



OpenFPGA: Mission and Activities

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OpenFPGA Vision

- ❑ Create a future where advances in reconfigurable computing technology will be easily and eagerly adopted, incorporated across critical high-performance computing and enterprise applications.
- ❑ OpenFPGA will be a catalyst for innovation and a vehicle for establishing standards for portability, performance and interoperability in the heterogeneous supercomputing community.
- ❑ OpenFPGA will advance contexts for reconfigurable computing research and channels for moving innovations into production use.

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The Mission of OpenFPGA is ...

*to promote the use of Field Programmable Gate Arrays
in high level and enterprise applications
by collaboratively defining, developing and
sharing critical information, technologies and best practices.*

The mission is realized through pursuit of the following objective areas

- **Innovation and Evaluation** – sharing tools and best practices
- **Standardization** – collectively defining common implementations
- **Education** – developing skilled professionals
- **Promotion** – advancing successful application uses of FPGAs
- **Communication and Collaboration** – fostering communication
- **Participation** – expanding involvement

OpenFPGA Quick History

- Nov 2004 Initial planning following successful FPGA workshop by OSC
- Feb 2005 Officially commenced with formation of cross-interest steering group
- Feb 2005 Announced at Manchester Reconfigurable Computing workshop
- Jul 2005 Co-host for RSSI held at NCSA
- Sep 2005 First open standards working group discussion @ MAPLD
- Oct 2005 Working groups formed
- Nov 2005 BoF session at SC2005

- Mar 2006 Draft organizational bylaws
- May 2006 Organization formed to ease sponsorship of activities
- Jul 2006 Working groups discussions at RSSI
- Nov 2006 AMD cornerstone sponsorship / SC06 Booth and BoF

Why Did OpenFPGA Emerge?

- ❑ **To Solve Fragmentation**
 - Many efforts working in isolation without cross-communication
- ❑ **To Address Common Challenges and Needs**
 - Expensive tools and long development times
 - No portability across vendors and across product versions
 - A Challenging market to enter
- ❑ **To Improve Common Practices**
 - Current situation similar to early days of message-passing and SMP
 - Vendor specific but common functionality
 - Technology emerging into general applications market
- ❑ **To Influence Priorities for Future Architectures**
 - Hardware interface designs and standards
 - Inter-component and inter-system designs and standards
- ❑ **To Lower the Risk of Adoption so Market Can Expand More Quickly**

OpenFPGA Steering Group

Cray, Inc.

George Washington University

GE Global Research

Koan Corporation

Mitrionics, Inc.

Nallatech, Inc.

NCI-ABCC

NCSA

NIST

Oak Ridge National Lab

OSC

Riken

Sandia National Lab

SGI, Inc.

SRC Computers, Inc.

Starbridge Systems, Inc.

