Problem

Embedded Systems Getting Increasingly Complex

System Design Span Multiple Chips (CPUs, GPUs, FPGAs, DSPs ….)

Difficult to Integrate, No Visibility

No Universal Tool Exists for Integration
Solution: Visual System Integrator

- Rapid, visual application development:
  - Describe Hardware platform.
  - Develop Application
    (Import C/C++/RTL blocks connect them)
  - Automatic code generation for the complete system
    (Software/Hardware projects, drivers, DMAs)

- Get unprecedented Transaction level visibility at runtime

Focus on your application, not the platform & firmware!
Design Visualization: Platform & System Layers

- **Platform Layer**
  - Board level Physical Hardware
  - Express connections & transport between Physical entities

- **Application / System Layer**
  - Easily add logical blocks
  - Import C/C++/Java or Python code
  - Connect blocks to express dataflow
Visual System Integrator: Work Flow

1. Describe Hardware Platform (Import Existing)
2. Compile Platform
3. Platform Meta data
4. Import Platform
5. Develop Application System
6. Compile Generate System
7. Software Projects: Eclipse, Qt, VC++, ...
8. Runtime, Drivers & OS Configurations ...
9. FPGA Projects
VSI Built Systems
Load On Demand (Partial Reconfig)

• Time multiplex hardware Resource [R5, FPGA Fabric … ]

• Dynamically change the behavior of a system

  • Radar: Transmit, Receive or Communication
  • Automotive: Mutually exclusive functions
    • Forward Camera, Reverse Camera.
Load On Demand

• Load on Demand using Data-Flow

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Diagram:

- Gear Spindle
- Forward Camera Display
- Rear Camera Display
- Forward Camera Processing
- Rear Camera Processing
- G1

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Load On Demand

- Load on Demand using Data-Flow
## Load On Demand

<table>
<thead>
<tr>
<th>Action</th>
<th>Time in uS (10e-6 Seconds)</th>
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<tbody>
<tr>
<td>Config Block Setup</td>
<td>210 uS</td>
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<tr>
<td>Decouple Logic from Active</td>
<td>123 uS</td>
</tr>
<tr>
<td>Load Partial Bitstream (~1.2Mbytes)</td>
<td>19845 uS</td>
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<tr>
<td>Recouple Logic to Active</td>
<td>138 uS</td>
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<tr>
<td>Restore Config block setup</td>
<td>77 us</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>20393 uS (.02 S)</strong></td>
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