

## Intel's New Generation of Processors to Improve Performance

Stephen Kleynhans, Martin Reynolds, Mark A. Margevicius

Intel's newly announced Penryn and Nehalem processors will improve on its strong Core 2 processor family and put continued pressure on AMD.

## NEWS ANALYSIS

---

### Event

On 28 March 2007, Intel announced details of its next two processor families, Penryn and Nehalem. Both processors will be based on Intel's new 45-nanometer (nm) manufacturing process. Intel will begin producing Penryn processors in 2H07 and Nehalem in 2008.

### Analysis

The Penryn family of processors will continue the architecture of Intel's Core 2 processors released in 3Q06, but add improved performance, higher clock speeds, additional instructions for media processing and lower power requirements. Penryn processors are likely to first appear in server products in 4Q07 and arrive on client systems early in 2008.

Nehalem is a new processor design that introduces several new features. Most important will be a move to new direct connections between processor cores and an integrated memory controller which reduces cost and boosts performance. Intel has historically objected to tying processor designs to memory technology due to the different rates of change between the two. However, Gartner believes that Intel's new two-year cadence on new processor architectures eliminates this concern.

Nehalem also reintroduces a form of hyperthreading (the ability to process two threads concurrently on a single core, first introduced with Pentium 4) and the smaller chip will reach to eight core processors. Intel also noted that it will include an integrated graphics controller on some client versions of the chip, simplifying system design and enabling lower-cost systems.

We believe that Penryn and Nehalem will challenge AMD, which now has approximately 12 months to bring a new product into the market that leverages its October 2006 merger with ATI. Moreover, AMD must invest smartly to deal with Intel's capital infrastructure or risk falling significantly behind Intel in manufacturing technology and processor design.

## RECOMMENDATIONS

---

- **Corporate buyers:** Plan for significant system upgrades from Intel in 2008 across servers, workstations and mobile devices. Consider adoption of Penryn systems only once Intel's PC original equipment manufacturer partners deliver corporate systems at the same price as current systems, which will likely occur by mid-2008.

## RECOMMENDED READING

---

- "New Products Promise a Competitive Turning Point for Intel" — The Core 2 Duo product introduction will help Intel deal with the performance challenges set by AMD. **By Steve Kleynhans and Mark Margevicius**
- "The Impact of Moore's Law on Client Systems" — Buyers must look for capabilities beyond raw performance when evaluating new processors and architectures. **By Steve Kleynhans**

(You may need to sign in or be a Gartner client to access the documents referenced in this First Take.)

## REGIONAL HEADQUARTERS

---

### **Corporate Headquarters**

56 Top Gallant Road  
Stamford, CT 06902-7700  
U.S.A.  
+1 203 964 0096

### **European Headquarters**

Tamesis  
The Glanty  
Egham  
Surrey, TW20 9AW  
UNITED KINGDOM  
+44 1784 431611

### **Asia/Pacific Headquarters**

Gartner Australasia Pty. Ltd.  
Level 9, 141 Walker Street  
North Sydney  
New South Wales 2060  
AUSTRALIA  
+61 2 9459 4600

### **Japan Headquarters**

Gartner Japan Ltd.  
Aobadai Hills, 6F  
7-7, Aobadai, 4-chome  
Meguro-ku, Tokyo 153-0042  
JAPAN  
+81 3 3481 3670

### **Latin America Headquarters**

Gartner do Brazil  
Av. das Nações Unidas, 12551  
9º andar—World Trade Center  
04578-903—São Paulo SP  
BRAZIL  
+55 11 3443 1509