University of Cincinnati

University of Manchester


University of South Carolina

University of Toledo

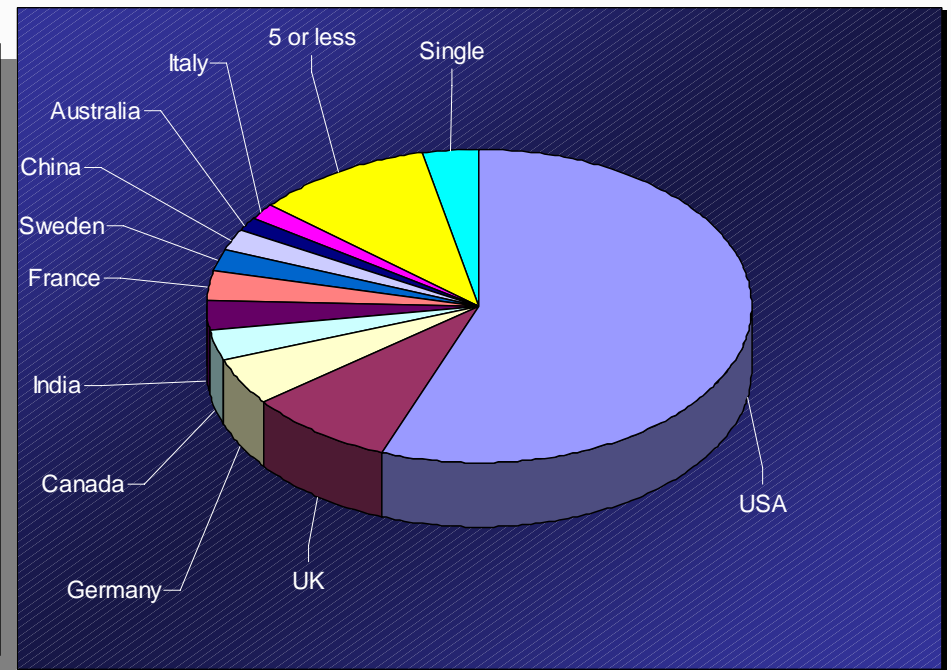
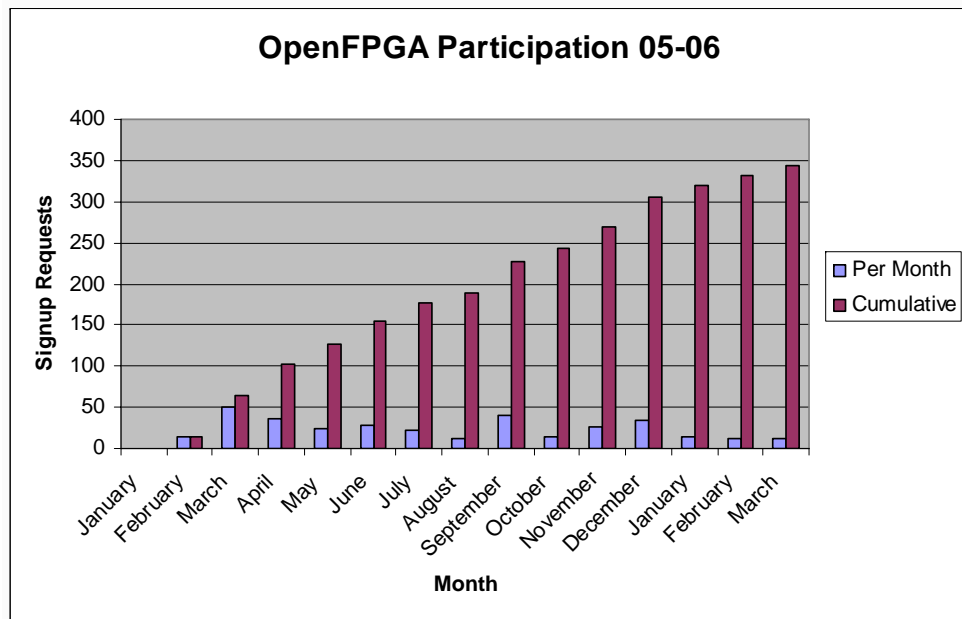
Zuse Institute Berlin

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OpenFPGA: Participants – World Wide



Now nearly 500 participants in over 40 countries worldwide

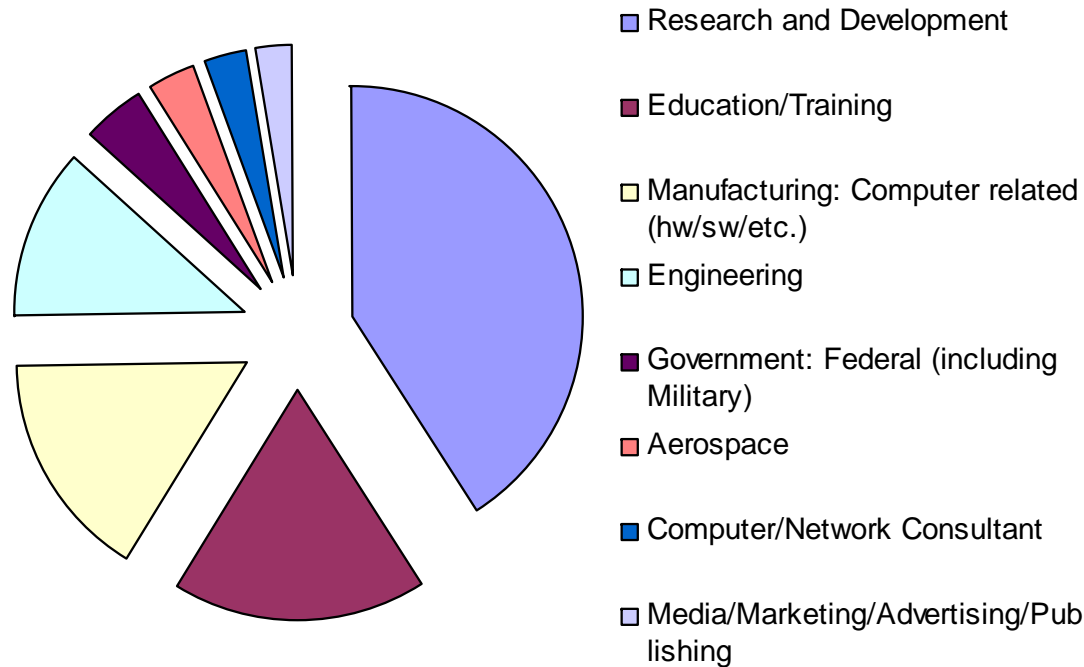
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OpenFPGA Company Profiles

