MAGIC VIEWS
VS.
ACTUAL GDSII/CIF

Magic Views vs. Actual GDSII/CIF

- All features in magic are rectangles on a 2-dimensional lambda grid
- However due to either essential requirements of the fabrication technology, or perhaps for optimization purposes, some features are modified when the final chip design is being prepared for fabrication
- The magic technology file specifies all details of the process necessary for design and GDS/CIF
  - In 2017, the EEC116 tech file is located in: /software/magic/116/magic/lib/magic/sys/SCN6M_DEEP.09.tech27
  - Look for commands such as *grow, shrink, squares,* etc.

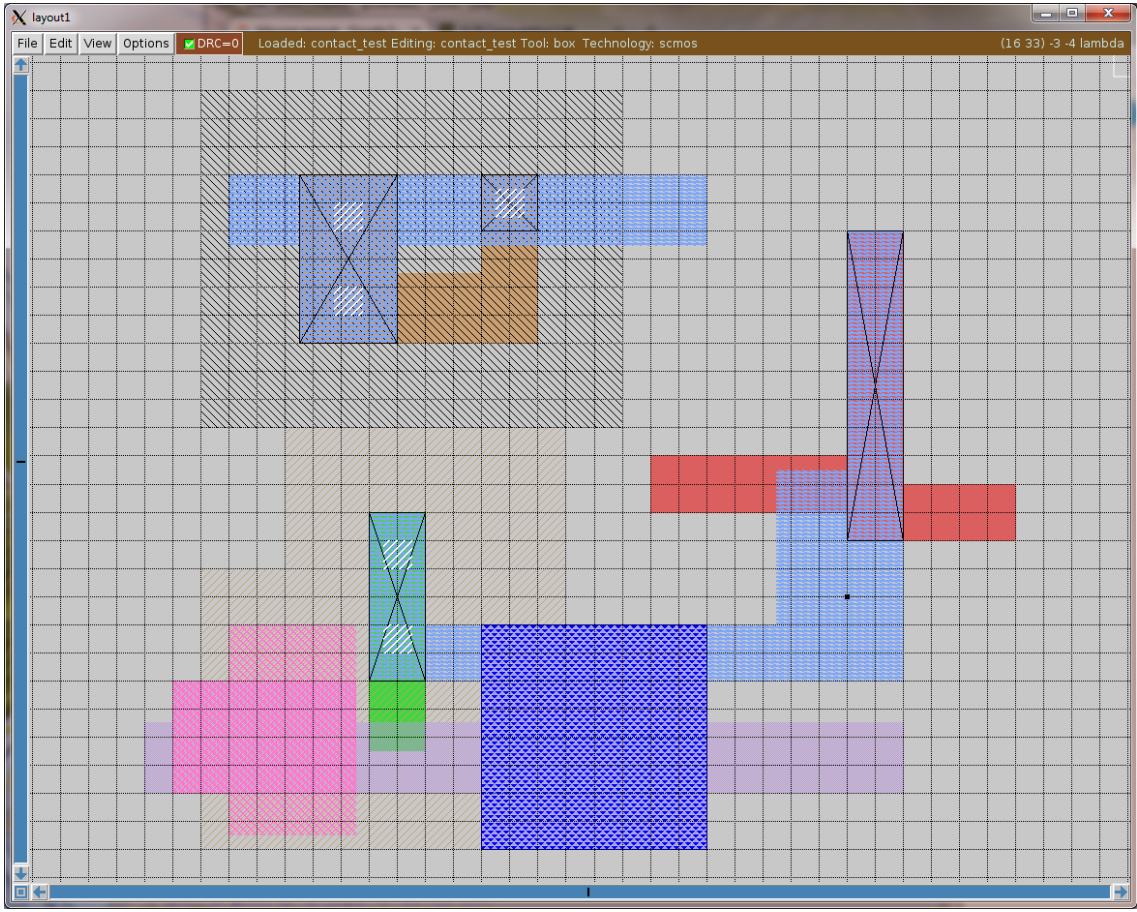
Generation of "Off-Grid" Features

- As one example, contacts and vias have permitted sizes that are only one specific size
- On the following slides are 4 different examples showing contacts/vias between different materials
- This is also an excellent example of how to optimize the sizing of critical contacts and vias for lower resistance
- Try the "cif see" commands in magic
- Side note: magic uses the **`squares`** command to solve the problem of generating exact non-lambda-grid sized contacts/vias. The command is in the SCN6M_DEEP.09.tech27 file and has the following syntax:

