New Intel 45nm Processors

Reinvented transistors and new products

November, 2007

Today's News

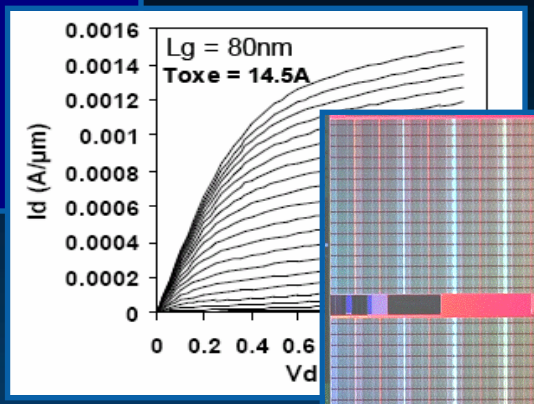
- Reinvented transistors, biggest advance in transistor design in 40 years
  - Up to 820 million transistors on a single processor
  - Revolutionary Hafnium-based high-k metal gate technology
- 16 new server, high-end desktop processors
  - Introduction of SSE4 instructions
- New platforms to meet diverse needs in server market
  - Investment protection on mainstream volume platform + 3 new platforms announced today
- Manufacturing now on 45-nm process
  - Higher performance and more energy efficient servers, desktops and laptops
  - Foundation for new growth opportunities next year (CE, ultra mobile, low-cost computers)
- Lead-free products today; Halogen-free in 2008

The Road to 45 nm HK + MG

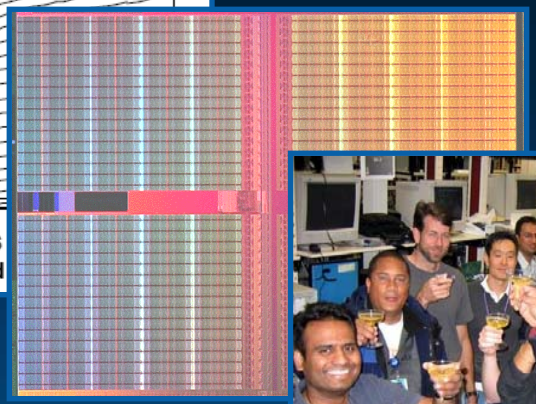
Intel foresees end of SiO_2 scaling

High-k transistor research initiated

Mid-1990s
Research Starts

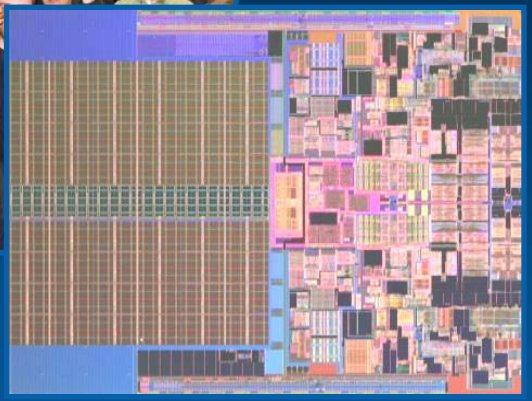


Nov. 2003
HK+MG Transistors



Jan. 2006
153 Mb SRAM

Jan. 2007
Penryn 1st Silicon

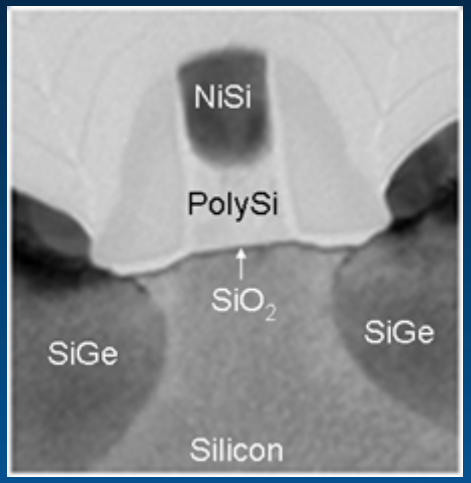


Nov. 2007
Penryn Launch

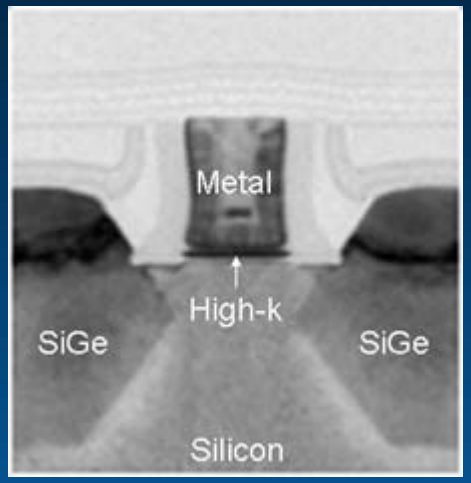
High-k + Metal Gate Transistors

Improved Transistor Density	~2x
Improved Transistor Switching Speed	>20%
Reduced Transistor Switching Power	~30%

