

All the members of the OpenCL working group 2010



(If you're searching for companies who offer OpenCL-products and services, please visit [OpenCL:Pro](#))

You probably have heard AMD is on the OpenCL working group of Khronos; but there are many more and they possibly all have plans to use it. Here is an overview, so you can make your own conclusions about the future that lays ahead. Is your company on "the list"?

We're specially interested in the less known companies, so most information is about the companies you and us possibly have not heard from before. **We've made assumptions what the companies use OpenCL for, so we need your feedback if you think we're wrong!** Most of these companies have not openly written about their (future) accelerated products, so we had to make those guesses.

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Last updated 6-Oct-2010.

GPU Manufacturers

GPUs being the first products targeted by OpenCL, we blast away with a list of CPU-manufacturers. You might see some unknown companies and now know which companies missed the train; it is pretty clear why GPU-manufacturers have interest in OpenCL. We skip the companies who have a GPU-stack built upon ARM-technology and only focus on pure GPU-manufacturers in this category.

AMD

We've already discussed [the biggest fan of OpenCL](#) several times. While having better GPU-cards than NVIDIA (arguable per quarter of the year), they put their bets completely on OpenCL. They even get credits like "AMD's OpenCL" when compared with NVIDIA's CUDA.

The end of 2010, beginning of 2011 they will ship their Fusion-product having a CPU and GPU on one chip. The first Fusion-chips will not have a high-end GPU because of heating problems, is told to PC-store employees.

NVIDIA

AMD's biggest competitor with the very well marketed similar product [CUDA](#). Currently they have the [most specialised products](#) in market for servers. While they put more energy in their own technology CUDA, it must be said that they have adopted OpenCL more than any other hardware vendor.

Intel

The biggest part of the CPU-market is for Intel en guess once, who has the biggest GPU-market in hands? Correct: [onboard-GPUs are Intel's speciality](#), but their [high-end GPU Larrabee](#) might once see the market. Just like AMD they have the technology (and products) to have an integrated CPU/GPU which will be very interesting for the upcoming OpenCL-market.

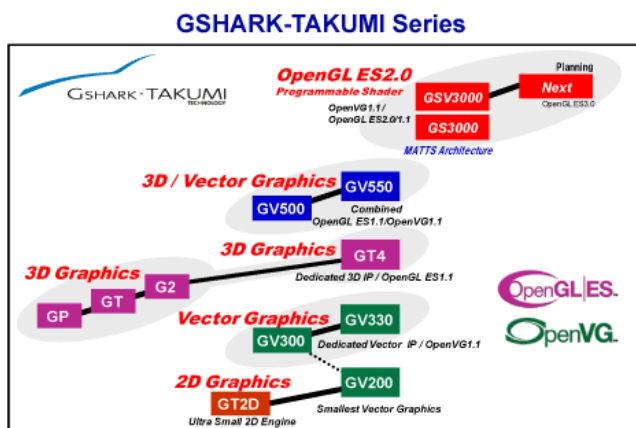
They are openly interested in OpenCL. [Here is a nice interview](#) which explains how a CPU-designer looks at GPU-designs.

Vivante

[Vivante manufactures GPU-chips](#). They claim their OpenGL ES 2.0-compliant silicon footprint is the smallest on the market. There is a lot of talk about OpenGL Shader Language (OpenCL's grandpa), for which their products are very well suited for. Quote: "The recent trend in graphics hardware has been to replace fixed functionality with programmability in areas that have grown exceedingly complex, such as vertex processing and fragment processing. The OpenGL® Shading Language was designed to allow application programmers to express the processing that occurs at those programmable points of the OpenGL pipeline. Independently compilable units written in this language are called shaders. A program is a set of shaders that are compiled and linked together."

Takumi

Japanese corporation Takumi manufactures the [GSHARK](#), a 2D/3D hardware accelerator. The focus is on shaders, like Vivante.



Imagination Technologies (ImTech)

From their [homepage](#): >>>POWERVR enables a powerful and flexible solution for all forms of multimedia processing, including 3D/2D/vector graphics and general purpose processing (GP-GPU) including image processing.

POWERVR's unique tile-based, deferred rendering/shading architecture allows a very small area of a die to deliver higher performance and image quality at lower power consumption than all competing technologies. All major APIs are supported including OpenGL ES 2.0/1.1, OpenVG 1.1, OpenGL 2.0/3.0 and DirectX9/10.1 and OpenCL.<<<

Currently all ARM-based OpenCL-capable devices have POWERVR-technology.

Toshiba

Like other huge Japanese everything-factories, you don't know what else they make. Besides rice cookers they also make [multimedia chips](#).

S3

Once they were big in the consumer-market of graphics cards, but [S3](#) still exists as a more business-oriented manufacturer of graphics products.

CPU Manufacturers

We miss the [Power Architecture](#), but IBM and Freescale are members of this group.

