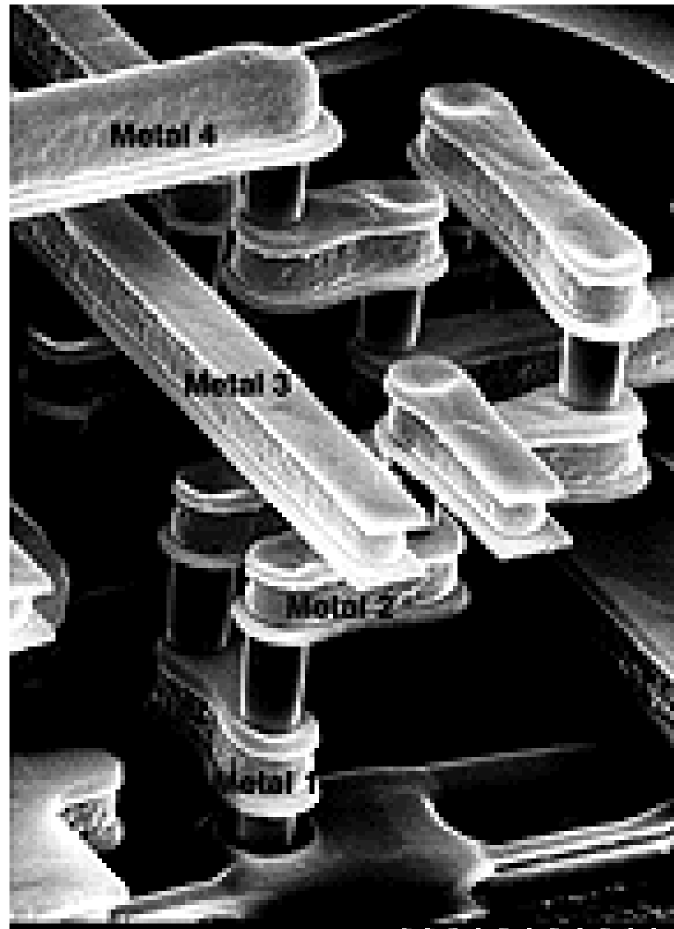
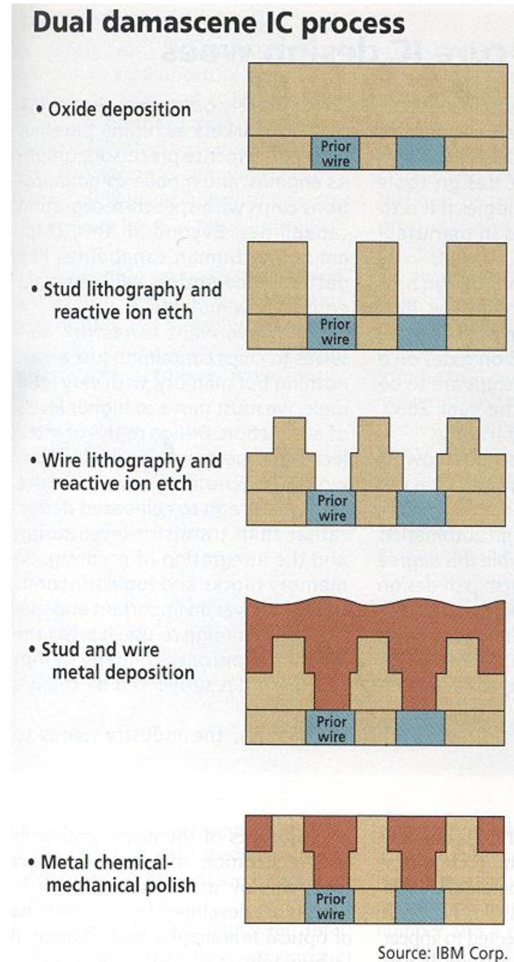
ADVANCED METAL INTERCONNECT EXAMPLES

