Origins of Timing Noise
PLL Noise Characteristics

- Everything adds noise
  - Reference, PFD, charge pump, supply voltage, ...

- Look at jitter TF for each one
  - And actual cause of noise (jitter)

Reference Jitter TF

- Reference jitter TF:
Example Reference Noise Spectrum

PFD Jitter

- Why does a PFD add jitter?
Estimating Jitter in “Digital” Gates

PFD Jitter TF
VCO Noise TF

Implications on PLL Design
Implications on PLL Design