Intel

While AMD tries to make OpenCL available for the CPU, we have not heard of a similar product from Intel yet. They see a future for multi-core CPUs, as seen in [these slides](#).

ARM

Most known for its same-named low-power processor, not supported by MS Windows. You can read below how many companies have a license on their technology. Together with POWERVR-technology they power all the embedded OpenCL devices of the coming year.

IBM

Currently they are most known for their Cell-processor (co-developed with Toshiba and Sony) and have a license to build PowerArchitecture-CPU's. The Cell [has full OpenCL-support](#) as first non-GPU. Older types of PS3s (without the latest firmware) and IBM's servers can use the power of OpenCL. End of June 2010 Khronos conformed their "Development Kit for Linux" for Power VMX and PowerXCell8i processors.

Freescale

Once a Motorola-division, they make [lots of different CPUs](#). Besides ARM- and PowerArchitecture-based ones, they also have it's own 'Coldfire'. We cannot say for which architecture they are interested in OpenCL, but we really would like to hear something from them since they can open many markets for OpenCL.

Systems on a Chip (SoC)

While it is cool to have a GPU-card in your pc, more and more the Graphics-functionality is integrated onto a CPU. Especially in the mobile/embedded/gadget-market you'll find such System-on-a-Chip solutions, which are actually all ARM- or PowerArchitecture based.

3DLABS (ZiiLabs)

Creators of [embedded hardware](#) with focus on handhelds. They have partners of Khronos for a long time, having built the first merchant OpenGL GPU, the GLINT 300SX. They have just released a multimedia-processor, which is an ARM-processor with pretty interesting graphic capabilities.

They have an "[early access program for OpenCL](#)" for their ZMS product line.

Movidia

On their [Technology overview](#)-page they imply they have flexible accelerators in their designs, which *could* in the future be controlled by OpenCL-kernels. They manufacture mobile [GPUs-plus-loads-of-extras](#) which are quite impressive.

Texas Instruments

Besides [ARM](#)-based processors they also have [DSPs](#). We watch them, for which product they have OpenCL in mind.

Qualcomm



They might be most famous for their ARM-based [Snapdragon](#)-chipset. They have much more products, but we think they start with Snapdragon before building OpenCL in other products.

Apple



The [Apple A4 powers their new products](#), the iPad. It becomes more and more clear Apple has really learned that you cannot rely on one supplier, after waiting for IBM's G6. With OpenCL Apple can now make software that works on ARM, all kind of GPUs and CPUs.

Samsung

They make anything that is fed by batteries, so for that reason they should be in the "other" category: mobile phones, mp3-players, photo-cameras, camcorders, laptops, TVs, DVD-players and Bluray-players. All products where OpenCL can wield.

A good reason to make their [own semi-conductors](#), ARM-based.

In the beginning of June 2010 they have launched their own Linux-based OS for mobiles: [Bada](#).

Broadcom

Manufactures networking and communications ICs for data, voice, and video applications. They could use OpenCL for their [mobile multimedia processors](#).

Seaweed

Since September acquired by Presagis. We cannot be sure they continue the OpenCL-business of Seaweed, but at least [GPGPU is mentioned once](#).

Presagis is "the worldwide leader in embedded graphics solutions for mission-critical display applications. The company has provided human-machine interface (HMI) graphical modeling tools, drivers and devices for embedded systems for over 20 years. Presagis pioneered both the prototyping of display graphics and automatic code generation for embedded systems in the 1990s. Since then, code generated by its flagship HMI modeling products has been deployed to hundreds of aircraft worldwide and its software has been certified on over 30 major aircraft programs worldwide. Presagis is your trusted partner for reliable, high-performance embedded graphics products and services."

ST Microelectronics

ST has [many products](#): "Singapore Technologies Electronics is a leader in ICT. It has main businesses in Enterprise, Satellite Communications and Interactive Digital Media. It is divided into several Strategic Business Units consisting of Info-Comms, Info-Software, Training and Simulation, Electro-Optics, Large Scale Group, Satcom & Sensor Systems."

We think they've shown interest for OpenCL for use with their [Imaging processors](#). Together with Ericsson they have a joint-venture in de mobile market, [ST-Ericsson](#).

Handheld Manufacturers

While most companies will find it hard to make OpenCL-business in the consumer-market, consumer-products of other companies make sales a little bit warmer.

Apple

At least the iPad and iPhone have hardware-capabilities of running OpenCL. It is expected that it will come available in the next major release of the iPhone-OS, iOS 4. We're waiting for more news.

Nokia

The largest manufacturer of mobile phones from Finland has a lot of [technology](#). Besides smartphones, [possibly a netbook \(in cooperation with Intel\)](#) they also have Symbian and the QT-library. Since a while [QT has support for OpenCL](#). We think the support of OpenCL in programming languages (in a more high-level way) is very important. See [these slides](#) to read some insights of the company.

