



# Accelerators in Commercial Clusters

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# Study Results: Accelerators

## Use of Applications Accelerators

Q: Do you have any plans to use applications accelerators?  
Multiple responses allowed.

Accelerator	Number of Mentions	Percentage of Responding Sites Mentioning
FPGAs	28	90.3%
Vector coprocessors	13	41.9%
GPUs	10	32.3%
Other	1	3.2%

n = 31

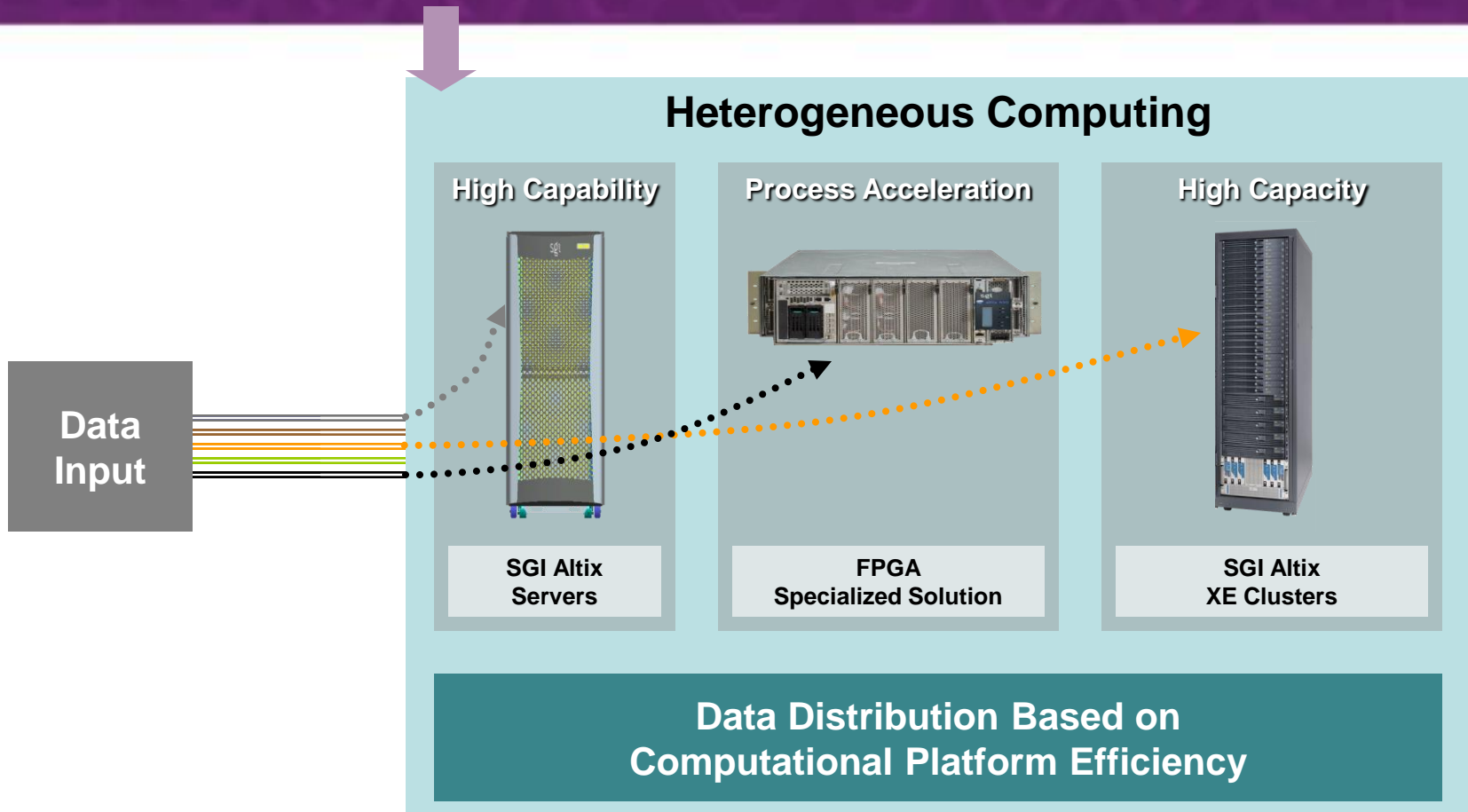
# Accelerators in Clusters

- Q: Commercial accelerators have been around for more than 25 years, commercial clusters for almost 10 years, so why don't we have more clusters with accelerators?

