WARP: Wireless Open-Access Research Platform

Welcome & Overview

Rice WARP Workshop Rice University November 14-15, 2008



Agenda

- Overview of Rice University WARP
 - Hardware
 - Design flows
 - Applications
- Lectures & Hands-on exercises

WARP Workshop Team

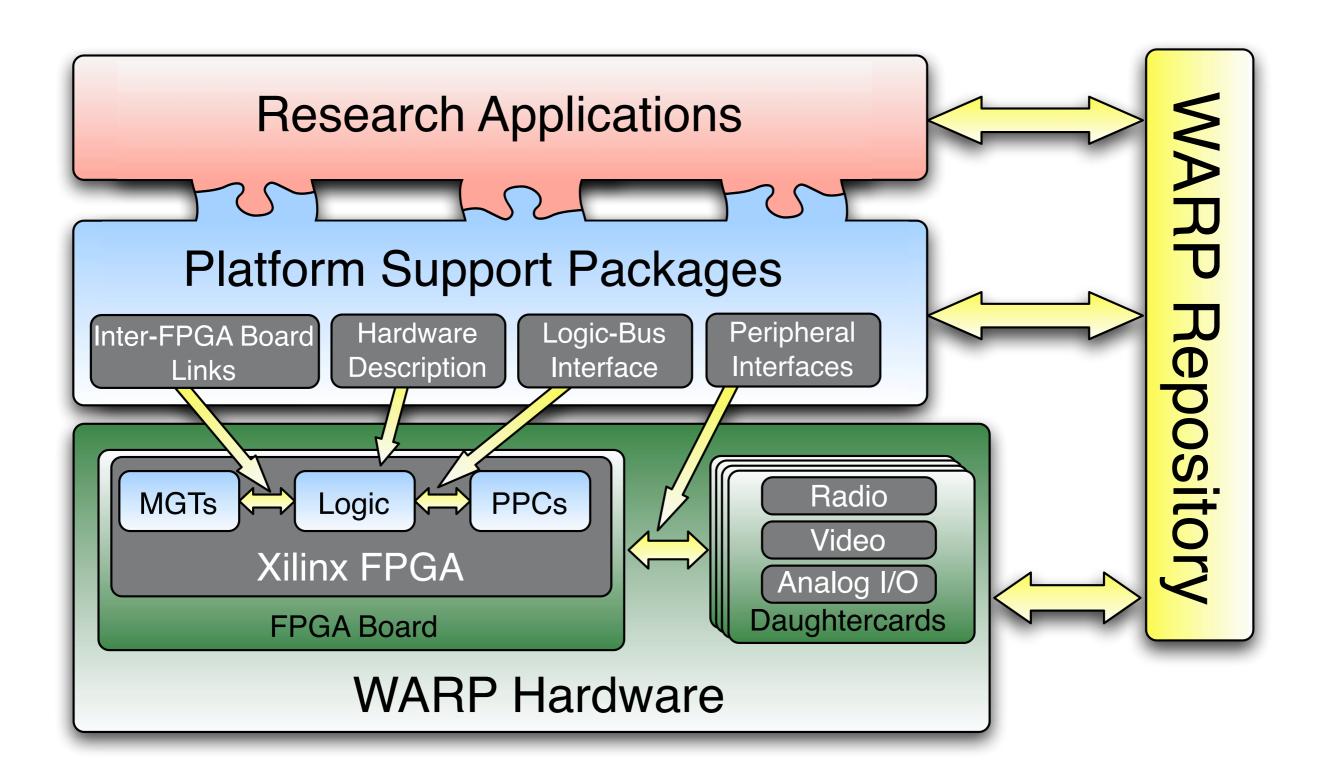
- Prof. Ashutosh Sabharwal
- Melissa Duarte
- Siddharth Gupta
- Chris Hunter
- Patrick Murphy