  `squares` *`border size separation`*

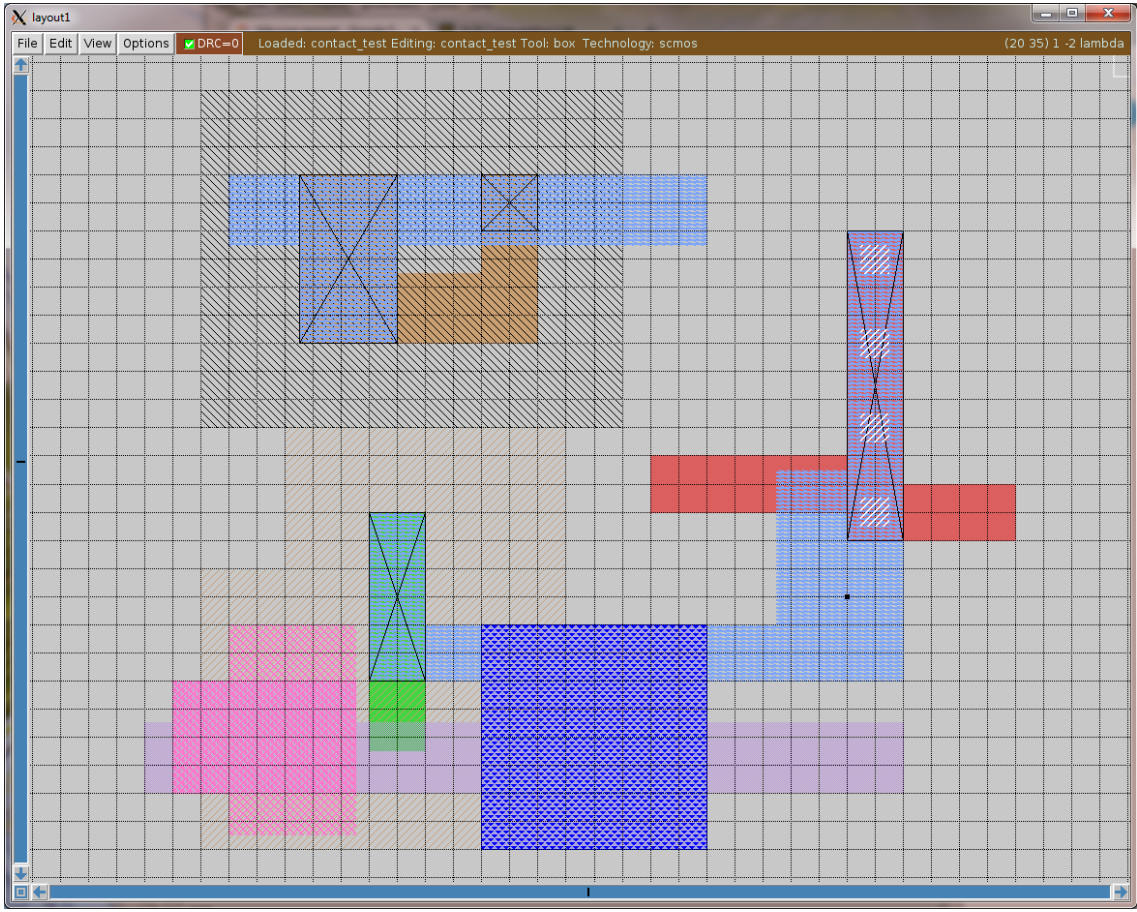
CCA: Actual NDC and PDC

- The same mask layer is used for both ndiff-m1 contacts and pdiff-m1 contacts—makes sense when you think about it
- **`:cif see CCA`**
- **`:fee cle`**
  - "feedback clear"
- **`squares 09 18 36`** (with ndc, pdc)