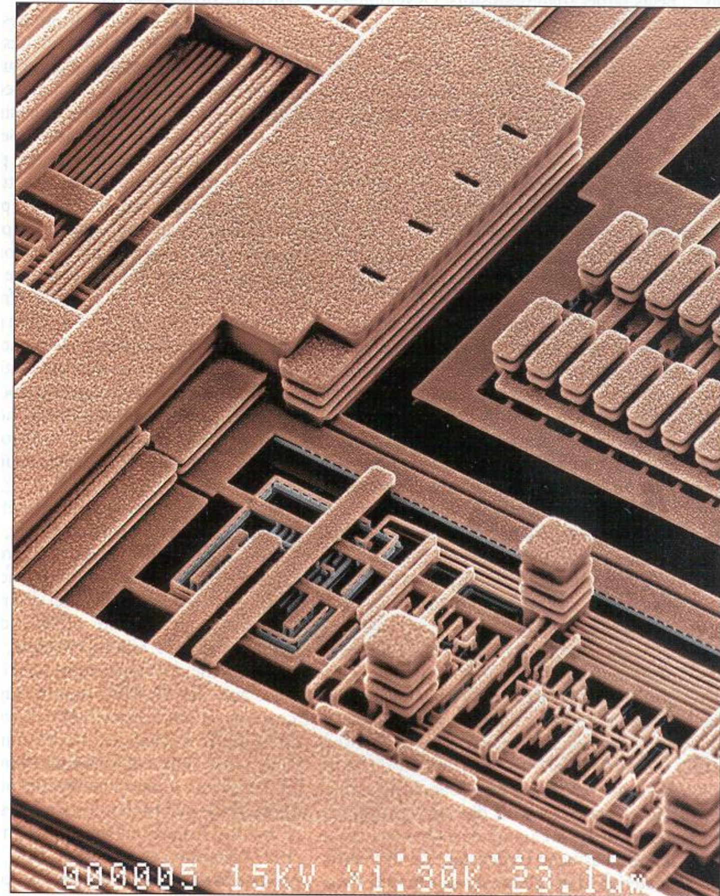
Four Levels of Metal Example



Source: Digital Integrated Circuits, 2nd ©

Advanced Metallization





Source: Digital Integrated Circuits, 2nd ©

Microprocessor Interconnect

- Microprocessor interconnect
- 8 levels of metal
- Steadily increasing pitch and thickness with higher levels for higher performance