65 nm Transistor



45 nm HK + MG



Enables New Features, Higher Performance, Greater Energy Efficiency

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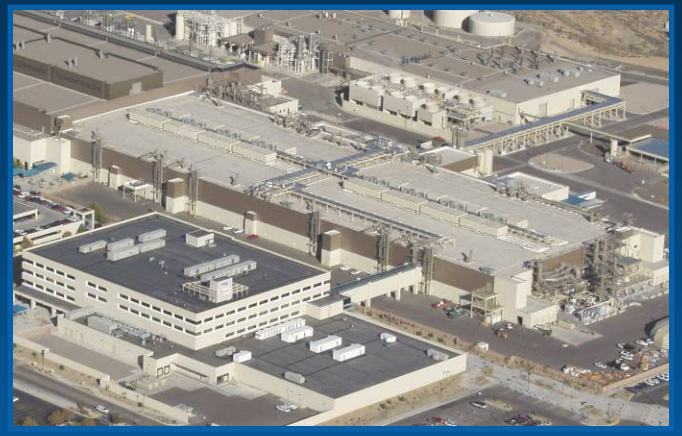
45 nm Manufacturing Fabs

D1D Oregon - Now

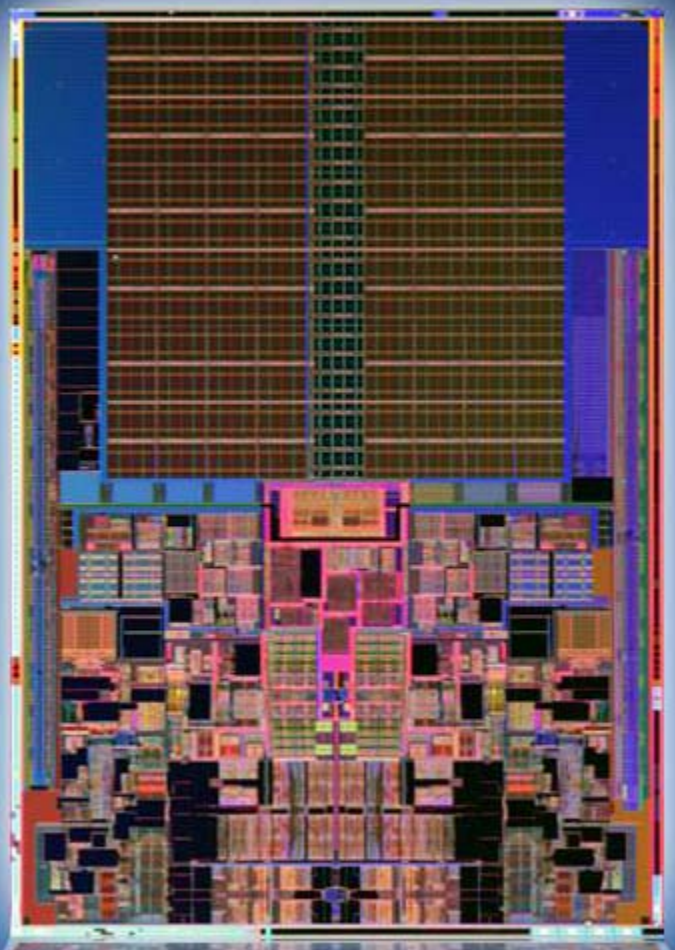
Fab 32 Arizona - Now

Fab 28 Israel - 2008



Fab 11X New Mexico - 2008

45nm Next Generation Intel® Core™ 2 and Xeon® Family processors (Penryn)



- Built Upon Enhanced Intel Core Microarchitecture
- Greater Performance at Given Frequency AND Higher Frequencies
- Introduces New SSE4 Instructions For Media/Gaming/Graphics
- New Levels of Energy Efficiency
- Larger Caches, Faster Buses

