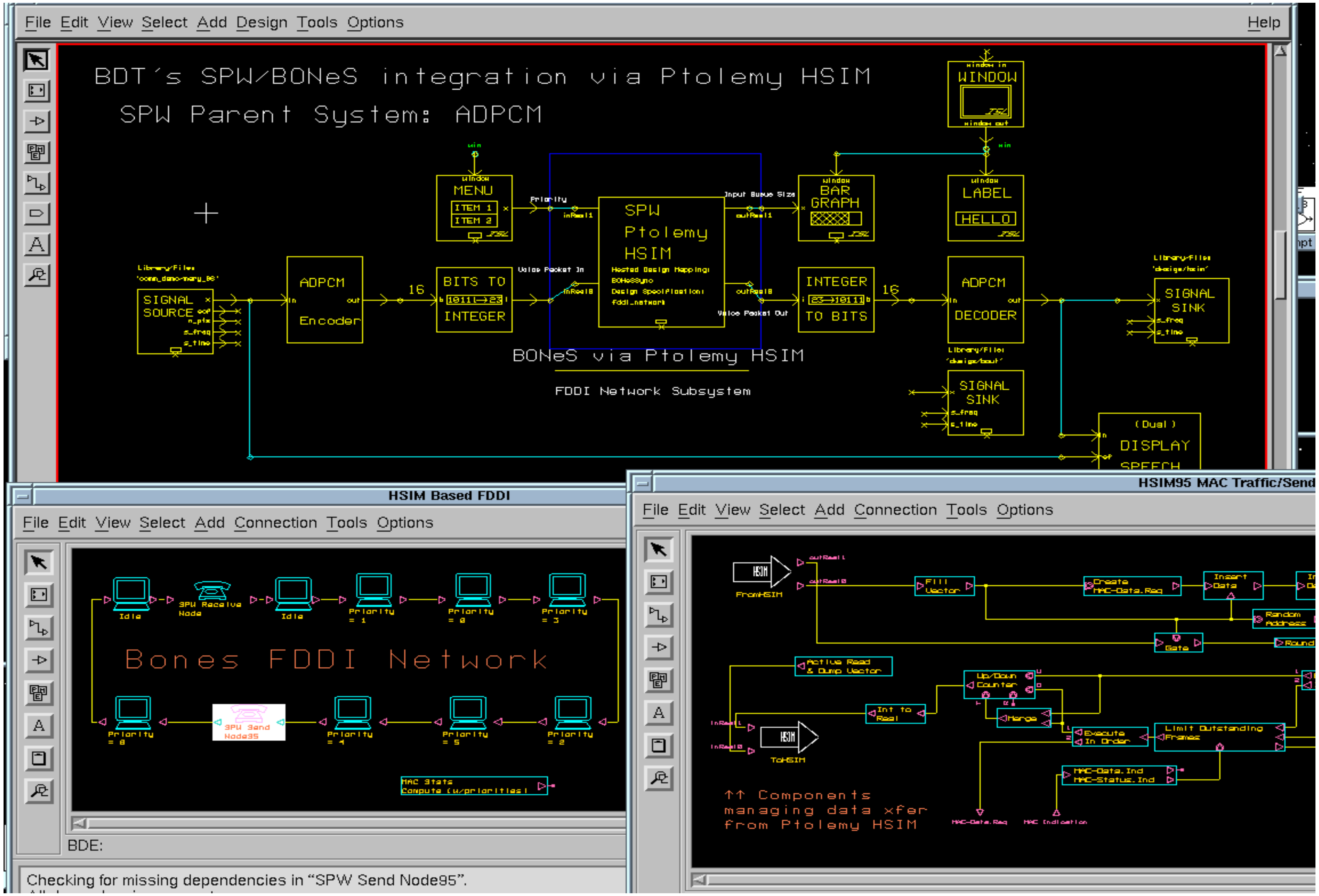
# Ptolemy HSIM application example



# Summary

- Today's complex systems increasingly require heterogeneity and hierarchy in the design process.
- A comprehensive design environment should leverage mature design capabilities and resources of both commercial and research tools.
- BDT’s extensible Ptolemy HSIM supports heterogeneous co-simulation between arbitrary design combinations from multiple tools.
- Heres what HSIM looks like: LAN-based teleconferencing example.


- contact BDT by email: hsim@bdti.com or by phone: (510) 791-9100


Please stop by our booth for a demo of Ptolemy HSIM.

