

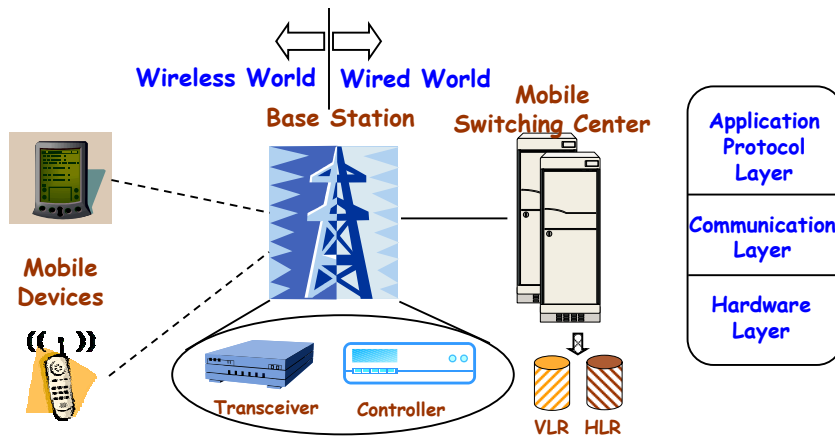
Robust System Design for Cellular Networks

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Motorola Presentation
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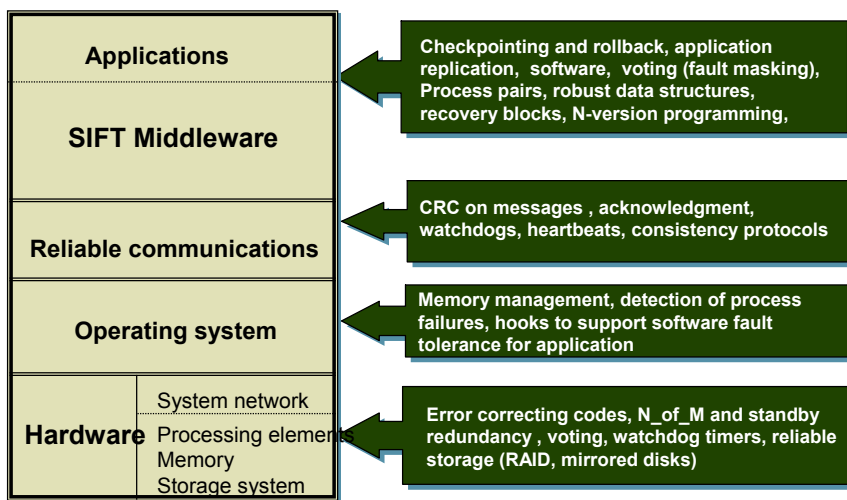
Personal Communication Systems



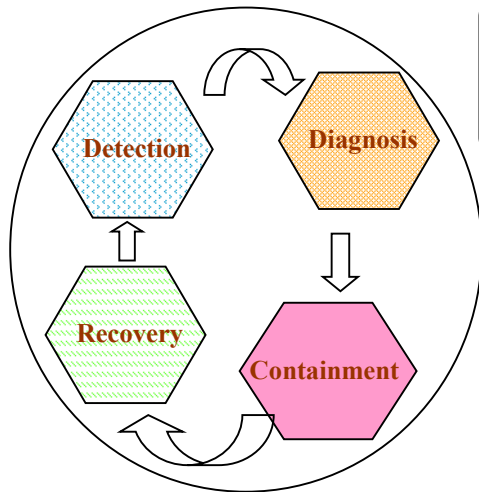
The Dreaded D-Word

- Downtime. In today's 24-7-365 world, an hour costs \$6M
- Three leading causes
 - Software
 - Operator
 - Malicious attacks
- Need an end-to-end solution with failure tolerance at each level of the architecture

Failure Tolerant Architecture



Phases of Failure Tolerance Process






Evaluation:

- Analytical
- Simulation
- Prototyping

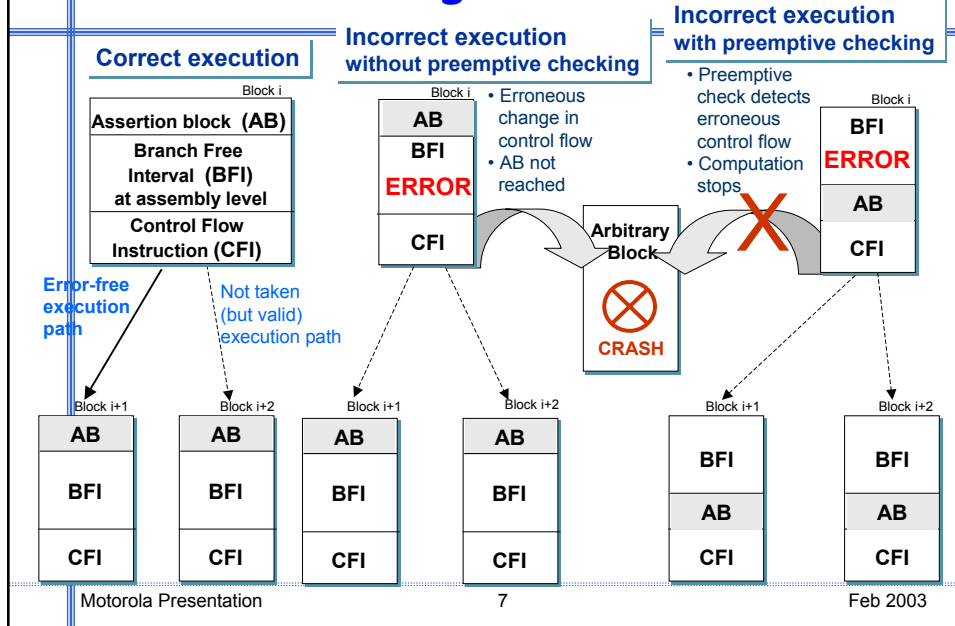
Domain Specific Challenges

1. Low Power
2. Disconnected operation
3. Uncertain environment

Research Directions in Dependable Computing Systems Lab

Phase	What?	How?	Application
 	<ol style="list-style-type: none"> 1) Control flow error detection 2) Memory errors 3) Intrusions 	<ol style="list-style-type: none"> 1) Embedded signatures 2) Hardware support 3) Collaborative intrusion detection 	<ol style="list-style-type: none"> 1) Embedded software with or without source code 2) Multi-threaded hardware platforms 3) Any system with outside network access
	<ol style="list-style-type: none"> 1) Self-checking software 2) Isolation of intrusions 	<ol style="list-style-type: none"> 1) Signatures prior to state change 2) Enforcing containment boundary around affected components through limiting interactions 	<ol style="list-style-type: none"> 1) Embedded software with source code 2) Interacting services

Control Flow Signatures



Evaluation

- What are the evaluation criteria? Examples include
 - Latency of detection
 - Prevention of propagation of failures
- How good are the following metrics for the systems
 - Reliability
 - Availability
 - Survivability
- Evaluated through
 - Theoretical analysis: Probabilistic models
 - Simulation: Discrete event simulation, Markov simulation
 - **Prototyping: Systems are built and stressed with faults and intrusions**

Info

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