Considerations for Future Storage System Metrics and Efficiency Evaluation

Green TWG - Design Metrics Subgroup

11/18/2015

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Present Storage

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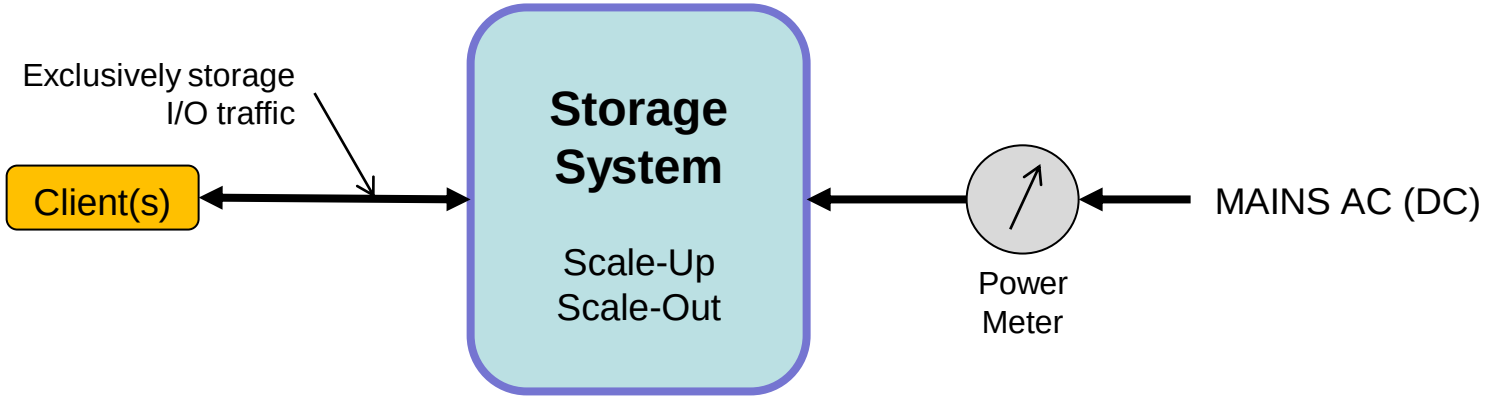
- "Present" Storage Systems Have Clear Physical Boundaries
  - Storage-only functionality
  - Black box with defined storage footprint
  - Defined and measureable I/O path
  - Defined and measurable power boundaries



- *An appliance typically composed of dedicated compute, persistent storage, and interconnect functions managed by storage-oriented SW*

Present Storage

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- SNIA Efforts to Date – Emerald™ Efficiency Specification
  - Taxonomy
  - Product/family
  - Definable and Measurable Metrics
    - Performance/W
    - Capacity/W
- Usage Models and Focus
  - Acquisition - Proxy workloads → Emerald™; ENERGY STAR® (present)
  - Operation – Real workloads, SLO's → TGG; ENERGY STAR® (future?)
- These Systems Will be Produced for Some Time to Come
  - Not suggesting they will just go away

