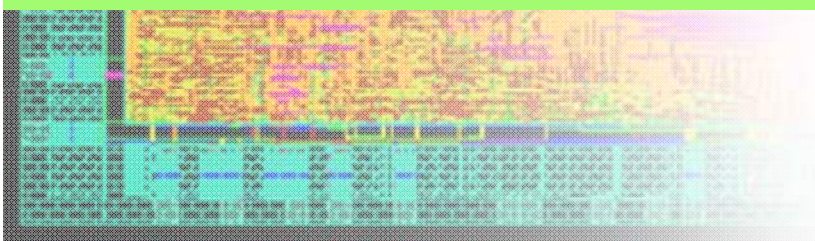


denali

Denali DDR Controllers: Performance and Configurability

Marc Greenberg
Director, Technical Marketing



2009 DDR Memory Pricing



DDR2 1GB PC5300 PATRIOT / ECS
PATRIOT:
FRYS.com #: 5453419


[In stock, same day shipping](#)

[Detailed Description](#) | [Tell a friend](#) | [Warranty Info](#)



Price: \$ **14.99**

[add to cart](#)
& buy it!



Quikrete®
50 Lb. All Purpose Sand

Item #: 98545 Model: 115253

\$2.97 ★

[Add to Cart](#)

★ Reflects Lower Local Price.

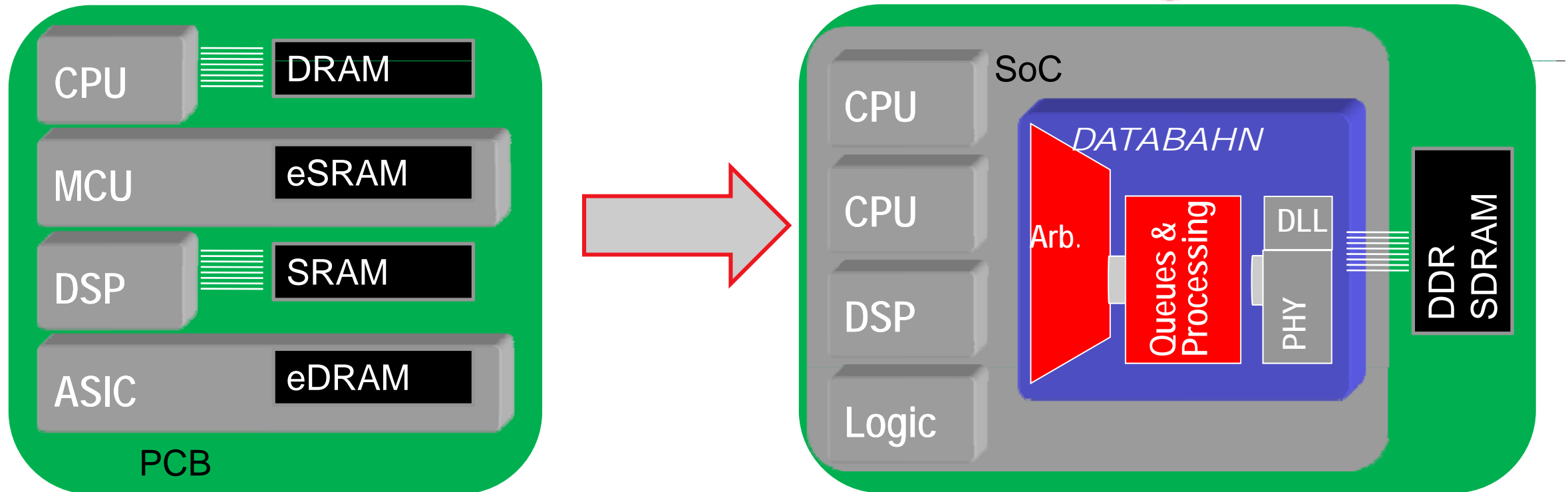
[Click to Enlarge](#)

- 1 DIMM = 8 Billion units
- 1 DIMM = \$14.99 retail
- Dropping fast

- 1 grain of sand = 1 unit
- 1 bag = 115 Million units
- 70 bags = 8 Billion units
- 70 bags = \$207.90 retail
- No price drop since 2007



Memory Controller Evolution



- Many clients in the system, that previously had their own dedicated memory, now share a single external memory
- Driving force: high-speed, low-cost memory
 - 500 million transistor DRAM chips: as low as 36¢



What makes a good memory controller?