WARP Goals

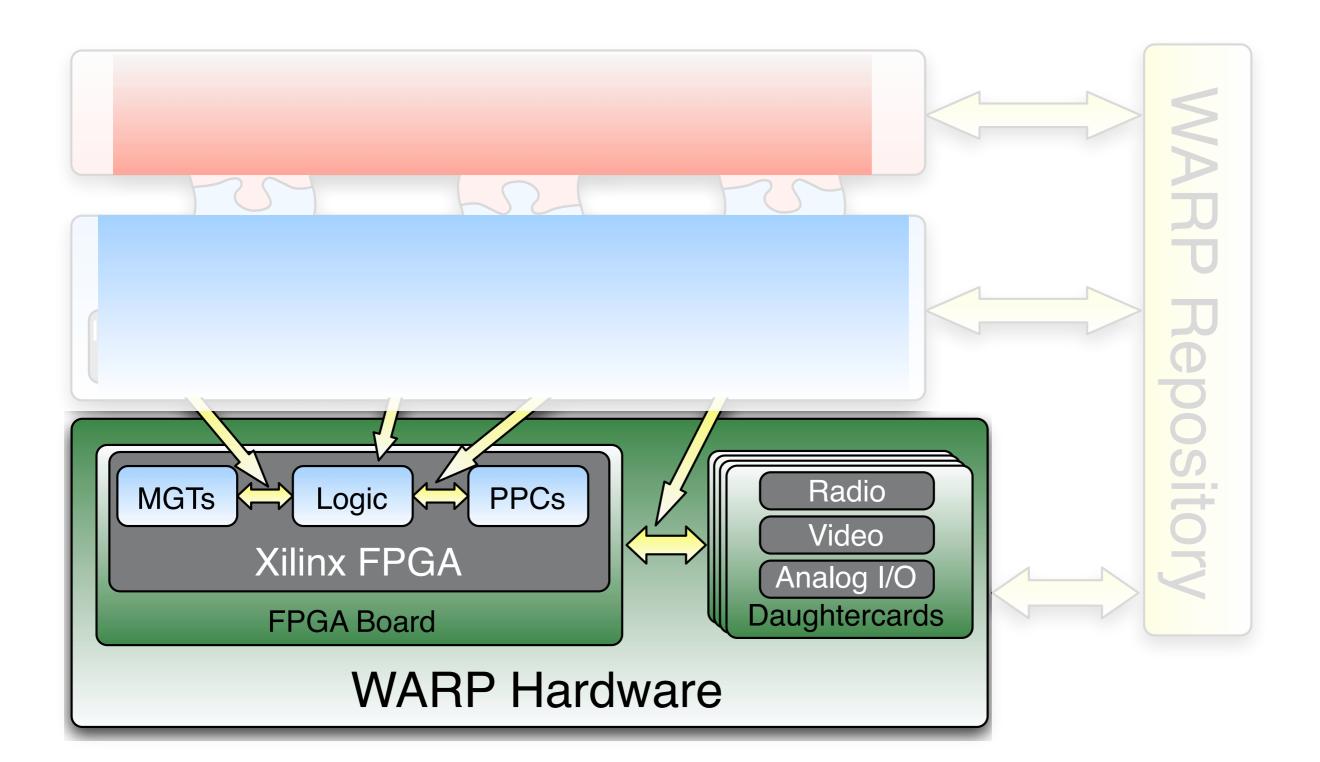
- Custom wireless network research
 - Programmable at every layer
 - Useful for users at just one layer

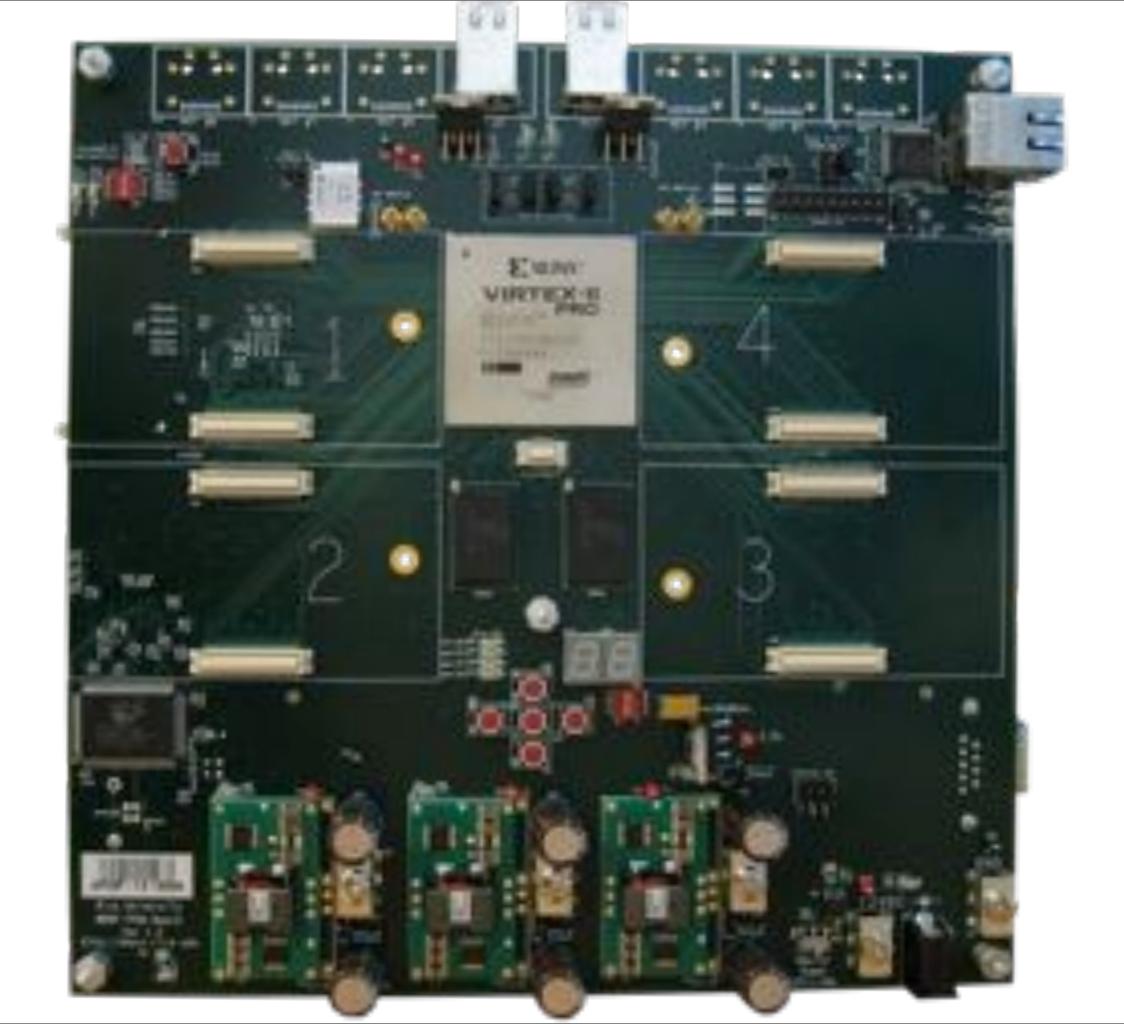
- Open access throughout
 - Free access to all designs & results
 - Community access
 - Hardware available to other researchers