**OpenFPGA Company Areas
(top 270 participant areas)**



Additional Key Areas

Financial: Commercial Banking

Financial: Brokerage

Energy

Agriculture

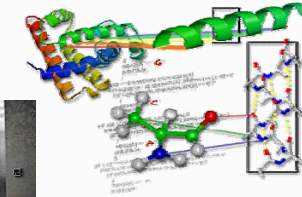
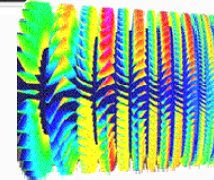
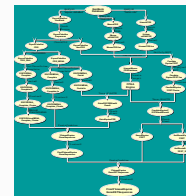
Pharmaceutical

Local/State Government

Retail / Wholesale


Member Interest Areas

- ❑ Xilinx, Altera
- ❑ Wireless Communications
- ❑ Supercomputing
- ❑ Software tools
- ❑ Signal Processing and cryptography
- ❑ SoC
- ❑ Algorithms and Applications
- ❑ Benchmarks
- ❑ Numerical simulation
- ❑ Low-power design
- ❑ Data Mining
- ❑ Cellular Automata
- ❑ Biological modeling
- ❑ Bioinformatics
- ❑ Automotive
- ❑ Clusters of FPGAs



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OpenFPGA: What We Do

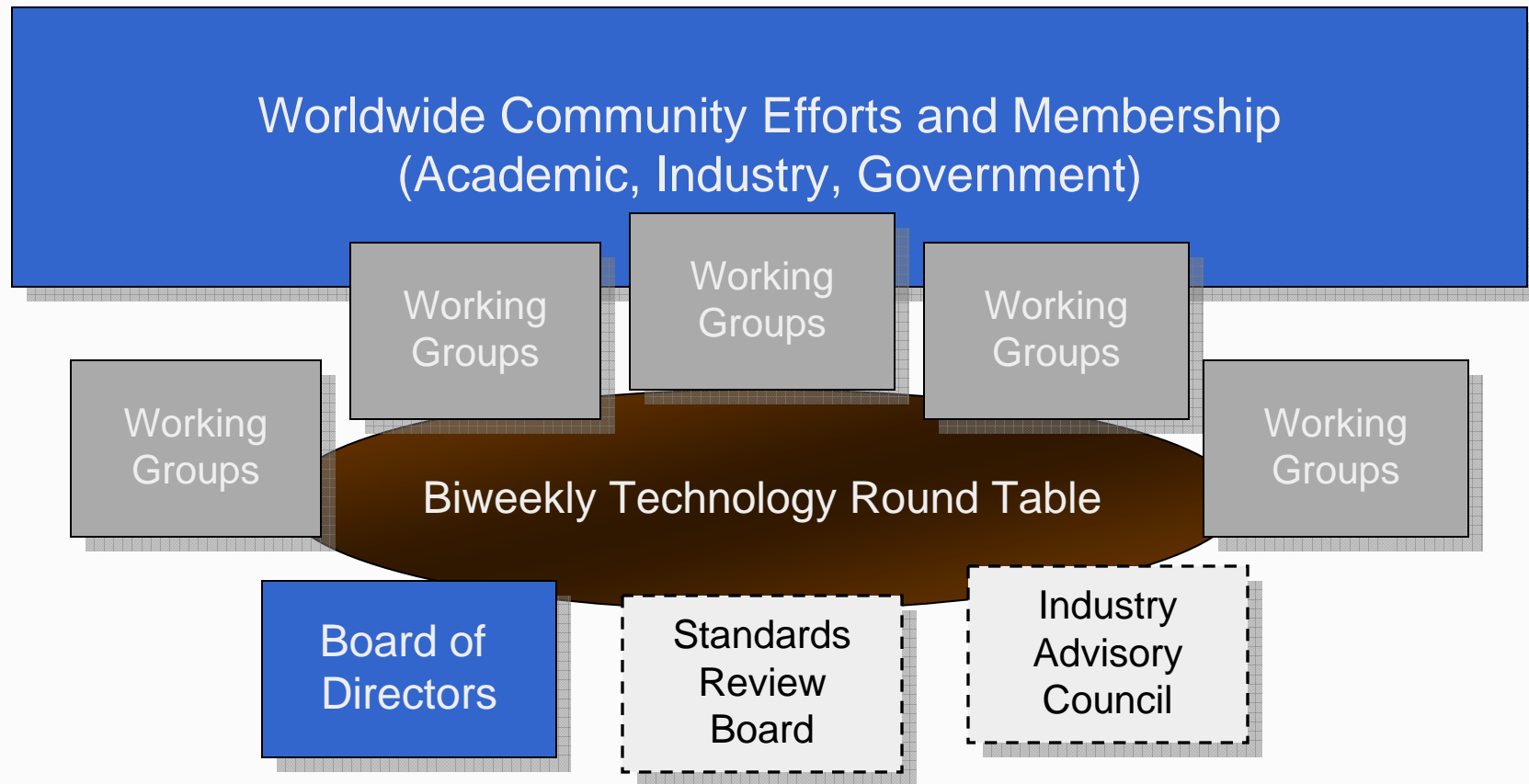
- ❑ **Promotion** – market building
 - Website, success stories, benchmarks
- ❑ **Participation** – community building
 - Nearly 500 participants worldwide
 - Over 40 countries
- ❑ **Communication & Collaboration** – sharing of ideas
 - Email lists, Wiki, RC application/development examples
- ❑ **Education** – expertise building
 - A starting point to bootstrap individual FPGA application development
- ❑ **Innovation & Evaluation** - assessments and new developments
 - Working groups and collaborations
- ❑ **Standardization – common practices for portability and supportability**
 - Rapidly developing