# Technical Issues

- **Semantic mappings raise subtle and sometimes complex issues.**
  - **e.g. should a nested DE design run reactively or synchronously?**
  - **or, if no new data is available, but the parent requires some, what should the heterogeneous boundary do?**
- **Since multiple mappings may be valid, give the designer the ability to choose which is appropriate in a given design.**
  - **make the choice an explicit design decision**

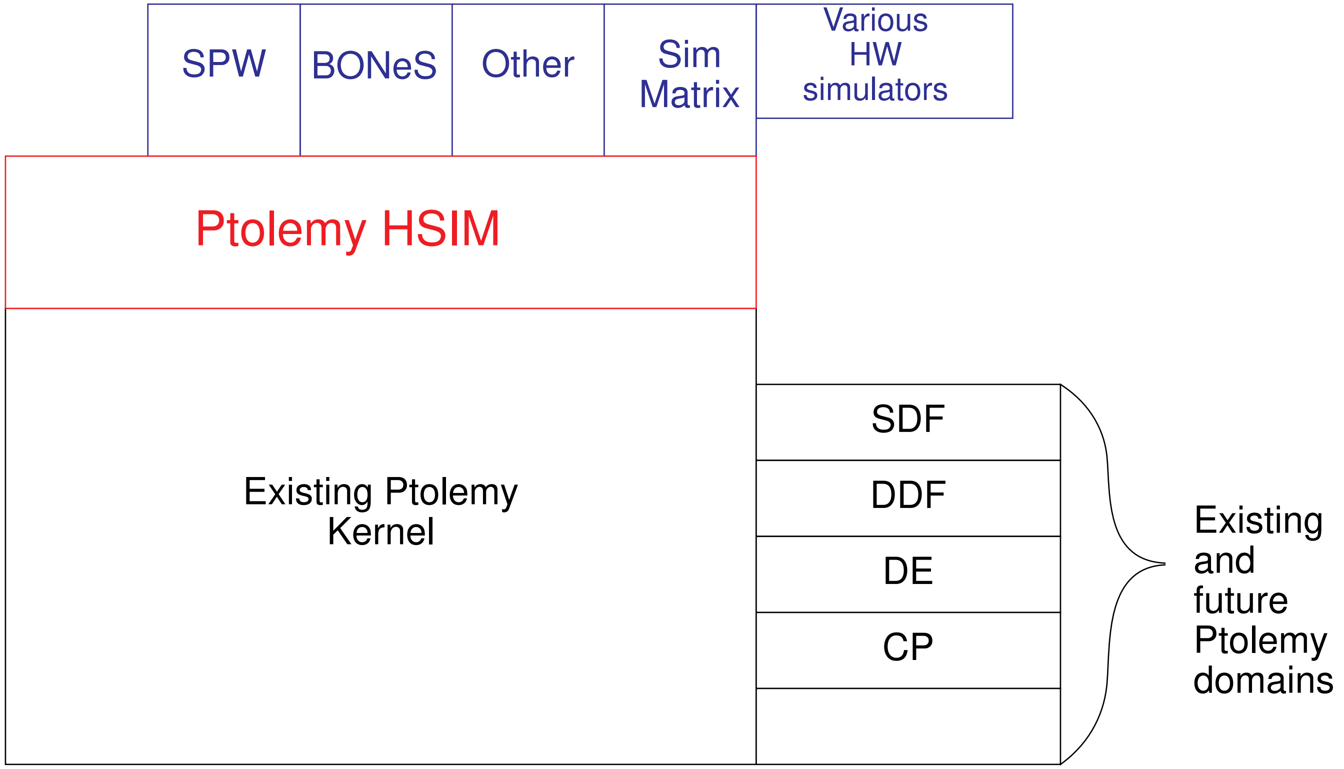
# Capabilities Needed for Heterogeneous Design

- Support arbitrary combinations of designs from multiple tools - using hierarchy and heterogeneity.
- Provide for flexible semantic mapping at heterogeneous boundaries.
- Must be efficient and offer a cost-effective solution for integration of high-level design tools.
- Should be easy to use.

# What is Ptolemy HSIM?

- A co-simulation mechanism that offers efficient heterogeneous interoperability to high-level design tools.

- Ptolemy HSIM includes additions and extensions to the kernel constructs.



# Value of Generalized Heterogeneous Design

- **Benefit from using the right tool for the job.**
  - natural form of expression
  - efficient simulation
  - possibility of efficient synthesis
- **Gain ability to mix widely varying levels of abstraction throughout the entire design process.**
  - improved prototyping at system level
  - flexible vehicle for validation at all levels
- **Leverage from specialization of successful commercial tools.**
  - libraries, computational models, analysis and visualization tools
- **Encourage reuse of existing tools and designs.**
  - a cost effective approach

# Focus on Heterogeneity

**BDT is focusing on Ptolemy's support for heterogeneous design.**

- **Today's systems are increasingly complex and are best described using multiple computational models.**
  - **designers gain leverage when working with a mixture of specialized tools applied at higher levels of abstraction.**
- **A primary technical contribution from the Ptolemy research is support for heterogeneity.**
  - **commercial high-level design tools offer little interoperability**

# BDT and Lockheed-Martin RASSP

Under RASSP, BDT is leveraging UCB Ptolemy concepts and software to bring heterogeneous capabilities to existing high-level, commercial system design tools.

- BDT has developed a heterogeneous co-simulation mechanism for use with existing commercial or research high-level design tools (including Ptolemy!).
- We call our Ptolemy-based, tool-independent mechanism Ptolemy HSIM.
- For RASSP, we are using it to integrate tools within the Enterprise framework for co-simulation.

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