Growing Performance and Energy Efficiency

Intel® Penryn Family

Server

12 = quad-core Intel® Xeon® 5400 series
- Available: 12 Nov '07

3 = dual-core Intel Xeon 5200 series
- Available: Dec '07

Dunnington
- Available: 2H'08

Desktop

1 = Intel® Core™2 Extreme Processor QX9650
- Available: 12 Nov '07

Intel Core 2 Quad Processors
- Available 1Q'08

Intel Core 2 Duo Processors
- Available: 1Q'08

Mobile

Intel Core 2 Extreme Processor
- Available: 1Q'08

Intel Core 2 Duo Processors
- Available: 1Q'08

45nm Products Ship in All Segments by '08

All products, dates, and figures specified are preliminary based on current expectations, and are subject to change without notice.

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Summary

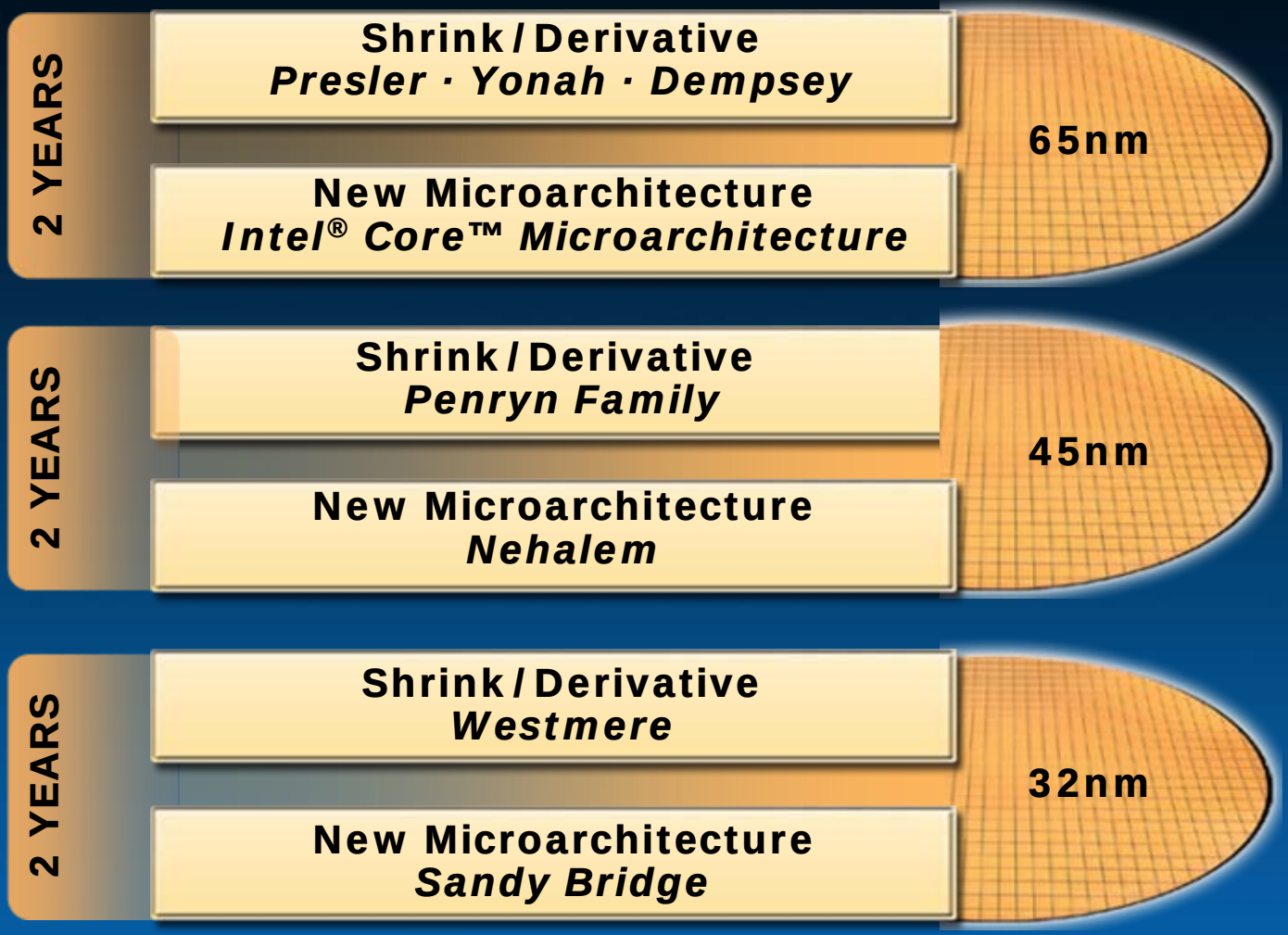
- Intel is launching a new lineup of desktop and server processors
  - Three new platforms meet the increasingly diverse needs of the server market
- Hafnium-based High-K Metal Gate transistors represent the important breakthrough in transistor design in 40 years
- Intel executing, and delivering on performance and energy efficiency
- Lead-free now, Halogen-free next year