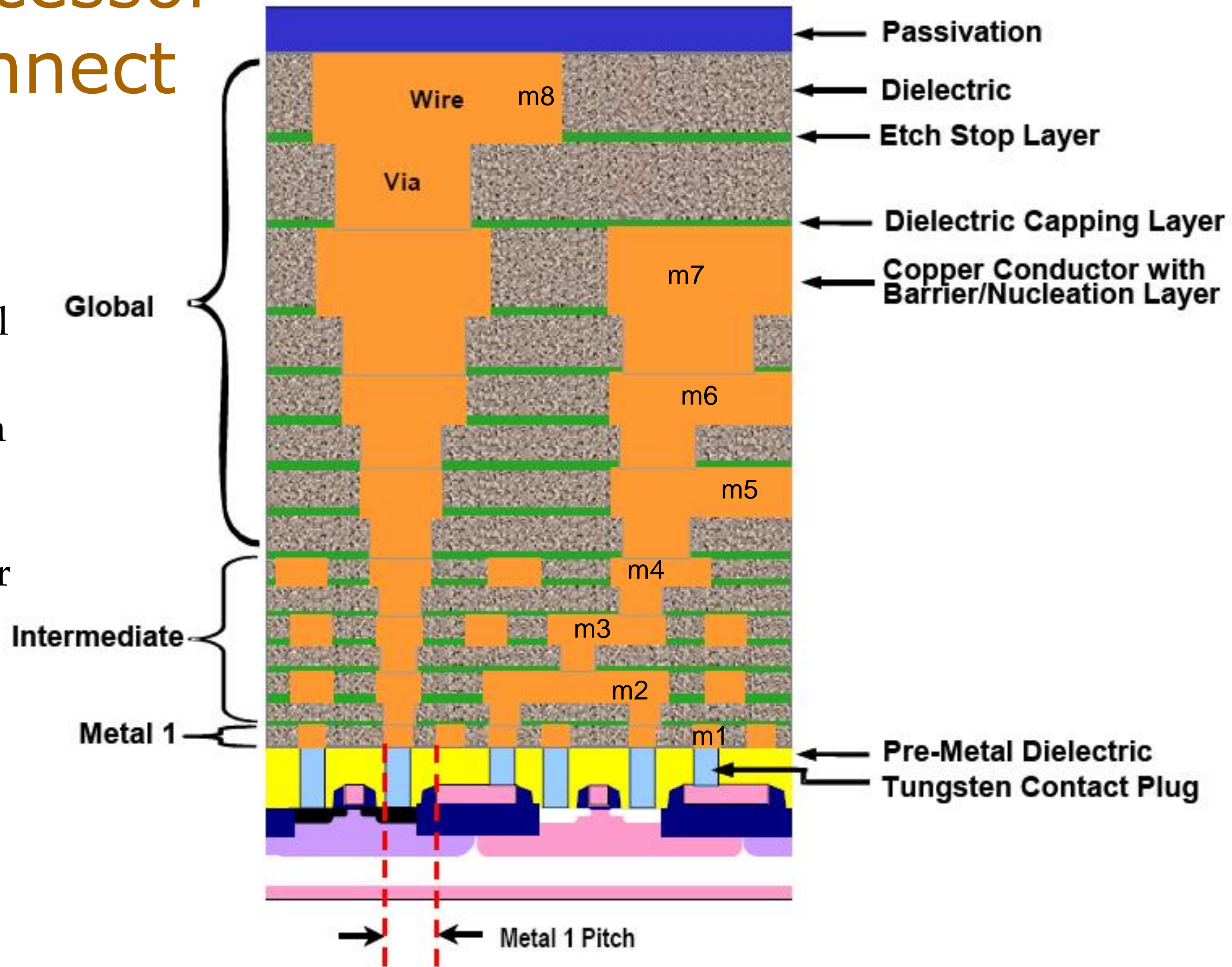


Figure 70 Cross-section of Hierarchical Scaling—MPU Device

Source: ITRS Interconnect, 2005

ASIC Interconnect

- Application Specific IC (ASIC) interconnect
- 8 levels of metal
- More regular structure
  - Semi-global is 2x Intermediate pitch
  - Global is 4x Intermediate pitch

