



LSI LOGIC®

**Power characterization,  
Power management, and  
Design Data communication  
requirements  
supporting the Consumer and Storage  
Industries**

**– an LSI viewpoint toward tool and data support**

**Dr. Gary S. Delp**  
**Distinguished Engineer, LSI Logic**

25  
YEARS

# Purpose and Agenda

- To provide one view of the focused requirements for management of the design aspect: POWER

## Agenda

- Key Messages
- LSI's interests and processes
- Requirement: IP Reuse
- Requirement: Characterization
- Requirement: Design Flow Control
  - Synthesis
  - Simulation
  - Timing closure
- Management
- Communication/Transport
- Summary

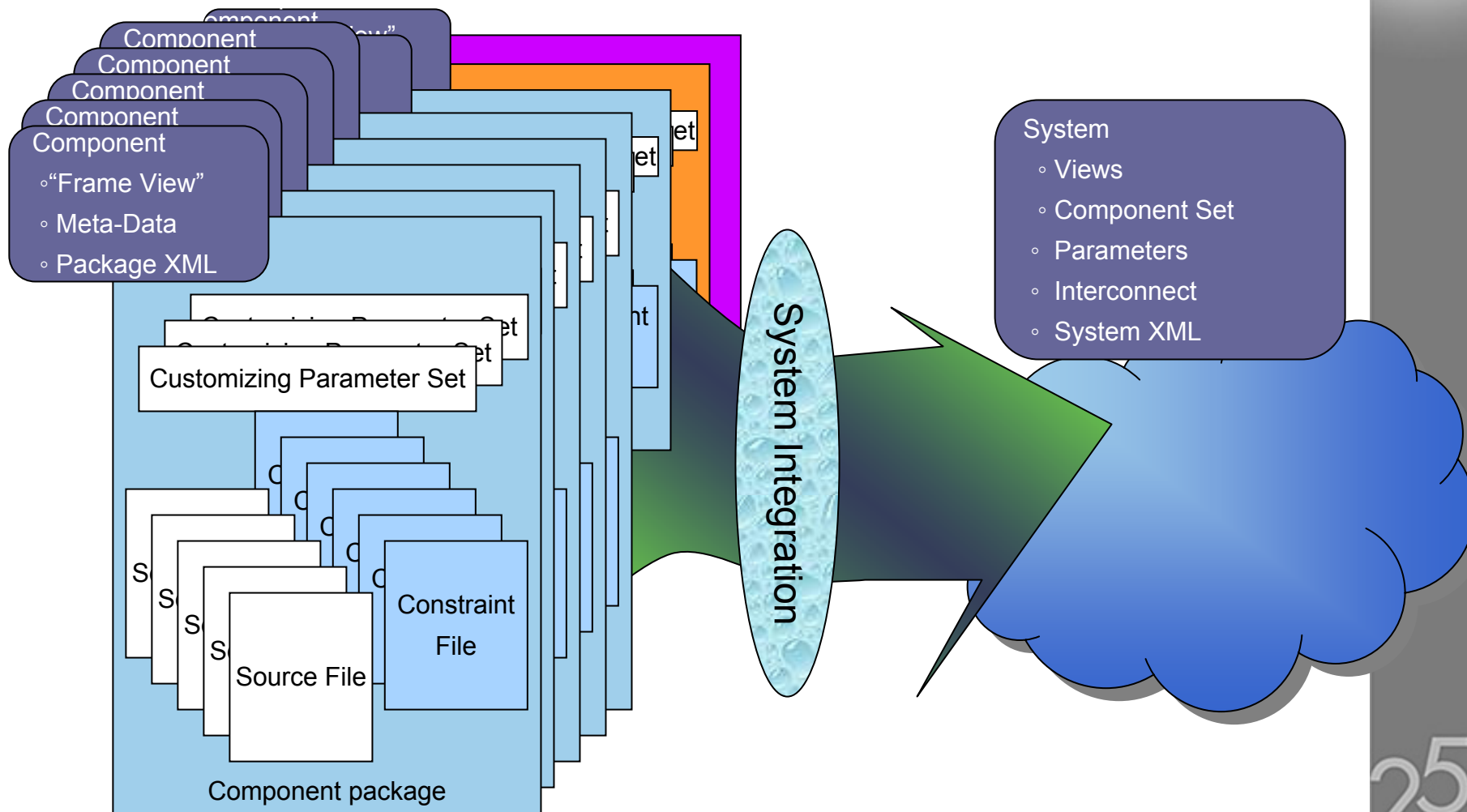
# Key Messages

- LSI customers in Storage and Consumer applications view the management and reduction of power as one of their key challenges.
- LSI is working with the EDA and IP vendors to simplify the characterization and management of power in systems.
- Where the progress is sufficient, LSI supports the standardization of these descriptions so that we and our customers can work across tool sets, focusing our energy instead on solving problems for our customers.
- There are different requirements for the characterization of:
  - Technology – PVTV modeling process voltage temp & back bias
  - Configurable IP parameterized based on frequency mode pvtv
  - Systems
- There are different management and specification requirements for leaf nodes (internal or embedded structures) and composed systems.
- Liberty (.lib / OMC) is an excellent base for Modeling.
- SPIRIT meta-data packaging is an excellent base for transporting characteristics of configurable IP

# LSI's interests and processes

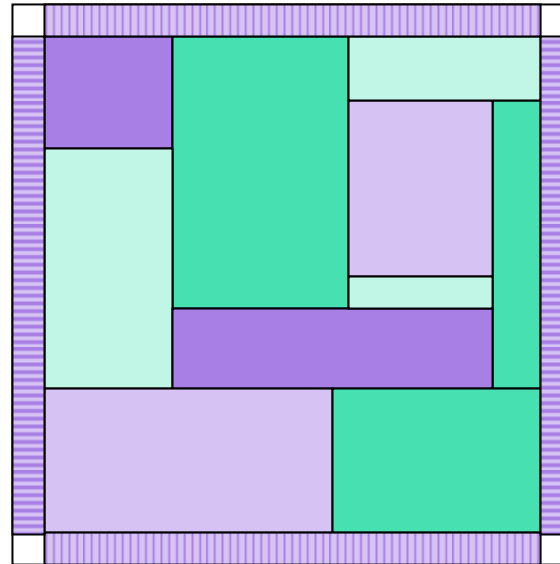
- LSI focus Today: Storage and wired consumer applications
  - You will hear many stories for the need for expanded battery life
  - Wired application have power concerns driven by
    - Data center power density
    - Cooling needs
    - 1 watt -> \$3/year
  - Consumer applications driven by green requirements
    - Instant on – state holding off
    - Placement of components
    - Burgeoning functions

# Communications and Transport



# System Aspect Overlays

- Layout
- Algorithm
- Implementation
- Power
- Source
- Temperature
- Security
- Address Space
- Documentation
  - Build a toaster - reference
  - Make Toast – task
  - Think about breakfast – concept



# Requirement: Characterization

- Technology level issues
- Reusable IP level issues
- System level issues
  - Timing closure
  - Margin management
  - Validation modeling – new sources of X's
  - Utilization / duty cycle

# Summary

- Power is an important/Critical Aspect of system Design/Management
  - Power is just 1 aspect of many
  - Meta-data and customization are a potential solution
- Wired devices have power issues