Backup

Penryn Family: Not Just A Shrink and New Transistors

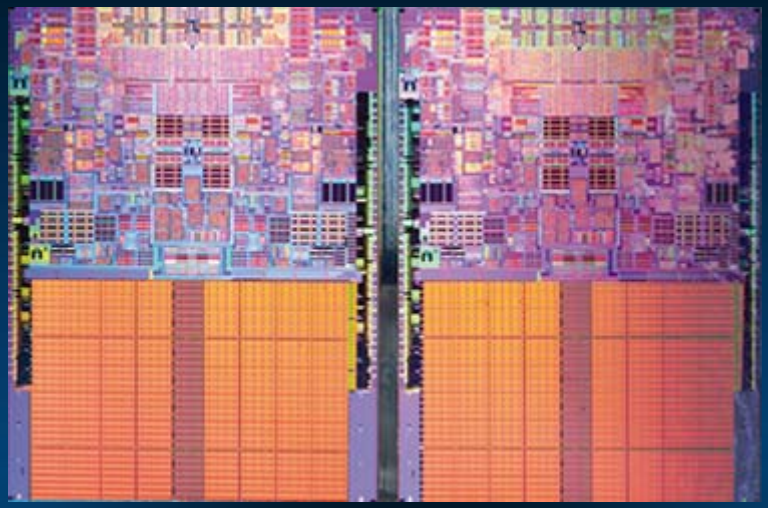
- Added new design features too:
  - **Intel® Streaming SIMD Extensions 4** – Forty-seven new instructions, many perfect for HD video, photos, and HPC
  - **Enhanced Intel® Virtualization Technology -** Virtual machine transition (entry/exit) times are improved by an average of 25 to 75 percent without changes to software
  - **Fast Division of Numbers** – A new fast divider roughly doubles the speed over previous generations for computations used in nearly all applications through a new divide technique called Radix 16.
  - **Unique Super Shuffle Engine** - By implementing a wider 128-bit shuffle unit, performance significantly improves for SSE-related instructions such as content creation, imaging, video and HPC.
  - **Sneak Peak: Deep Power Down Technology** - For Energy Savings and improved battery life, coming with our mobile processors early next year.

Innovation Engine



45nm Hi-k Processor Advantage

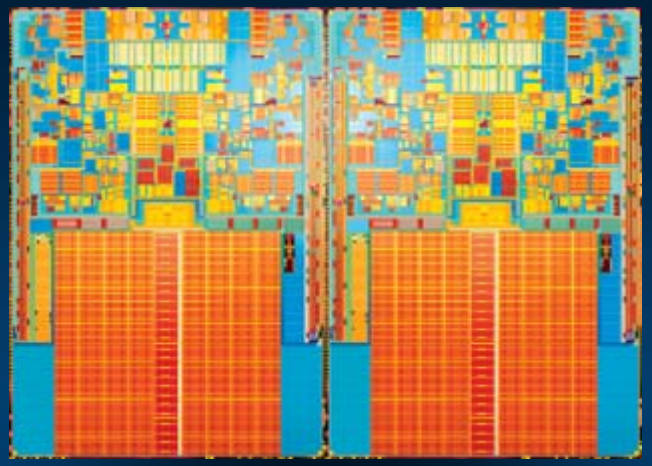
Quad-core Intel® Xeon® 5300 Processor (Clovertown) 65nm



143 mm^{2*} 143 mm^{2*}

582m Transistors
8 MB Cache

Quad-core Intel® Xeon® 5400 Processor (Harpertown) 45nm Hi-k



107 mm^{2*} 107 mm^{2*}

820m Transistors
12 MB Cache

*Source: Intel
Note: die picture sizes are approximate

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