Feedback from the cmrf8sf ASIC Designers Fest

DESY
June 9th-10th 2008

Aims &Goals

Avoid redundant efforts

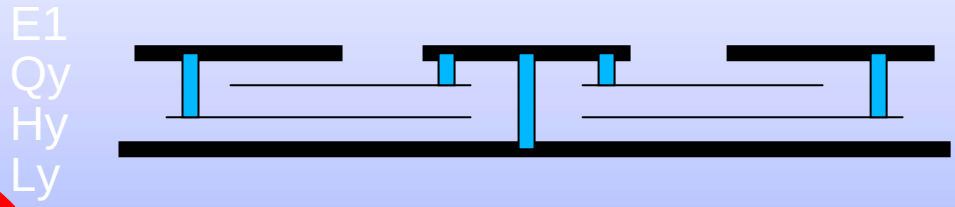
"REPITA NON PLACENT" or

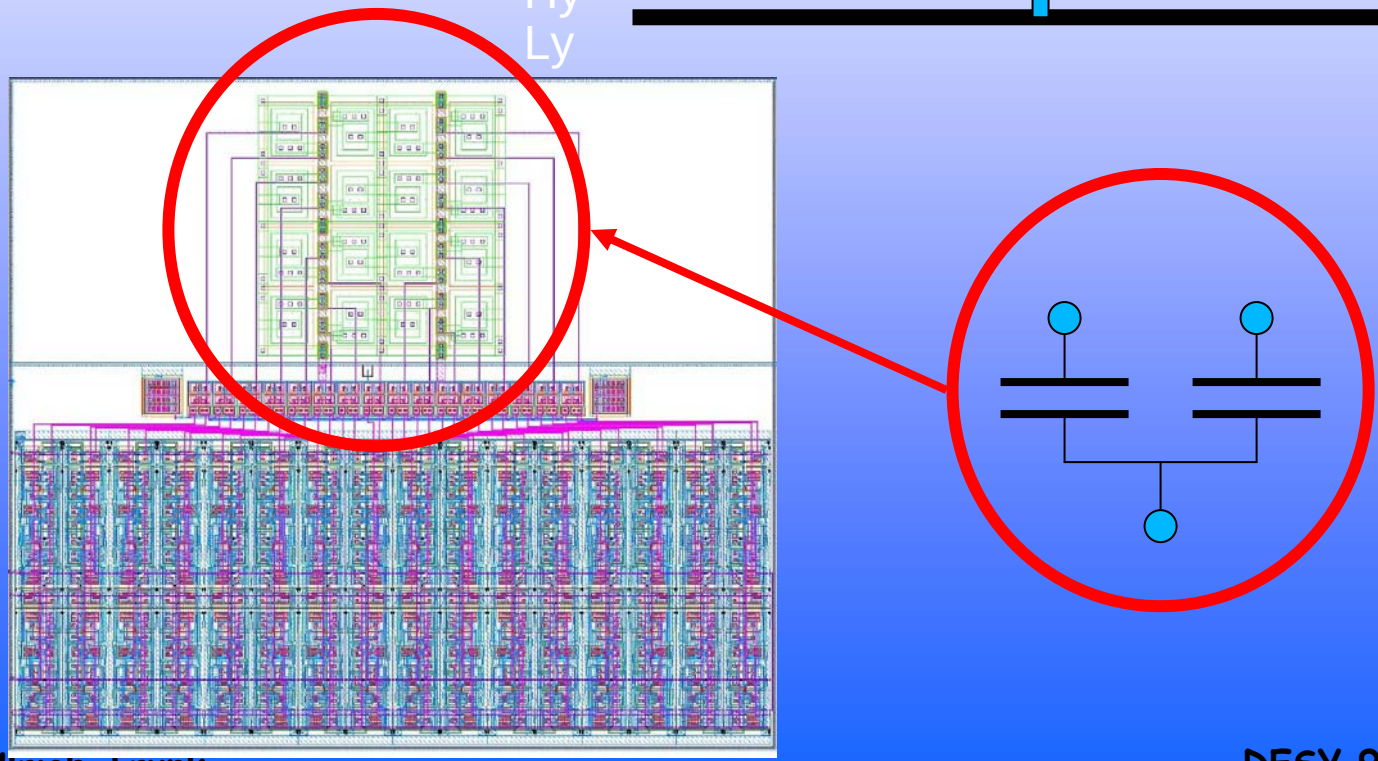
"Don't re-invent the wheel"

- By sharing the results of distributed drudgework
  - Library development
  - LVS deck generation
  - Checking procedures
- By efficient communication of
  - bugs and problems and the related
  - workarounds and fixes