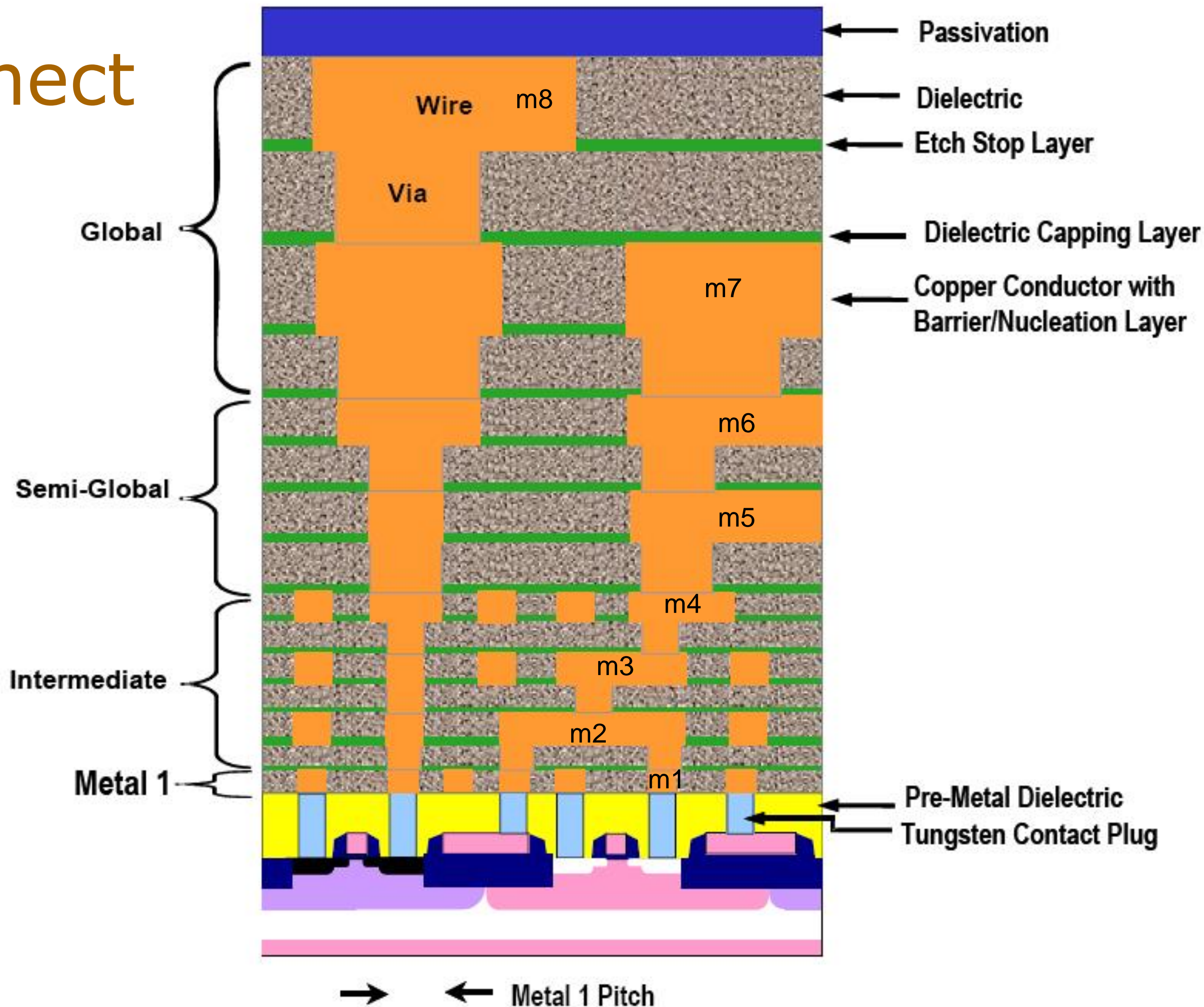
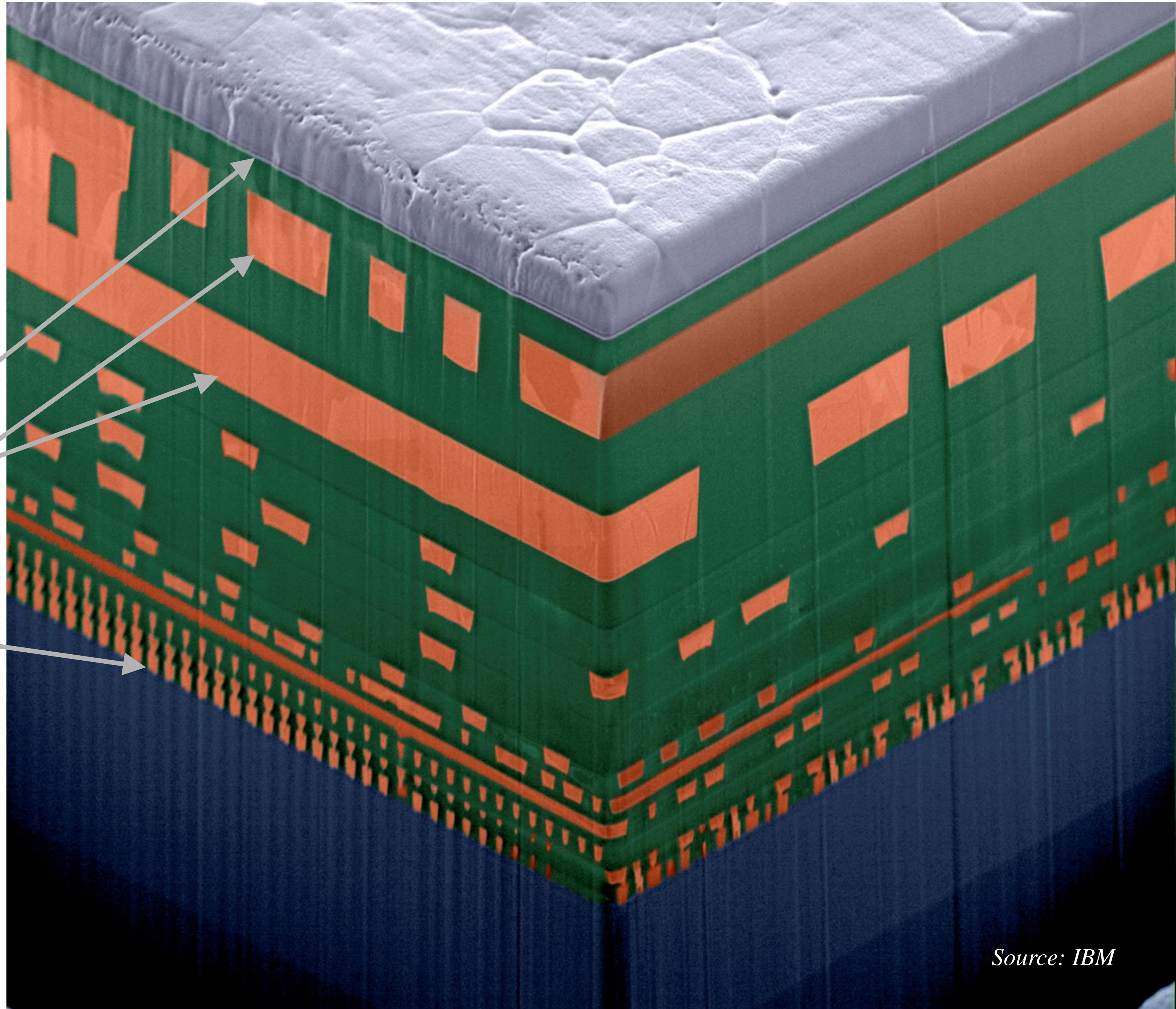