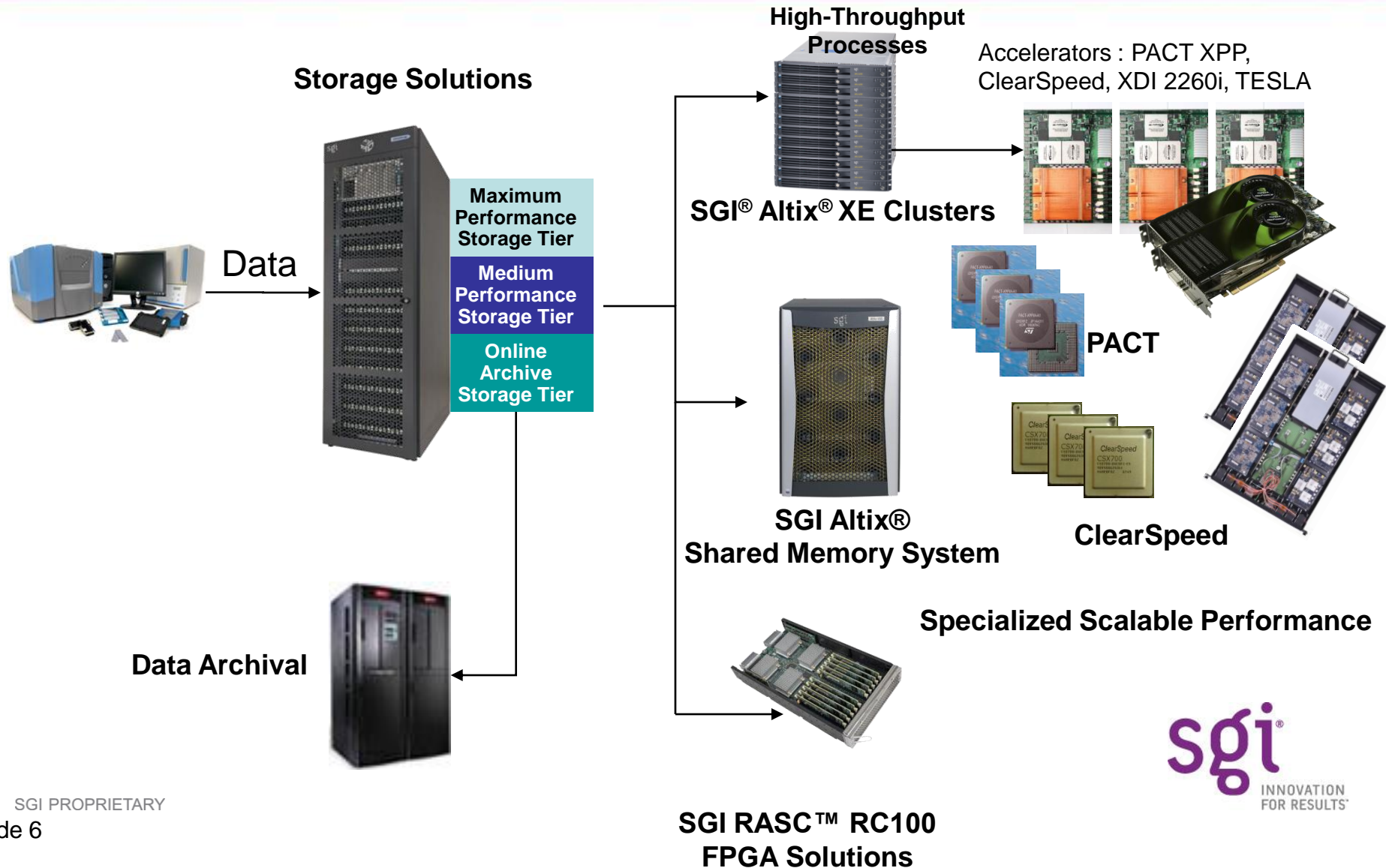
# Hybrid Computing

- Hybrid is about the concept of utilizing heterogeneous “computing platforms” and/or Accelerators because the HPC problem isn’t optimally solved by a homogeneous “computing platform”.
  - **Capability Systems**
  - vs
  - **Capacity Systems**

# SGI Hybrid Solution



# A broader view of Hybrid Computing



# What is the Accelerator Enablement Program?

- SGI is expanding its commitment to the accelerator technology market by driving the Accelerator Enabling Program (AEP).
- The AEP's goal is close cooperation between accelerator hardware vendors, ISVs and key customers to provide the best accelerator choice for different scientific domains.
- Through the AEP, ISVs and customers will have access to dozens of accelerator technology experts from SGI and participating partners.
- By collaborating with these experts, developers and customers can optimize their codes to run on the accelerator that best suits the needs of their applications.
- Customer benefit is pre-approved partners - SGI's engineering team has evaluated their capabilities and stand behind them as a supplier.

# Partner Benefits

- **Customer Introductions**
- **Co-Marketing Activities**
- **Trade Shows Visibility**
- **Publicity**
- **Use of SGI's Logo and Partner Logo**
- **Promotions**
- **Referrals & Presentation**
- **Elevated support and Software Tools**
- **Training and Information**



# Charter Partners

## Accelerator Enabling Program

- **XtremeData** for Field Programmable Gate Array (FPGA) accelerator options beyond the SGI RASC RC100 to optimize scientific computing and medical imaging
- **NVIDIA®** - parallel visual computing on NVIDIA professional GPU (graphics processing unit) solutions
- **ClearSpeed Technology** - acceleration solutions for molecular dynamics, drug design, computational chemistry, electromagnetics and turbulent fluid flow analysis
- **PACT XPP** - digital signal processors for 2D edge detection used in biomedical imaging, pattern recognition and searches



Thank You



# Backup Slides

# Lessons learned - 1

- Not every Accelerator Technology is applicable to every HPC Problem – and it's a moving target
- Not every HPC Application can be accelerated
- The Majority of Users is interested in complete Appliances/Applications
- “Ease-of-Use” is relative
- Standards starting to emerge now which will be key to broader acceptance

# Lessons learned – 2

- Domain knowledge absolutely critical when working on acceleration
- Enabling accelerators for ISVs will be key
- Strategic partnerships are a great way to create synergies

# Lessons learned - 3

- Keep in mind that a solution has to be price/performance competitive.
- There should be at least a 10-20X speedup compared to current top-end CPUs
- CPUs speeds (and multi-core architectures) continue to evolve
- Make sure your Algorithm Implementation scales across multiple Accelerators
- Talk to the experts – we are here to help you