Bug in Calibre LVS

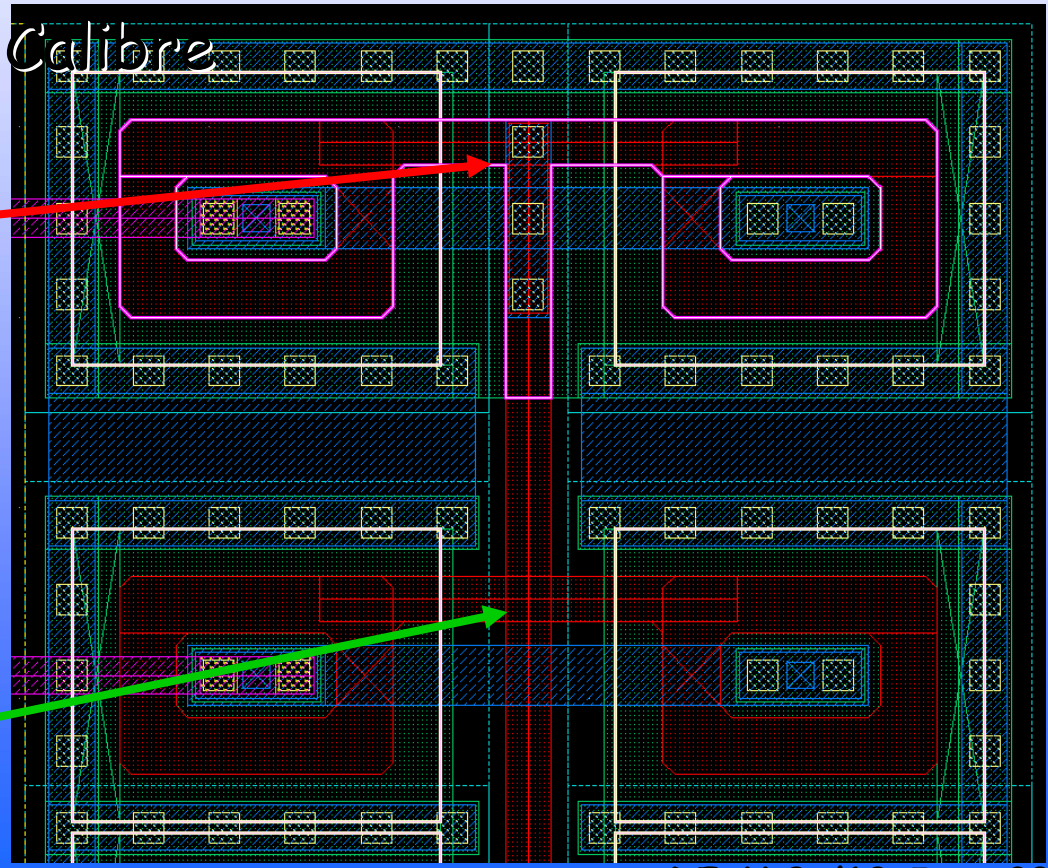
- (Dual-)MIMCAPS with a common LY electrode are not extracted





Bug in DIVA & Assura LVS

- ELTs connected by PC over RX are not recognized
- Not checked with Calibre



Rules & Libraries

- Extraction rules for enclosed transistors
- Enclosed transistor library
- Pads & I/Os
- Digital std. Cells
- Other common cells

Extraction & LVS of enclosed transistors

- DIVA ELT extraction rules from RAL/CERN exist for IBM cmos6sf
  - Relied on additional layers
- Assura ELT LVS rules exist in HD/MA (Group of P. Fischer) for UMC 180nm technology
  - Further information on that required
- Calibre ELT LVS rules exist for IBM cmos6sf

- Currently no rules available for CMRF8SF

Enclosed transistor library

- Includes all basic FETs:
  - lvtnfet
  - nfet
  - lpnfet
  - dgnfet
  - zvtnfet
  - zvtdgnfet
  - lvtpfet
  - pfet
  - lppfet
  - dgpfet

