Ethernet in the Data Center
Chevron Viewpoint

G. Fred Hartley-Staff Research Analyst

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What's Driving Chevron IT?

Legend (this slide only):
- Business Need
  - -IT Objective
    - Strategy

- Accelerate Business Insight: Better information and better decisions
  - Identify, extract, analyze and present data rapidly, accurately and reliably
    - Consolidation (of data centers, applications and data)
  - Provide easy and rich access to people and data
    - Mobile applications and infrastructure
    - Interactive, multimedia collaboration (best possible face-2-face substitute)
- Increase Business Agility: Rapid and cost effective adaptation to change
  - Deliver IT services using flexible, streamlined methods
    - Cloud computing (virtualized, automated, elastic, agnostic to user location)
  - Operate and manage IT with excellence
    - Simplify , integrate and prioritize (*standardize* systems, processes, vendors; *conserve* energy, capital, expense; *optimize* capabilities, capacities; *preserve* safety, security, value)

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Suggested Ethernet Alliance Focus Areas

- Advocate the standardization of "jumbo frame" specifications
  - Specifications appropriate for local area network speeds above gigabit
  - For both wired and gigabit wireless (802.11ad) physical media
  - Compatible with Fibre Channel over Ethernet encapsulation
  - Include standard methods for intermixing different frame sizes
  - Include standard methods for discovering intermediate device capabilities
- Standardize data privacy safeguards, and protections against layer 2 attacks, within a virtualized infrastructure
  - In particular need to separate, monitor and protect virtual machine –virtual machine communications
- Keep pace with physical layer multiplexing and bonding advances that increase speed or enable dynamic scaling
  - Automated ability for virtual & physical NICs to dynamically scale Ethernet traffic across multiple optical wavelengths or multiple fiber pairs

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Resulting Improvements Within the Data Center
Jumbo Frame Ethernet

- Application and Data Consolidation:
  - Standardized jumbo frame specifications will improve interoperability
    - Simpler to combine transport of communication and storage traffic
    - Data consolidations require memory-memory bulk data transfers; jumbo frames make transfers quicker and more efficient
- Cloud Computing (private implementations within Chevron):
  - Reduced network complexity speeds provisioning and facilitates dynamic scaling of data center workloads
    - We use VLANs to assure interoperability when different vendor/chipset MTUs are transported within the data center. Provisioning and support are more complex and routing is more complex. It adds up to unnecessary network complexity
- Simplify, Integrate, Prioritize (OE through energy conservation):
  - Larger frames = less processing = lower CPU usage = less energy

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Resulting Improvements Within the Data Center
Jumbo Frame Ethernet

- Simplify, Integrate, Prioritize (OE through process standardization):
  - Standardized specifications for frame intermixing will enable standardization and simplification of data center processes
    - Reduce design effort and capital
    - Reduce change and incident management effort and expense
- Interactive, Multimedia Collaboration:
  - Users need simultaneous voice, video and data. By its nature this traffic mix can best be optimized within the data center, and within the wired/ wireless LAN at the user end, if a mix of Ethernet frame sizes is available
- Flexible, Optimized Data Center Infrastructure (future):
  - Chevron is following the progress of software defined networking closely including the potential benefits of separated control and data planes. We believe an important requirement for achieving benefit is data plane hardware/ software commoditization. Such commoditization will be aided by comprehensive Ethernet standardization and interoperability, including jumbo frame standardization

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Resulting Improvements Within the Data Center
Protection and Scaling

- Flexible, Optimized Data Center Infrastructure (future):

  Protection:

  – The information in Chevron's private data centers serves numerous joint venture partners and relies on many key suppliers; this information must remain separated, protected and monitored at each OSI layer

  – Proprietary multi-tenant solutions for a virtualized infrastructure have emerged but standardization remains key to the success of our data center services. Resulting data center benefit can be summarized as providing service flexibility with reasonable effort and cost

  Scaling:

  – Outside of technical computing, Chevron intends to meet most remaining data center hosting needs with a single general hosting platform. That goal demands a very scalable and elastic infrastructure but achieving it means more dollars can be allocated to oil & gas production

  – The Ethernet standards provide the foundation for large and dynamic scaling. Potentially, updates to physical layer specifications, auto negotiation, discovery protocols and more are required

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Summary

Chevron Businesses Need:

- Improved Business Insight
- Greater Business Agility

Chevron Suggests:

- Standardizing Ethernet jumbo frames within data centers
- Evolving Ethernet to protect VM-VM comms, enable dynamic scaling

Resulting Data Center Benefits:

- Faster provisioning, flexible services
- Improved operations & management
- Conservation and prioritization of energy, financial resources & effort

Thank you.

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