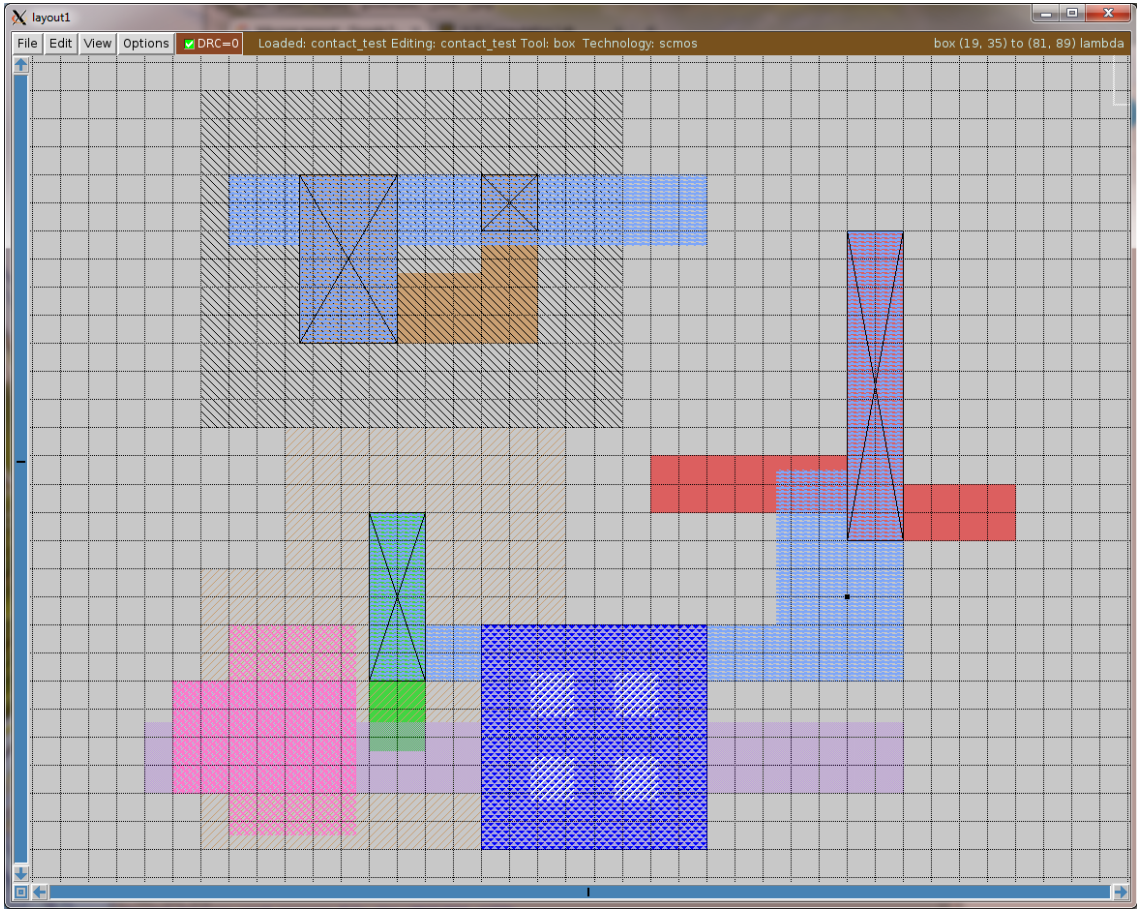
CCP: Actual Poly-M1 contacts

- Polysilicon-M1 contacts
- **`:cif see CCP`**
- **`:fee cle`**
  - "feedback clear"
- **`squares 09 18 36`**