Overview



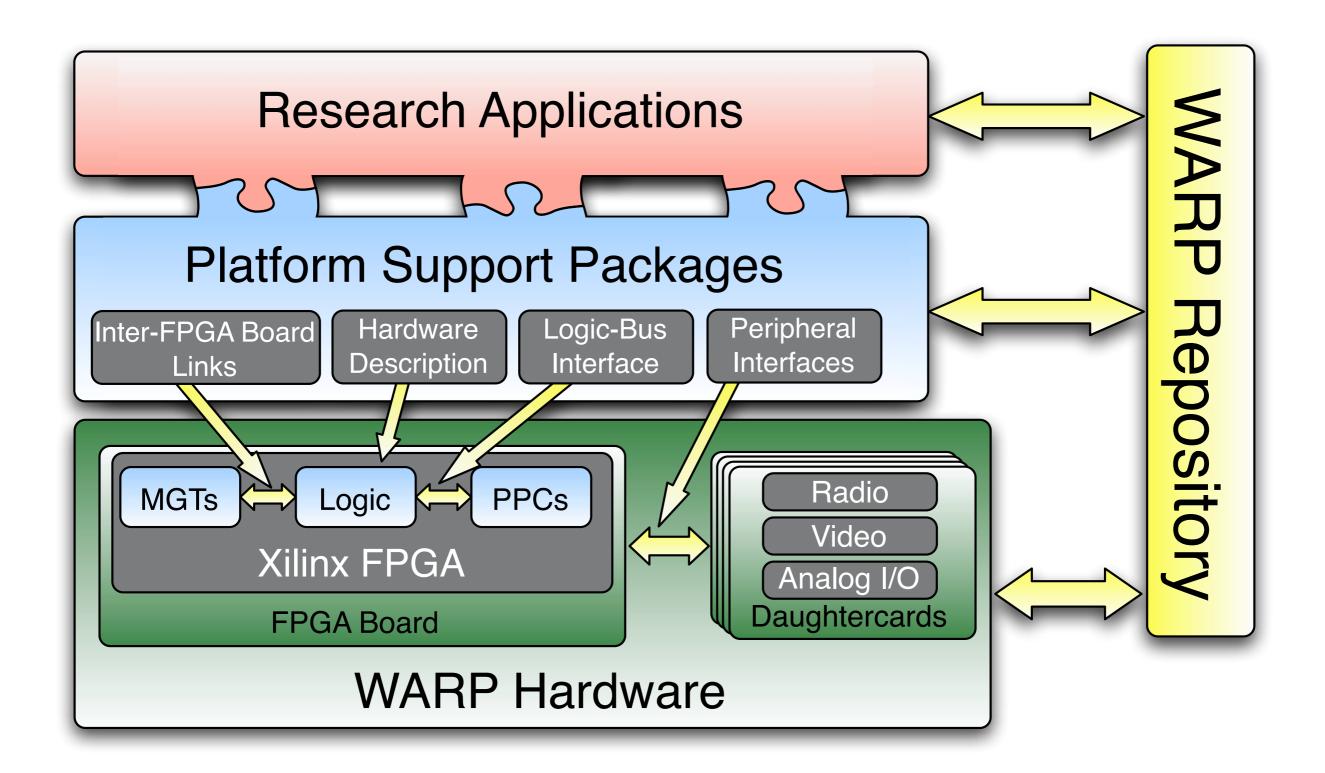
WARP Hardware

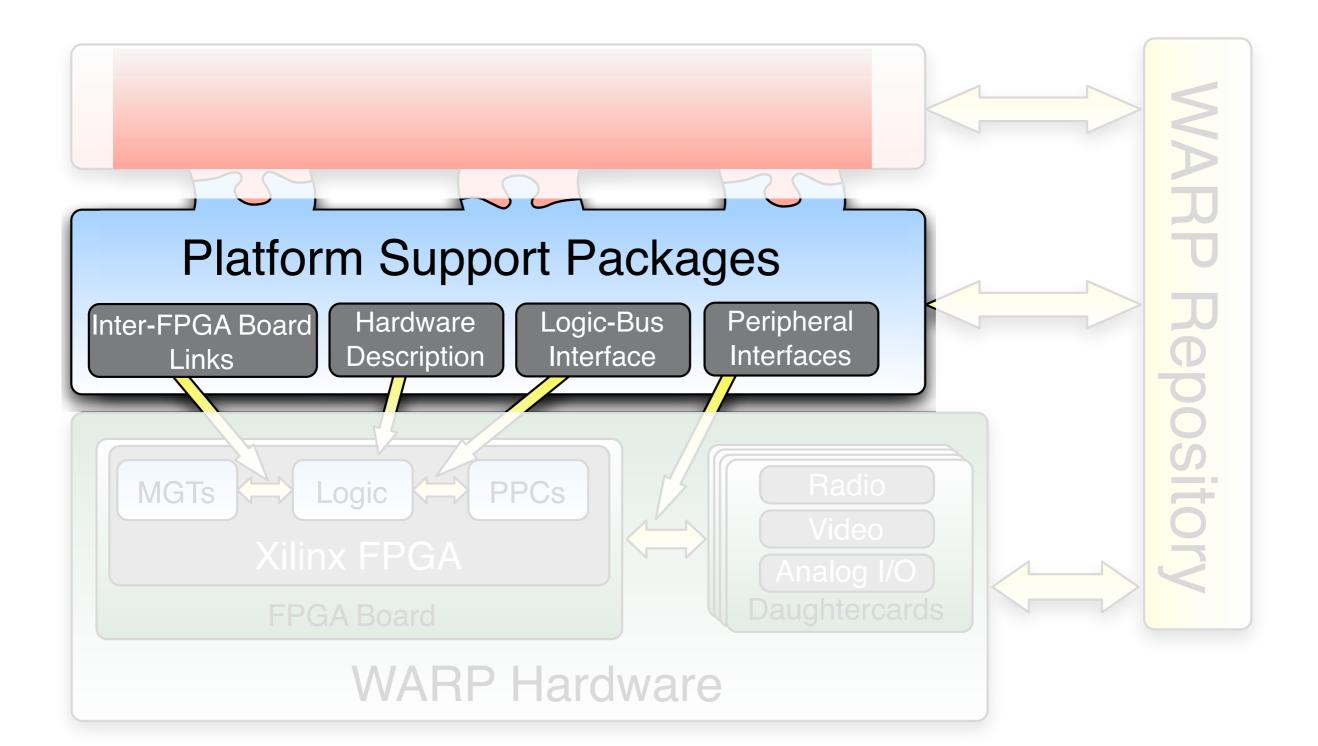






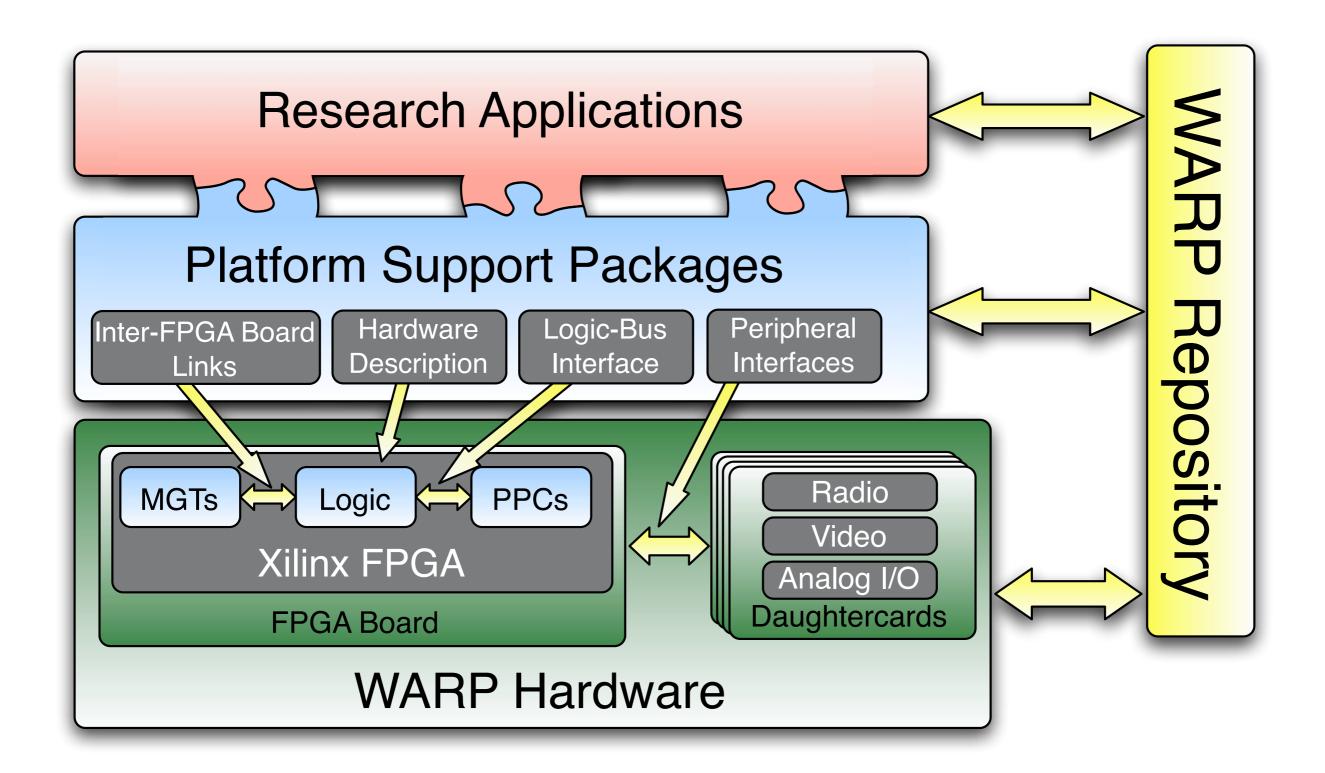


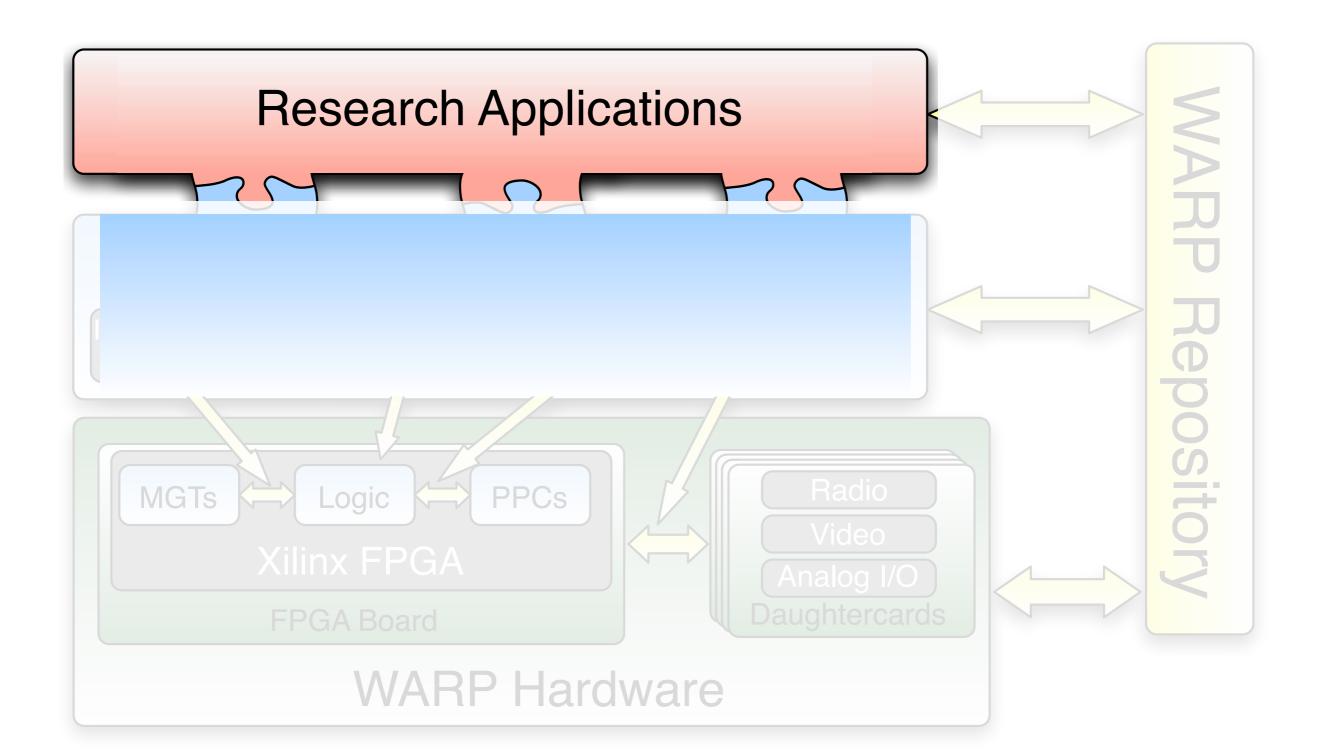




