

Session 5 Government Funded Standards

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Outline





- DoD Need
- Standards Goals

- Key Efforts
- Summary



Why Is DoD Concerned with Embedded Software?



- COTS acquisition practices have shifted the burden from "point design" hardware to "point design" software (i.e. COTS HW requires COTS SW)
- Software costs for embedded systems could be reduced by one-third with improved programming models, methodologies, and standards



Evolution of Software Support Towards "Write Once, Run Anywhere/Anysize"



- Application software has traditionally been tied to the hardware
- Many acquisition programs are developing stove-piped middleware "standards"
- Open software standards can provide portability, performance, and productivity benefits
- Support "Write Once, Run Anywhere/Anysize"



DoD Standards Goal



<u>Goal:</u> Transition advanced software technology and practices into major defense acquisition programs

Common Imagery Processor (CIP)





Measuring Success

Program Goals

- Develop and integrate software technologies for embedded parallel systems to address portability, productivity, and performance
- Engage acquisition community to promote technology insertion
- Deliver quantifiable benefits

Portability:	reduction in lines-of-code to
	change port/scale to new
	system
Productivity:	reduction in overall lines-of-
	code
Performance:	computation and
	communication benchmarks



Outline

• Introduction

Standards in Systems

Development Status of the Vector, Signal, and Image Processing Library (VSIPL) Mark Richards / Georgia Institute of Technology Dan Campbell / Georgia Tech Research Institute Randall Judd / U.S. Navy SPAWAR Systems Center James Lebak / MIT Lincoln Laboratory Rick Pancoast / Lockheed Martin

Will describe API status, vendor adoption and Forum plans

Some other VSIPL work at HPEC:

- VSIPL, from API to Product, Sacco/SKY
- National Weather Radar Testbed, Walsh/SKY
- SIP-7 Experience, Linderman & Bergmann / AFRL
- HPEC-SI Demonstration, Sroka / MITRE

VSIPL++: Intuitive Programming Using C++ Templates

Mark Mitchell Jeffrey D. Oldham CodeSourcery LLC

Implementors of prototype VSIPL++

Will describe API and its benefits:

- Direct support for parallel computation
- Simpler syntax and improved type-checking
- Reduced validation verification (V&V) costs
- Support for specialized data storage formats
- Potential for higher performance

HPEC-SI: VSIPL++ and Parallel VSIPL

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Technical Scope

Data Reorganization Interface (DRI)

Kenneth Cain, Jr. / Mercury Computer Systems Anthony Skjellum / MPI Software Technology

Technology Focus

• Higher level abstraction for collective communication (i.e. "corner turn")

Will describe API status, vendor adoption and Forum plans

Software Communications Architecture (SCA) Compliant Software Defined Radios S. Murat Bicer / Mercury Computer Systems Jeffrey Smith / Mercury Computer Systems

Technical goal:

• Open architecture radios across multiple domains

Will describe:

- Advantages and difficulties of implementing a SCA-compliant software defined radio
- An implementation to define a Minimum SCA OMG Specification

- Government funded standards play a key role in transitioning DoD developed technology into DoD systems
- Four efforts are critical for the future success of DoD embedded computing systems
 - VSIPL
 - VSIPL++ and Parallel VSIPL
 - DRI
 - SCA