Motorola

They have [consumer products like mobile phones](#) and [business products like networking](#). It is not clear where they are going to use OpenCL for, since they mostly use other companies' technologies.

Super-computers

While OpenCL can revive old computers once upgraded with a new GPU, imagine what they can do with Super-computers.

IBM

IBM builds [super-computers](#) based on different technologies. With OpenCL-support for their Power VMX and PowerXCell8i processors, it is already possible to use OpenCL with IBM-hardware.

Fujitsu

They have [many products](#), but they also make [super-computers which use GPGPU](#).

Los Alamos National Laboratory

[They](#) build super-computers and really can use the extra power.

A [job-post](#) talks about heterogeneous architectures and OpenCL.

Petapath

Petapath, founded in 2008, focuses on delivering innovative hardware and software solutions into the high performance computing (HPC) and embedded markets. As can be seen from [their homepage](#) they build grids.

NVIDIA

As a newcomer in the [super-computer business](#), they do very well having helped to build the #2 HPC. Many clusters are upgraded with their streaming-processors.

Other Hardware

We don't know what they are actually doing with the technology, purely because they are too big to make assumptions.

GE

US-based electronics-giant [General Electronics builds everything there is, fed by electricity](#) and now also [GPGPU-powered solutions](#) as can be found on their [GPGPU-page](#). They probably switched to CUDA.

ST-Ericsson

Ericsson together with ST they have a joint-venture in the mobile market, [ST-Ericsson](#). Ericsson is big in (mobile) [networking](#). It also builds [mobile phones](#) with Sony. It is unclear what the joint-venture wants to do with the technology, but it must be mobile.

Software Developers

While OpenCL is very close to hardware, we have to talk software too. Did anybody say there is a strict line between hardware and software?

Graphic Remedy

Builders of [debugging software](#). You will hear later more from us about this company soon. See something about debugging in [this presentation](#).

RapidMind

[RapidMind](#) provided a software product that aims to make it simpler for software developers to target multi-core processors and accelerators (GPUs). It was acquired by Intel in august 2009.

HI

Japanese corporation [HI](#) has a product MascotCapsule, which is a real-time 3D rendering engine (native library) that runs on embedded devices. We see names of other companies, except SMedia. If you're not familiar with mobile GPUs, here you have a list.

This is another big hint, OpenCL will have a big future on mobile devices.

MascotCapsule V4 product specification

Operating
environment

CPU

ARM: ARM9 or above

Freescale: i.MX Series

Marvell: XScale

Qualcomm: MSM6280/6550/7200/7500 etc.

Renesas Technology: SH-Mobile etc.

Texas Instruments: OMAP

32-bit 150 MHz or above is recommended

(Capable of running without a floating-point hardware)

Code size

Approx. 200 KB

Engine

work area

2 MB or more is recommended, including data load area

Note: The actual required work area varies depending on the content

3D hardware

accelerator

ATI: Imageon

Imagination Technologies: PowerVR MBX/MBX Lite/SGX

NVIDIA: GoForce

SMedia: Glamo

TAKUMI: GSHARK
Toshiba: T4G/T5G
Other OpenGL ES compliant 3D accelerators

OS/platforms
BREW, iPhone, iPod touch, ITRON, Java, Linux, Symbian OS, Windows CE, Windows Mobile

3D authoring tools
3ds Max 9.0/2008/2009/2010
Maya 8.5/2008/2009/2010
LightWave3D 7.5 or later
SOFTIMAGE|XSI 5.x/6.x/7.0

Codeplay

They are most famous for their [compilers for the Playstation](#). They also make [code-analysis software](#).

QNX

From their [homepage](#): "Middleware, development tools, realtime operating system software and services for superior embedded design". Their real-time OS in all kinds of embedded products and they might want to see ways to support specialised low-power chips.

[RIM acquired QNX in april 2010](#).

Fixstars

Newcomer in the list 2010. Famous for their PS3-Linux and for their OpenCL-book. They also have FOXC, Fixstars OpenCL Cross Compiler. They have written [one of the few books](#) for OpenCL.

Kestrel Institute

<http://www.kestrel.edu/> does not show anything GPGPU. We'll probably hear from them when the next version of their [Specware](#)-product is finished.

Game Designers]

Physics-calculations and AI are too demanding to do on a CPU. The game-industry keeps pushing the GPU-industry, but now on a different way than in the 90's.

Electronic Arts

This game-studio builds [loads and loads of games](#) with impressive AI. See [these slides](#) to see what EA thinks GPGPU can do.

Activision Blizzard

Yes, they are [one company](#) now, so now they are together famous for best-selling hit "World of Warcraft". Currently not much is known where they use OpenCL for, but probably the same as EA.

Thank you for your interest in this article

If you know more about OpenCL at these companies or job-posts, please let us know via comment or via e-mail.

We've made some assumptions about what these companies use OpenCL for - we need your feedback!