Future Storage*

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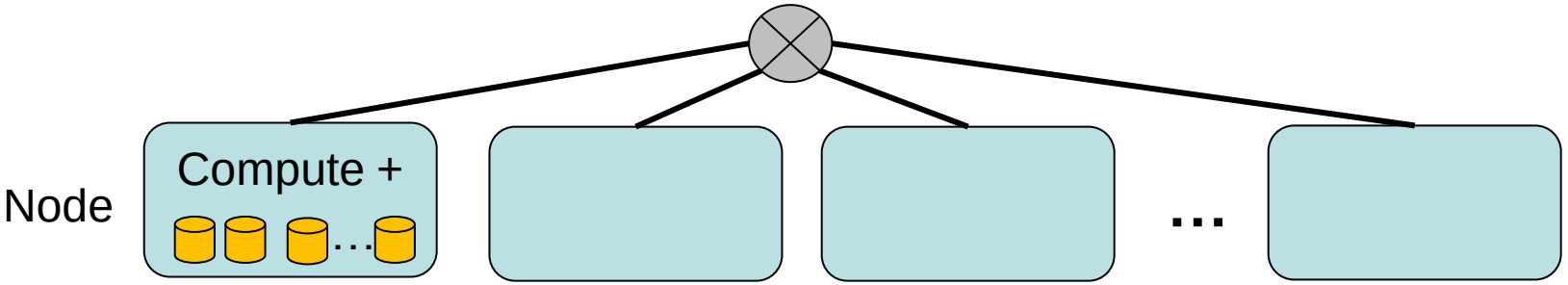
- Different Approaches to Storage Functionality
  - Virtualized, converged, disaggregated, SW-defined, orchestrated, agile…
  - Newer types of persistence – NVM, next gen flash, …
- Impact on Physical Implementation
  - Storage function physical boundaries become blurred
- Some Examples
  - Scale-out nodes supporting both applications and "virtual SAN"
  - Time-of-use orchestrated set of "raw" compute, persistence, interconnect
- New Challenges for Efficiency Metrics and Evaluation
  - How are Purchased Components Defined and Evaluated?
  - How are Operational Parameters Defined and Evaluated?

* Actually already here

Future Storage

Example: Hyper-Converged System

- Scale-out nodes supporting application, storage, and networking functions
- Run-time orchestration methods to create, modify, manage functions



- Acquisition: A server or storage device → *Both*
- Operation: Variable functional proportions (applications vs storage)

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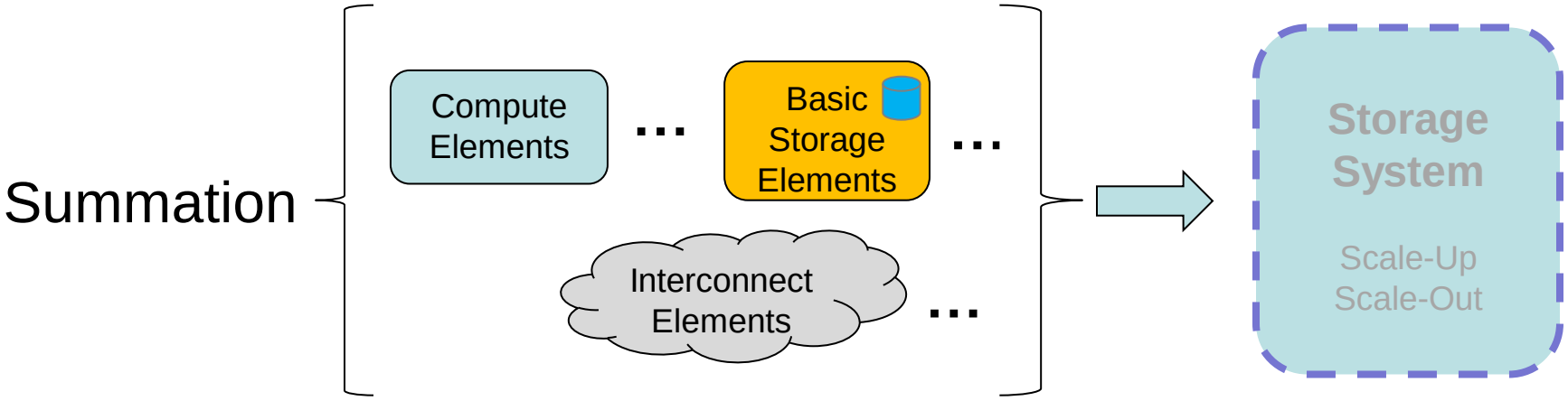
Example – Software Defined

- Elements utilized/combined for application and storage functions
- Run-time orchestration and storage software determines function



- Acquisition: Involves basic elements, not systems
- Operation: Varies by situation

Discussion

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- Consider Impacts on Spec Development
  - Emerald
  - EPA and others
  - Acquisition and operational aspects

- Approach
  1) Continue existing appliance efforts – Spec and operational metrics…
  2) Begin discussing how we should address future systems
     - With other organizations…TGG
     - With agencies…EPA

Thanks