Figure 71 Cross-section of Hierarchical Scaling—ASIC Device

Source: ITRS Interconnect, 2005

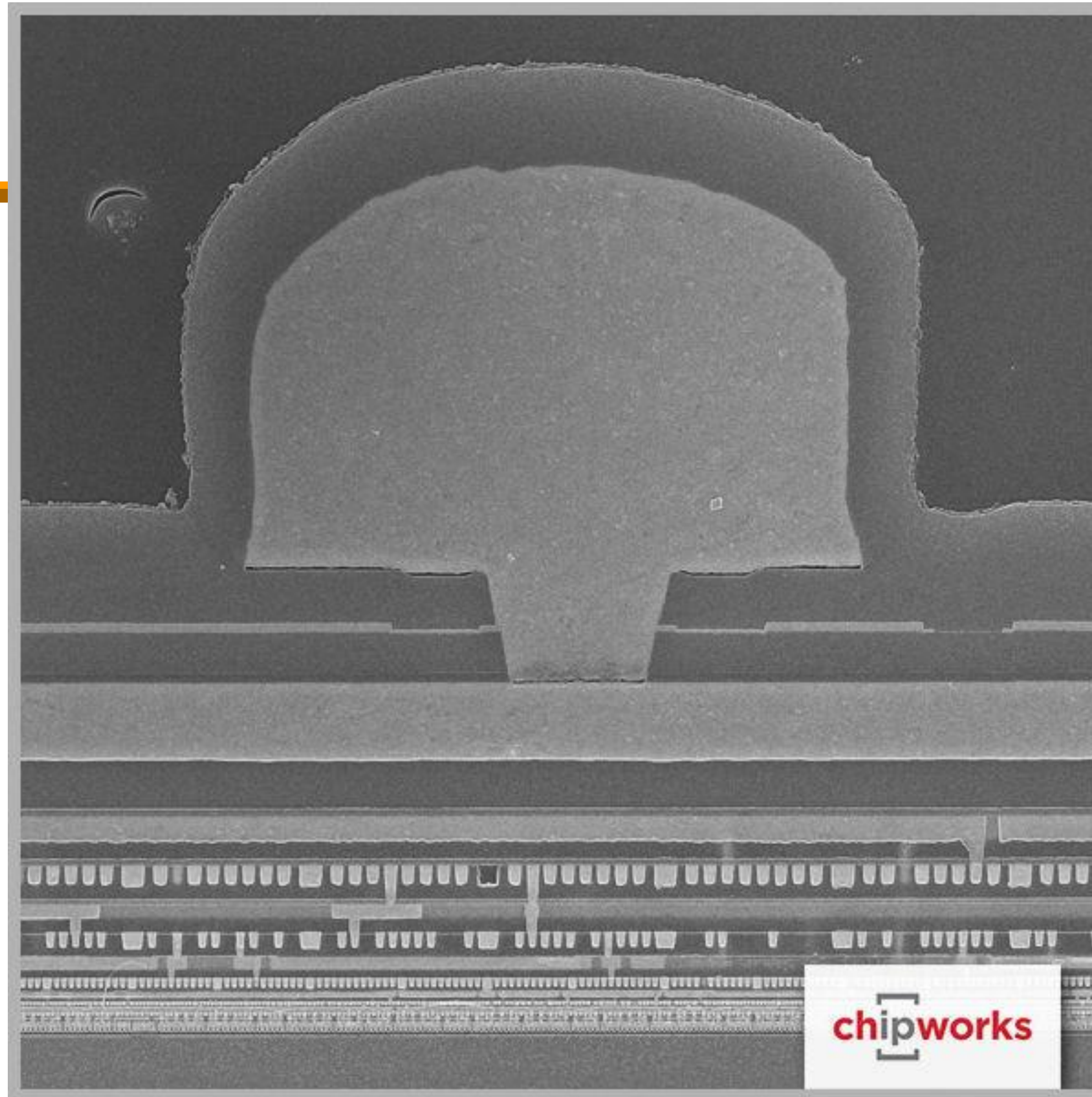
IBM 90 nm

- 64-bit micro-processor
- (1) Al(Cu) [top]
- (2) 6x Cu
- (3) 2x Cu
- (5) 1x Cu
- (1) W local [bottom]
  - 0.12 μm width & spacing



Intel 14 nm

- Broadwell Core M
- 13 metal layers
- Super thick top level metal
- MIM-capacitor layer under the top level metal



[Chipworks]

Intel 14 nm

- Broadwell Core M
- Detail of metal layers 1–12