?
- 14. How do I exclude myself from the settlement?
- 15. If I do not exclude myself, can I sue Home Depot for the same thing later?
- 16. If I exclude myself, can I still get a settlement payment and free credit monitoring?
- 17. Do I have a lawyer in the case?
- 18. How will the lawyers be paid?
- 19. How do I tell the Court that I like or don't like the settlement?
- 20. What's the difference between objecting and excluding myself?
- 21. When and where will the Court decide to approve the settlement?
- 22. Do I have to come to the hearing?
- 23. What happens if I do nothing?
- 24. How do I get more information?



1. Why is there a notice?

A Court authorized the notice because you have a right to know about a proposed settlement in several lawsuits against Home Depot, and all of your options, before the Court decides whether to give final approval to the settlement. The notice explains the nature of the lawsuits, the general terms of the settlement, and your legal rights and options.

The lawsuits were brought on behalf of consumers whose credit or debit card information or personal information was stolen as a result of the Home Depot Breach. Judge Thomas W. Thrash of the U.S. District Court for the Northern District of Georgia is overseeing this litigation. The litigation is known as *In re: The Home Depot, Inc., Customer Data Security Breach Litigation,* Case No. 1:14-md-02583-TWT. The consumers who sued are called the "Plaintiffs." Home Depot is the "Defendant."

2. What is this lawsuit about?

In September 2014, Home Depot announced that it had been the victim of a data breach by third-party intruders who stole payment card data from consumers who made purchases using a self-checkout terminal at a U.S. Home Depot store between April 10, 2014 and September 13, 2014. The intruders also stole a separate email file which contained the email addresses of certain Home Depot customers. Plaintiffs claim that Home Depot did not adequately protect customers' payment card data and personal information and that Home Depot delayed in providing notice of the data breach. Home Depot denies any wrongdoing, and no court or other judicial entity has made any judgment or other determination of any wrongdoing.



3. Why is this a class action?

In a class action, one or more people called "class representatives" sue on behalf of themselves and other people with similar claims. All of these people together are the "class" or "class members." One court resolves the issues for all class members, except for those who exclude themselves from the settlement class.

4. Why is there a settlement?

The Court has not decided in favor of Plaintiffs or Home Depot. Instead, both sides agreed to a settlement. Settlements avoid the costs and uncertainty of a trial and related appeals, while providing benefits to members of the settlement class ("Settlement Class Members"). The "Settlement Class Representatives" appointed to represent the class, and the attorneys for the Settlement Class (referred to as "Settlement Class Counsel," *see* Question 17 of the Notice) think the settlement is best for all Settlement Class Members.

5. How do I know if I am part of the settlement?

You are a member of the Settlement Class and affected by the settlement if your personal information was stolen as a result of the Home Depot Data Breach.

You are a member of the Settlement Class if:

- You used your credit or debit card at a self-checkout lane at a U.S. Home Depot store between April 10, 2014 and September 13, 2014 and your payment card information was compromised;
- You received notification that your e-mail address was compromised; or
- You received a settlement notice by email stating that you are a Class Member.

Excluded from the settlement are:

- Officers and directors of Home Depot;
- The presiding judge and any judicial staff involved in the lawsuit; and
- Any Class Member who opts out.



6. What does the settlement provide?

Home Depot will pay \$13 million into a Settlement Fund to make payments to eligible Settlement Class Members and service payments to the Settlement Class Representatives (see Question 18 in the <u>Notice</u>). Home Depot has also agreed to separately pay attorneys' fees, costs, and expenses (see Question 18 in the <u>Notice</u>) and the costs of notifying the class and administering the settlement.

In addition, Home Depot will pay to provide for 18 months of Identity Guard® Essentials monitoring services for all Settlement Class Members who used a payment card at self-checkout lanes at U.S. Home Depot stores between April 10, 2014 and September 13, 2014 and had their payment card information compromised, who elect to enroll in the service.

Home Depot has also agreed to maintain and implement certain business practices relating to its information security program, including naming a high-level executive to coordinate the program, conducting regular data risk assessments, implementing reasonable safeguards to address issues raised in risk assessments, maintaining and making available to its customers clear written disclosures explaining that Home Depot stores certain customer information and describing how the company uses that information, implementing an employee education program to educate and train its workforce on the importance of the privacy and security of customer information, and adopting enhanced encryption and security measures for all credit and debit card transactions. A more detailed description of these changes is available in the Settlement Agreement which is available <u>here</u>



Part VI

The Total Cost of Ownership vs. Risk Balance to Provide Best Practices for the Enterprise Data Center Solution



The Total Cost of Ownership vs. Risk Balance to Provide Best Practices for the Enterprise Data Center Solution

- 1) Sixteen (16) elements combine, specific to the individual client, to produce the optimal data center enterprise solution
- 2) Vendor Neutral
- 3) Total cost of ownership vs. risk model business decisions, per enterprise, to be made based on tolerance of risk
- 4) Impacts of OPEX vs. CAPEX
- 5) Focus on:
 - Uptime
 - Data breach
 - Recovery





Part VII

Closing - Summary - Recap



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3 Key Things You Have Learned During this Session

- 1. The "2016 and beyond" data center enterprise trends being observed globally.
- 2. The provisions and considerations that enterprises are making currently and in the future to "protect and provide" recovery to the enterprise in the event of data center downtime and/or a data breach? The exploration of different types of "data" and the impacts of "candidacy" and the reason why the data security is so important.
- 3. The total cost of ownership vs. risk decision matrix when developing a sixteen (16) element data center enterprise solution.



Thank You

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