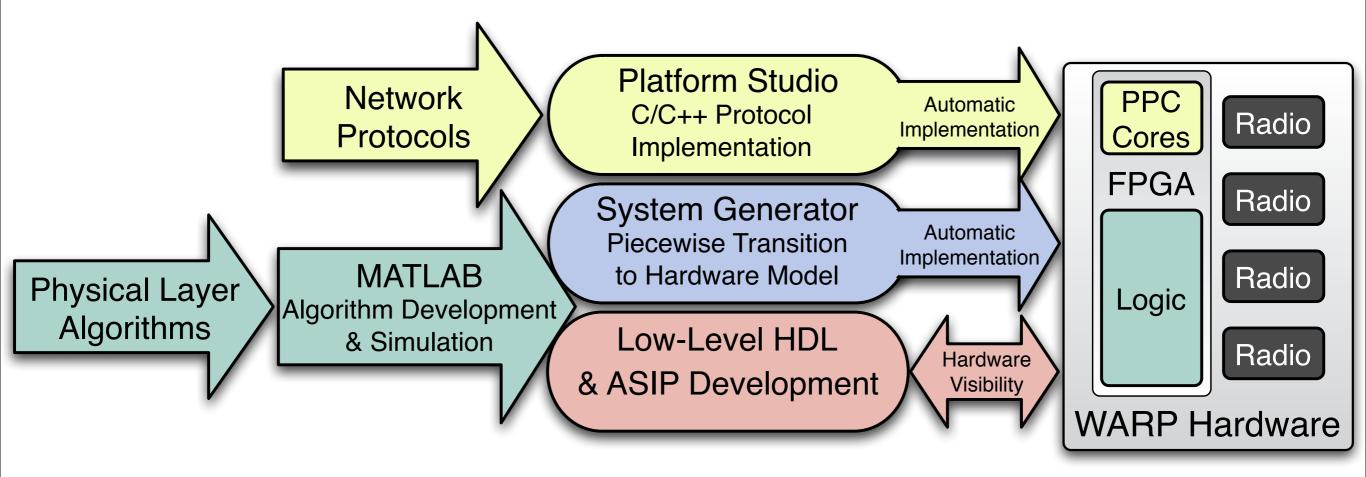
Platform Support

- Hardware needs support libraries
 - Mask complexity of underlying hardware
 - Easy interfaces & APIs for low-level functionality
- Research applications built on top of packages
 - PHY needs radio interface
 - MAC needs packet interface with PHY
 - Networks need packet interface with MAC
 - No one should have to build it all