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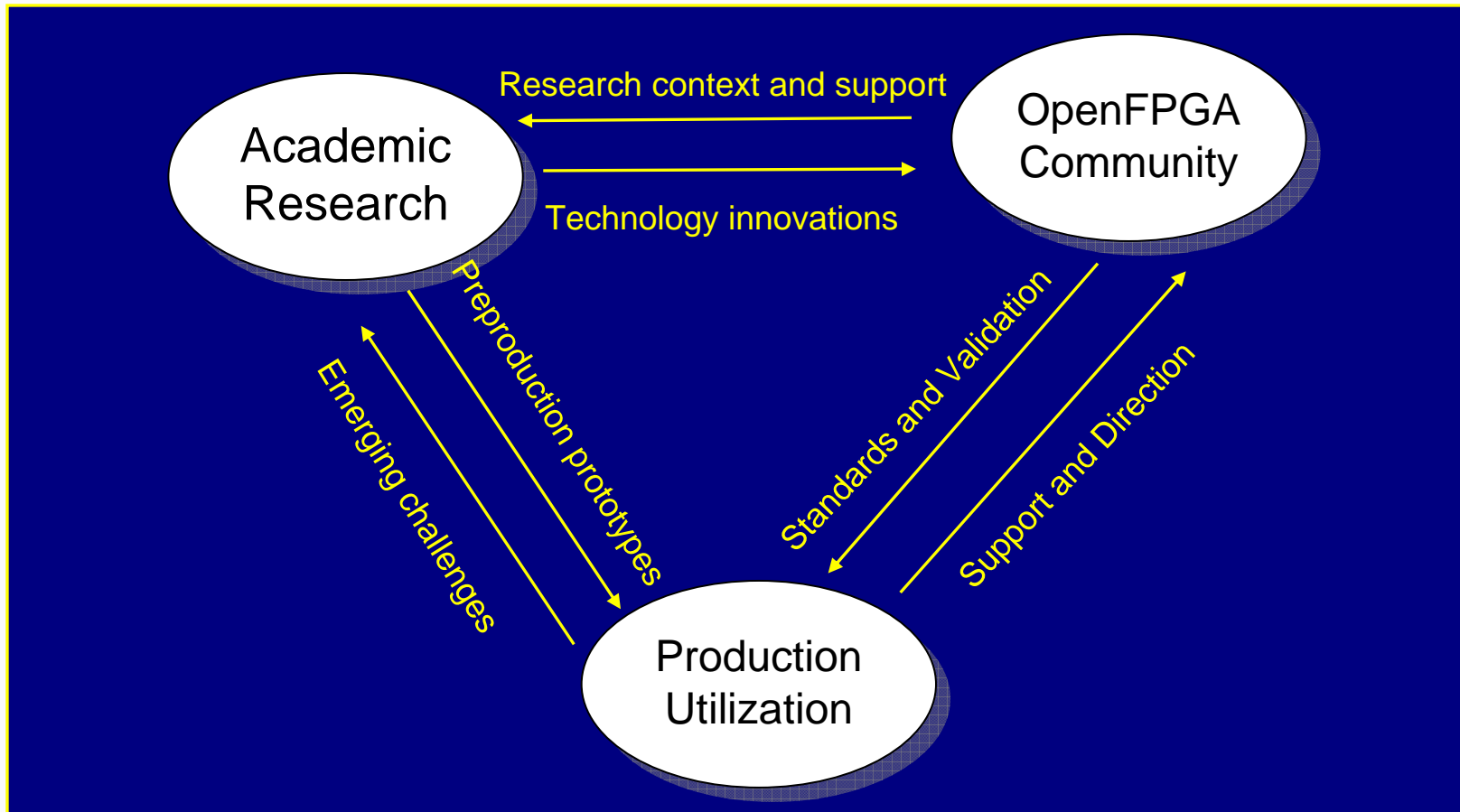


