Variability Panel

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Who is responsible for Library Quality

- **This is fundamentally a business/contractual question**

- **ASIC**
  - Owns flow and libraries responsible to make a working chip
  - Guard-band versus reliability / yield made by the Asic Vendor

- **Fabless but Customer Owned Tooling**
  - Customer makes the library and the flow and owns the quality
  - Customer owns the guard-band versus reliability / yield in partnership with fab
  - Fab agrees to make geometries within a certain error
  - Ownership of the spice model of the transistor quality is usually the foundry
  - Pre variation this was clean
  - Now the fab must control variation in some workable way
    - Simplex, TSMC, ATI partnership circa 2001 on lithography effects

- **Own Fab**
  - Internal problem but similar to COT between Fab and Library teams
  - Easier to get custom recipes in the process

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Delay versus constraint variability

- It is easy to add guard-banding at every level

- This is very dangerous because when timing won't close and the inevitable desire to reduce the guard-band comes, we need to know where the guard-band is

- Delay calculation should match spice as closely as possible with absolutely minimal guard-band
  - This is the place to do everything possible to model variation and every effect possible
  - Keep the effects separable when possible for traceability in order to be sure to avoid double guard-banding the same thing.

- Constraint calculation is the place to add guard-band, one place

Proprietary Delay Models

- Standards are great when the state of the art has stabilized enough such that a 'standard' solution is acceptable

- For technology in flux, proprietary models lead the way and become future standards

- If the current standard models are not enough to do what needs to be done then we have to use proprietary models

- 'Not enough' can be spun by marketing, be real

Proprietary Delay Models

- ## Do we need tighter integration between Spice and library characterization?
  - If its needed for the next bullet, not clear

- ## Will we be able to do statistical characterization with reasonable accuracy and runtime?
  - So far we have not solved this problem in a workable way due to the resulting data size and use of that data, not the characterization runtime

- ## Do we need more waveform parameters for constraint characterization?
  - Yes, especially for highly resistive and noisy nets