Application Design Flows

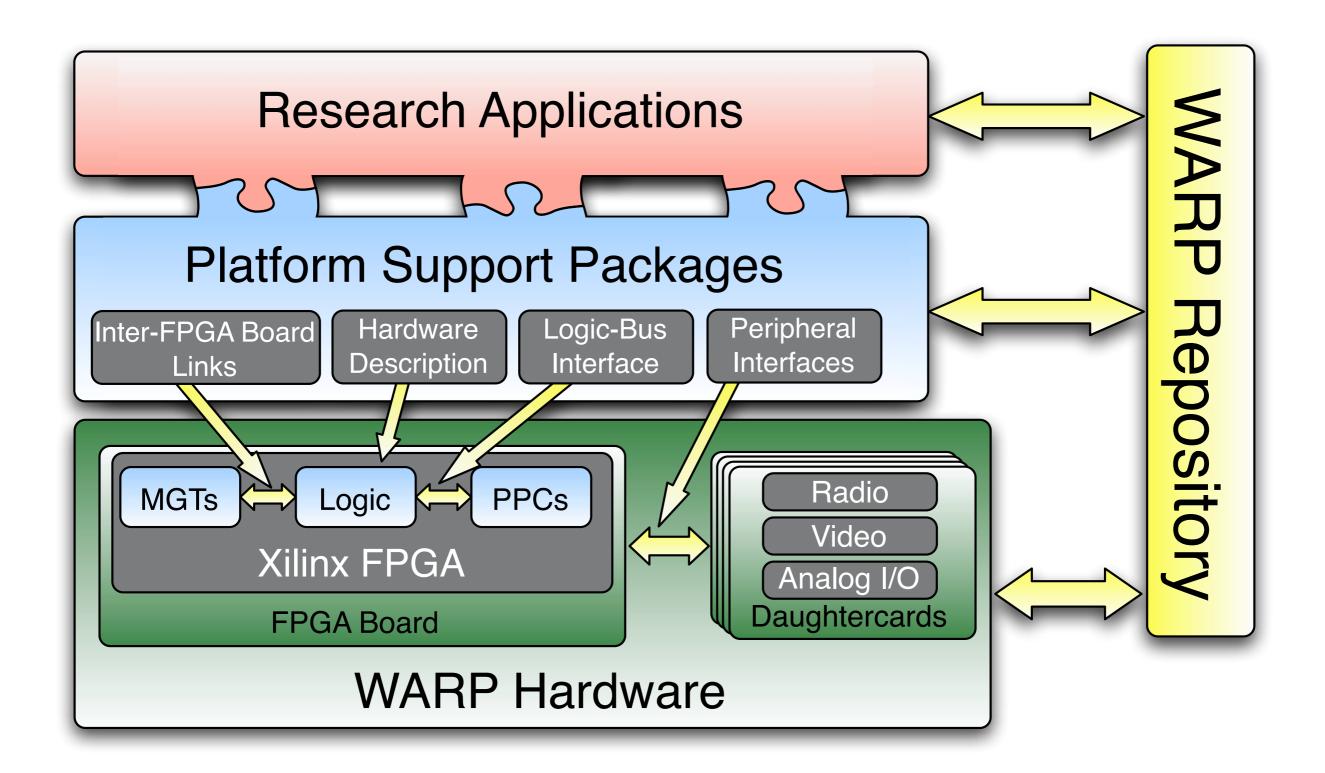


Physical Layer Designs

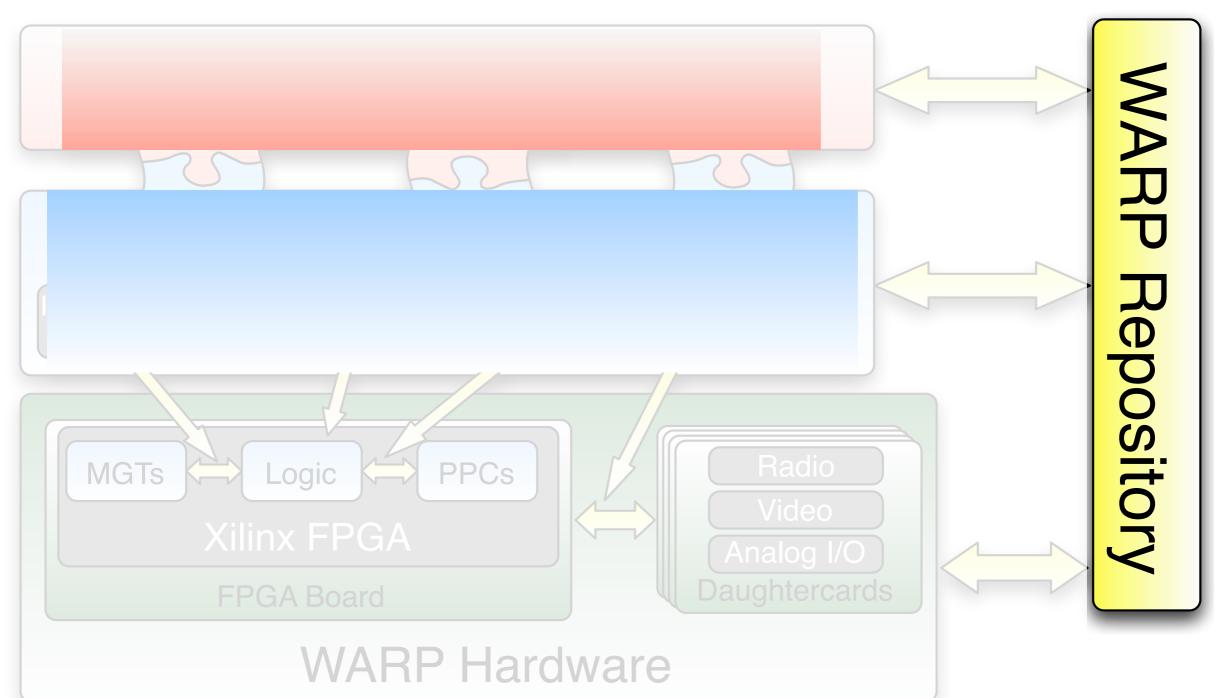
- WARPLab
 - MATLAB-based PHY prototyping
 - Very fast design cycle
- Real-time PHY designs
 - Multiplexing MIMO OFDM
 - Alamouti MIMO OFDM
 - Cooperative OFDM

Networking Designs

- WARPMAC framework
- Carrier Sense Multiple Access (CSMA)
- RTS/CTS MAC
- Scheduled MACs in progress



WARP Repository



WARP Repository

- Integral part of WARP effort
 - Open-source access to all our designs
 - Schematics, code, models & results all available
- Version control of all source files
- Wiki-based documentation
- BSD-based open-source license
- Repository is live
 - <u>http://warp.rice.edu/trac/</u>

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WARP

WARP: Wireless Open-Access Research Platform

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- a '1' MAAP search tracing list
- a kind Description

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 - · Software views Surder
 - · Traduently Nated Questions
 - API Socurrentees

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- WARP & intrusteing of Outs July 2007
- MART & Rock Association (2027

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 - · Dependencies in Million Partnersh Studio



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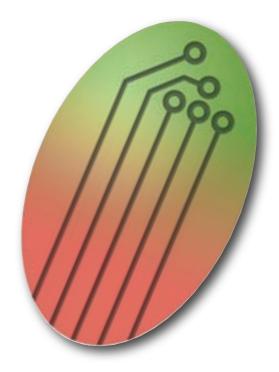
WARP Community Forums