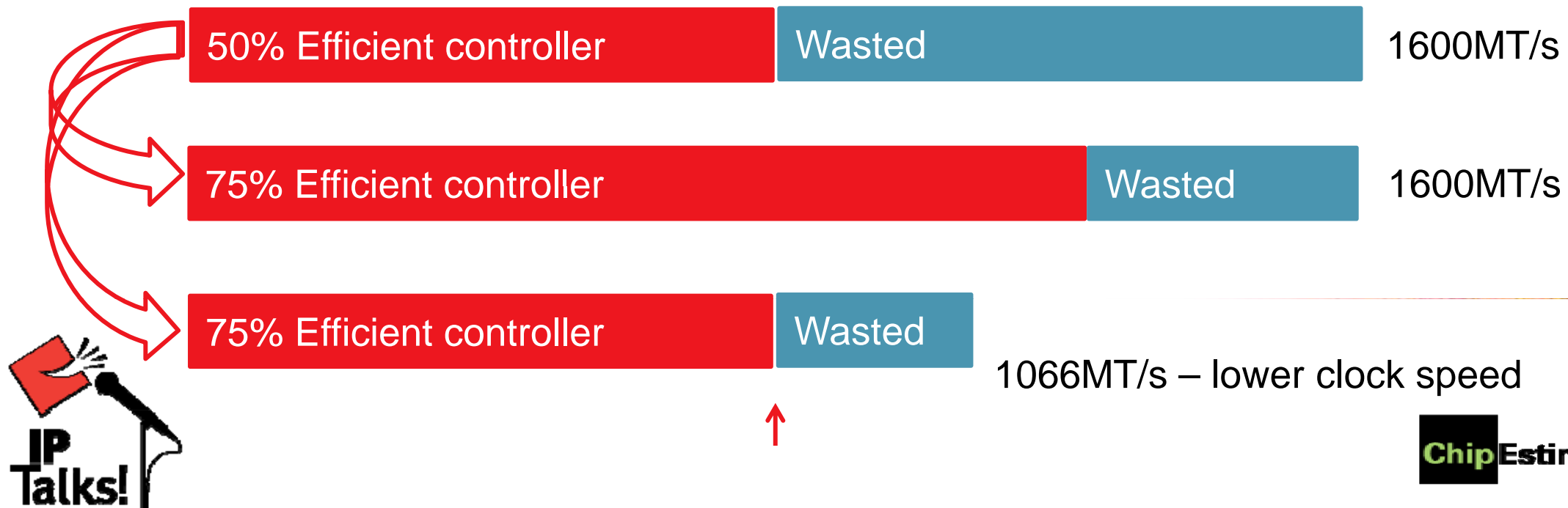


- Multiple clients in the system share a single memory
 - Reduced system part count, less cost, less power
- Low latency for critical transactions
- High bandwidth for large transfers
- Re-order transactions for better performance
 - Maintain coherency
 - Observe system priority (CPU cache misses over bulk transfers)
 - Improve bandwidth by utilizing already-open pages, arranging traffic to avoid page misses, sequencing reads and writes to reduce bus turnarounds
- Databahn gives up to 25% bandwidth gain
 - Improves system performance, reduces cost, reduces power
- Configurability: Fit the controller to the system



DDR Performance

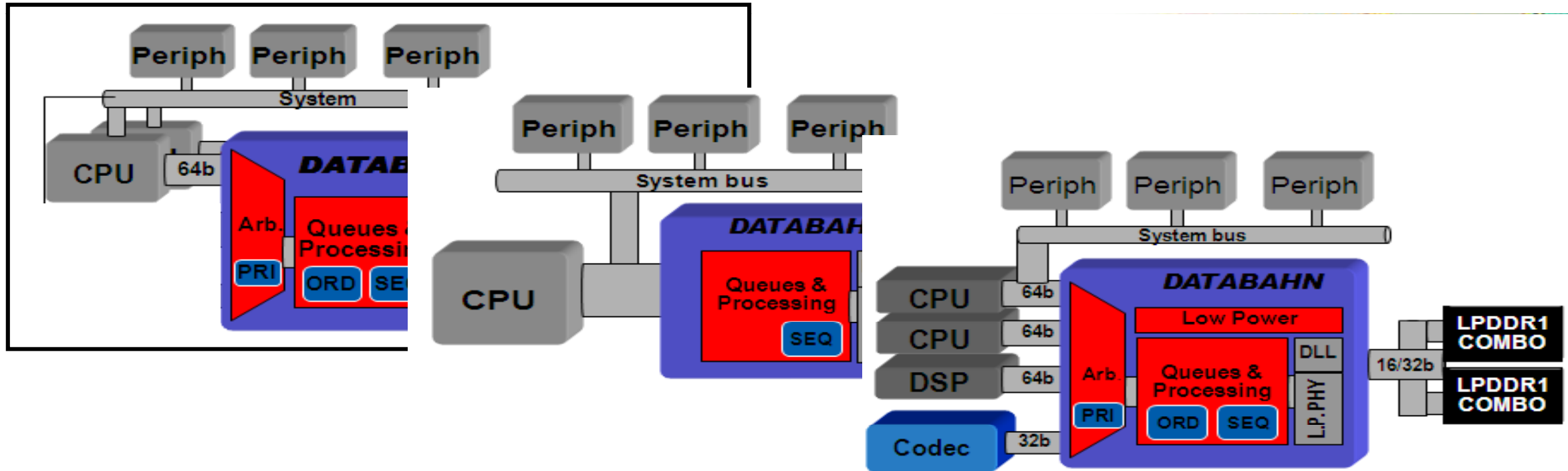
- DDR memories are naturally inefficient
- An efficient memory controller can allow:
 - More bandwidth at a given clock frequency
 - OR --
 - The ability to reduce the clock frequency to achieve a particular bandwidth



What does configurability mean for you?



- There are billions of possible configurations...



- ... and only one that you care about!
- Configurability means that you can design your memory controller around your chip, not the other way around



Support for New Memory Technology



- Databahn provides upgrade path to the latest technologies:
 - DDR3
 - DDR3 RDIMM and LRDIMM
 - Low-voltage DDR2L and DDR3L
 - LPDDR2-SDRAM
 - LPDDR2-NVM
 - DDR4 and Future Mobile DRAM as it becomes available
- Similar system interface on Databahn for new memory technologies



Conclusion



- Denali has a long and extensive history of memory controller design
- Denali's Databahn has the features that allow you to improve performance and reduce power
- Denali's Databahn memory controller is configurable to fit your design
- Denali's Databahn supports the latest memory technologies and will continue to do so in the future



Thank you

- Explore Denali IP at ChipEstimate.com
- Use Denali IP to plan your next chip!
- Please stay and talk with Marc Greenberg



Denali