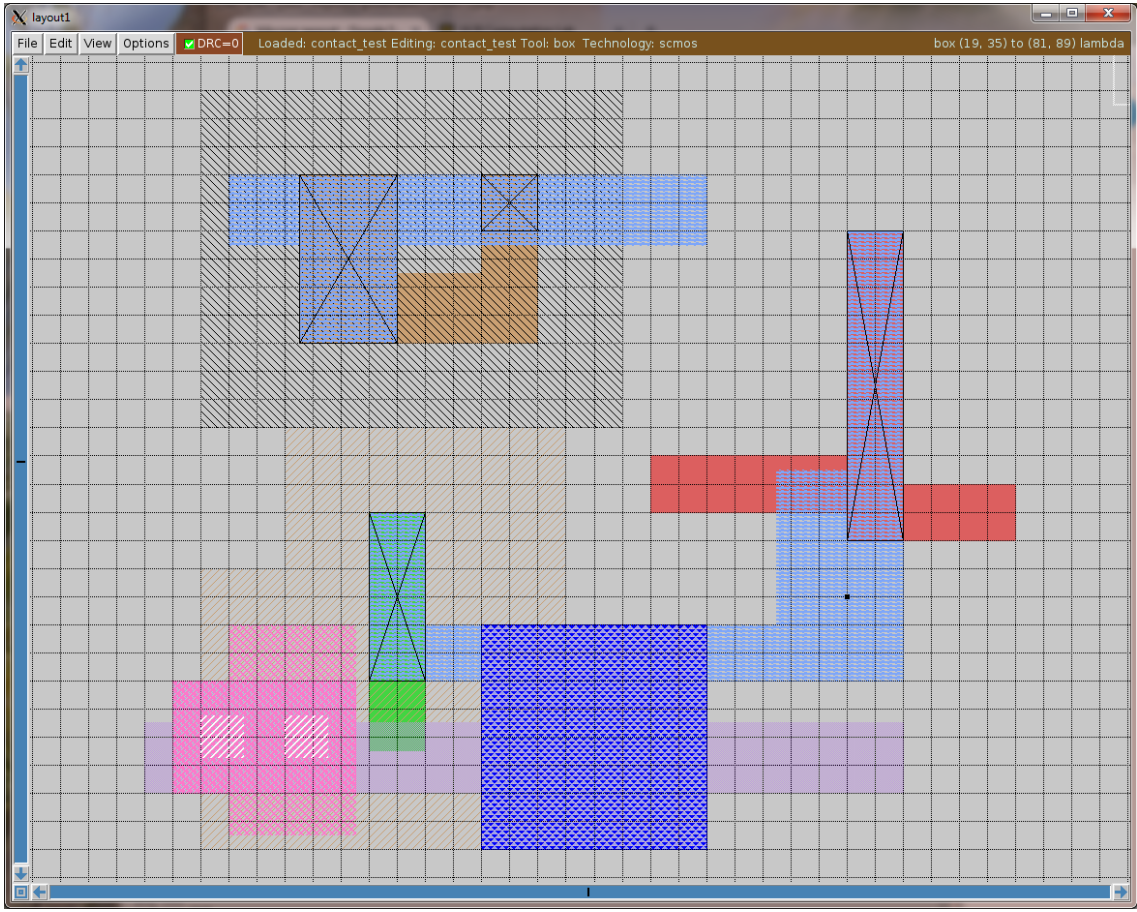
CV1: Actual M1-M2 contacts

- Metal1-Metal2 contacts
- **`:cif see CV1`**
- **`:fee cle`**
  - "feedback clear"
- **`squares 09 27 27`**



CV2: Actual M2-M3 contacts

- Metal2-Metal3 contacts
- **`:cif see CV2`**
- **`:fee cle`**
  - "feedback clear"
- **`squares 09 27 27`**



A Number of Layer Names

- Search for "cifoutput" in the SCN6M_DEEP.09.tech27-116 file
  - CWN nwell
  - CWP pwell
  - CAA ndiffusion + pdiffusion + NMOS + PMOS + ndc + pdc + ...
  - CPG polysilicon
  - CM1—CM6 metal 1 – metal 6
  - CCA ndiff contacts and pdiff contacts – M1
  - CCP poly – M1 contacts
  - CV1 M1 – M2 contacts
  - CV2 M2 – M3 contacts