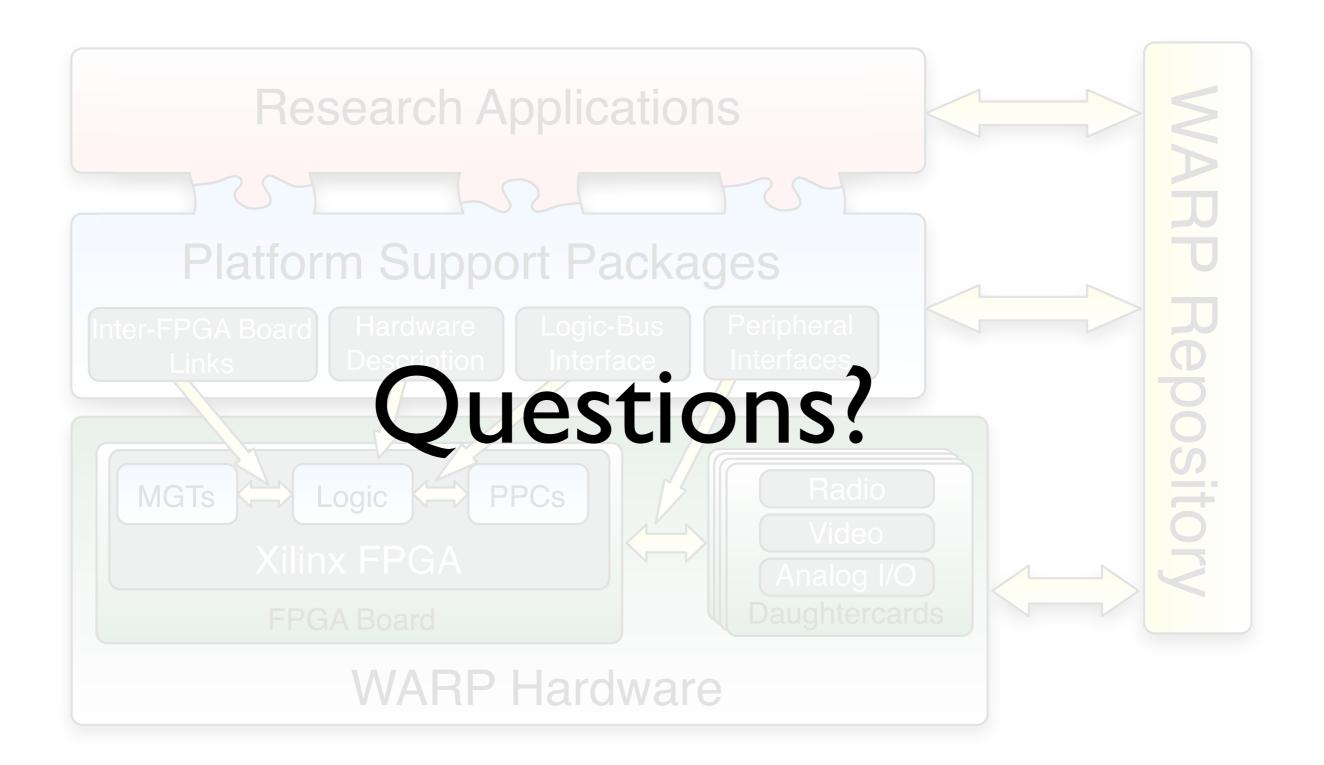
- Primary source of WARP support
- Online since July 2006
- 140+ users
- 1500+ posts

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WARP Hardware Purchases

- WARP hardware available from Mango Communications
- Shipments started in September 2008
- Visit <u>http://mangocomm.com</u>/ for details





Workshop Outline - Day I

- Physical layer prototyping Melissa Duarte
 - WARPLab PHY design flow
 - Lab I: using WARPLab for PHY design
- Introduction to Xilinx tools Patrick Murphy
 - Lab 2: XPS/Base System Builder
- Physical layer design Siddharth Gupta
 - Physical layer basics
 - Real-time PHY design
 - Lab 3: designing a simple transmitter

Workshop Outline - Day 2

- MAC layer design Chris Hunter
 - Medium access control basics
 - WARPMAC framework
 - How to build custom MAC protocols
 - Labs 4-6: Building 3 simple MACs

Logistics

- Everyone sharing 3 applications servers via RDC
- Keep your files in C:\workshop\userN\ on server
 - Your monitor has a label showing your N
 - W:\ mapped to your working directory
- Please be careful with your WARP hardware
- All slides & handouts will be on WARP site
 - http://warp.rice.edu/trac/wiki/Workshops

http://warp.rice.edu/



Questions?

Sponsored by the National Science Foundation & Xilinx Advanced Systems Technology Group

Thanks also to Maxim Integrated Products, Analog Devices & Texas Instruments