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OpenFPGA Organization



OpenFPGA: Taking Research to Practice



OpenFPGA Working Groups

- ❑ Comprised of OpenFPGA members
- ❑ Cross-disciplinary teams leveraging worldwide interest and investment in FPGAs
- ❑ Activities supported through OpenFPGA
 - Working group email lists
 - Wiki for collaboration
 - Technology roundtable for ongoing updates
 - Financial support for working group activities

OpenFPGA Application Working Groups

- ❑ Applications Requirements (U-APPREQ)
 - Organizing lead: Eric Stahlberg (OSC)
 - Goal: Characterize application needs present and future

- ❑ Benchmarking (T-BENCH)
 - Organizing lead: Dean McCoullough (NCI-ABCC)
 - Goal: Provide performance metrics for comparison

- ❑ Applications Libraries (T-APPLIB)
 - Organizing lead: Thomas Steinke (ZIB)
 - Goal: Delivery of usable FPGA-enhanced application libraries

OpenFPGA Technology Working Groups

- ❑ High-level Languages (T-HLLANG)
 - Organizing lead: Ron Sass (U of North Carolina Charlotte)
 - Goal: Address efficient algorithm specification for FPGAs

- ❑ General API (T-GENLIB)
 - Organizing lead: Stefan Möhl (Mitrionics)
 - Goal: Define portable generalized FPGA API

- ❑ Core Interoperability (T-CORELIB)
 - Organizing lead: Dan Poznanovic (SRC)
 - Goal: Define interoperability among RC cores

2007: Progress in Standardization

- ❑ **Core libraries**
 - Define interfaces for interoperability
- ❑ **General APIs**
 - Common interface supported across vendors
- ❑ **Application specific libraries**
 - First library API for molecular dynamics
- ❑ **Capability and performance benchmarks**
 - Adding new algorithmic benchmarks

2007 Standardization Activities

- ❑ Standards Definition
 - Manchester (UK) Conference, March 28-30, 2007
- ❑ Comment and Evaluation Period
- ❑ Standards Adoption
 - Reconfigurable Computing Summer Institute, NCSA, July 2007
- ❑ Standards Demonstration and Release
 - Supercomputing 2007 (November, Reno, Nevada)

OpenFPGA Member Network

- ❑ Nearly 500 participants via email
- ❑ Connecting through informal email discussions
- ❑ List members only traffic – no spam
- ❑ Simple sign-up at the OpenFPGA site



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Join in the Future of OpenFPGA

- ❑ Low-cost individual membership makes OpenFPGA open to all
- ❑ Funding directed to working group activities
- ❑ Easy sign up at the OpenFPGA site
- ❑ Sponsorship opportunities exist for companies and organizations

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Acknowledgements

- ❑ OpenFPGA Steering and Organizing Committee

- ❑ Early Supporters
 - Exegy, Mitrionics, SRC Computers, Alpha Data, Nallatech, FPHCA, Cray, SGI, Xilinx

- ❑ First Cornerstone Sponsor
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