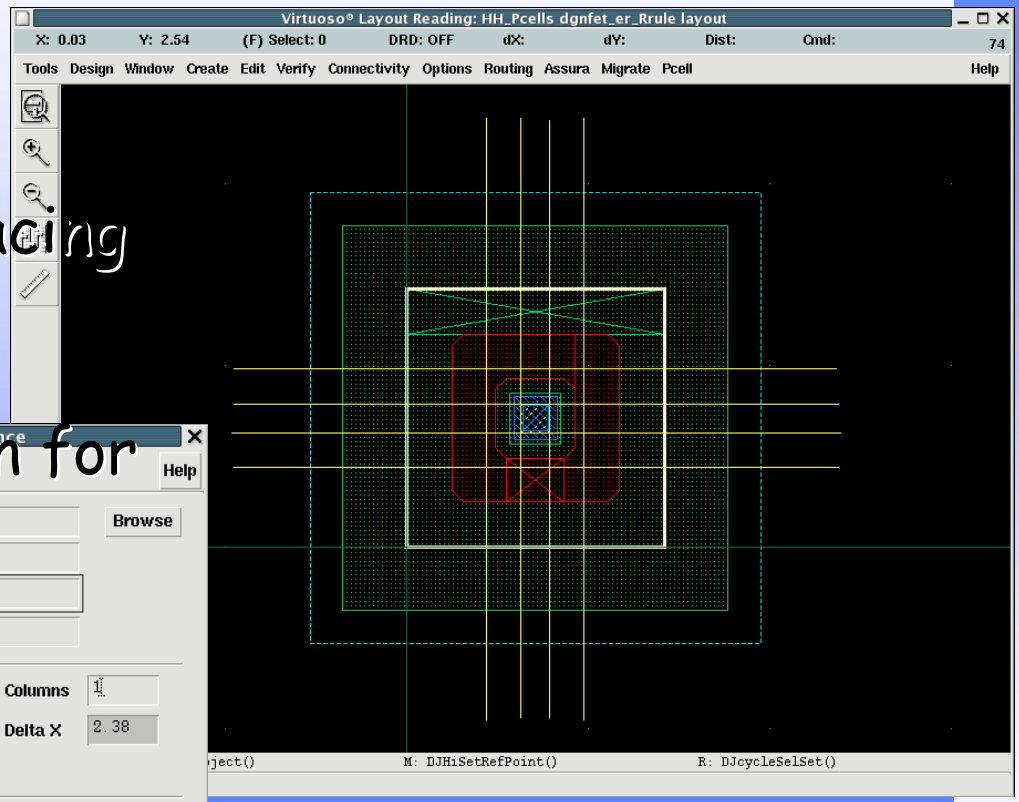
Exists, but

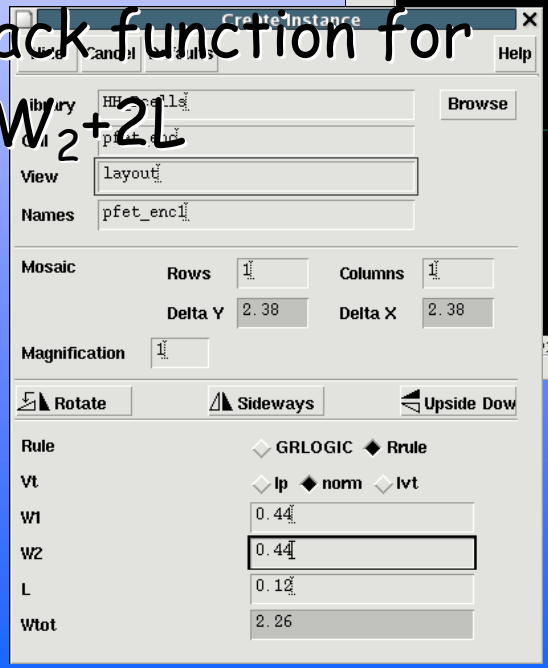
Optiona l contacts desirable

ELT pcell example

Ultra-pcell selection of

- RRULE or GRLOGIC spacing
- V_{th}-selection
- Simple callback function for $W_{tot}=2W_1+2W_2+2L$





Do we need a library with radiation hard logic gates?

- Radiation hardness
  - HPAD:
    - 1GGy (100Grad) @ sensor
    - 80% efficient
    - 20MGy @ ASIC
- Leakage currents
    - Driving strength
    - Timing
    - Power consumption
- YES!

Common analog cells

- Comparator
- PP-buffer
- ZVT-buffer
- DACs
- Quasi-analog cells
  - Level shifter 1.2V-2.5V
  - Delay element (400ns, I²C)
  - OD-I²C I/O pads
  - LVDS I/O

Conclusions

What-Who-When

• CMRF8SF-Wiki	HPAD (M.K)	July 08
• DRC-Procedure	HPAD (M.K)	July 08
• LVS-Procedure	HPAD (M.K)	July 08
• ELT-Extraction (Assura)	LPD (F.K.)	end 08
• ELT Pcells with contacts	HPAD (U.T.)	Q4/08
• ELT Std. cell lib & synthesis files	LPD (F.K.)	end 08
• Common analog cells		
• Pads	HPAD (B.S.)	Sept. 08
• LVDS	HPAD (R.M.)	end 08
• Level Shifter & Open Drain I/O	HPAD (U.T)	end 08
• Delay (400ns, I^2C)	HPAD (U.T)	end 08

Follow-Up tentatively scheduled for 6.-7. November at MPI Munich