Memory Applications with Xilinx FPGAs

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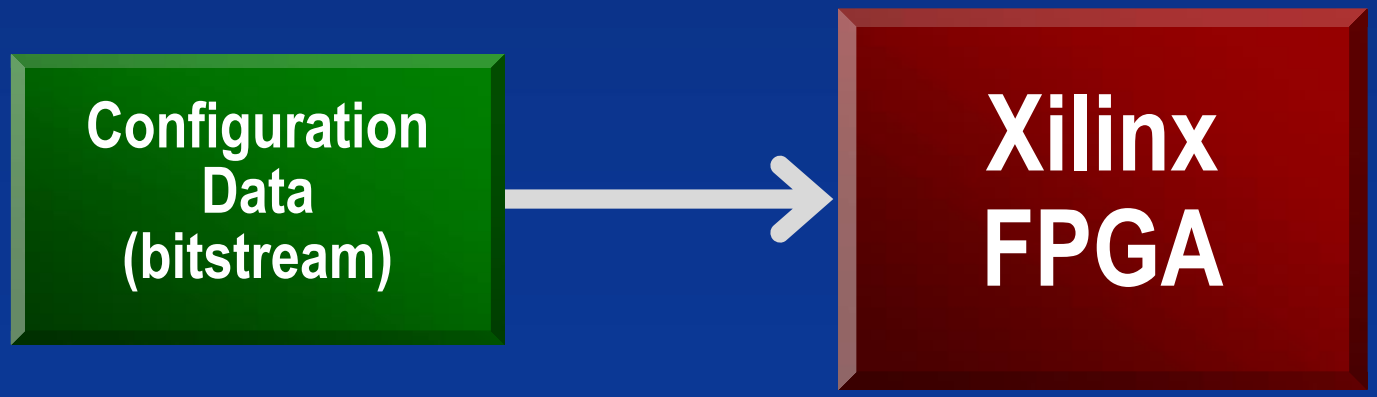
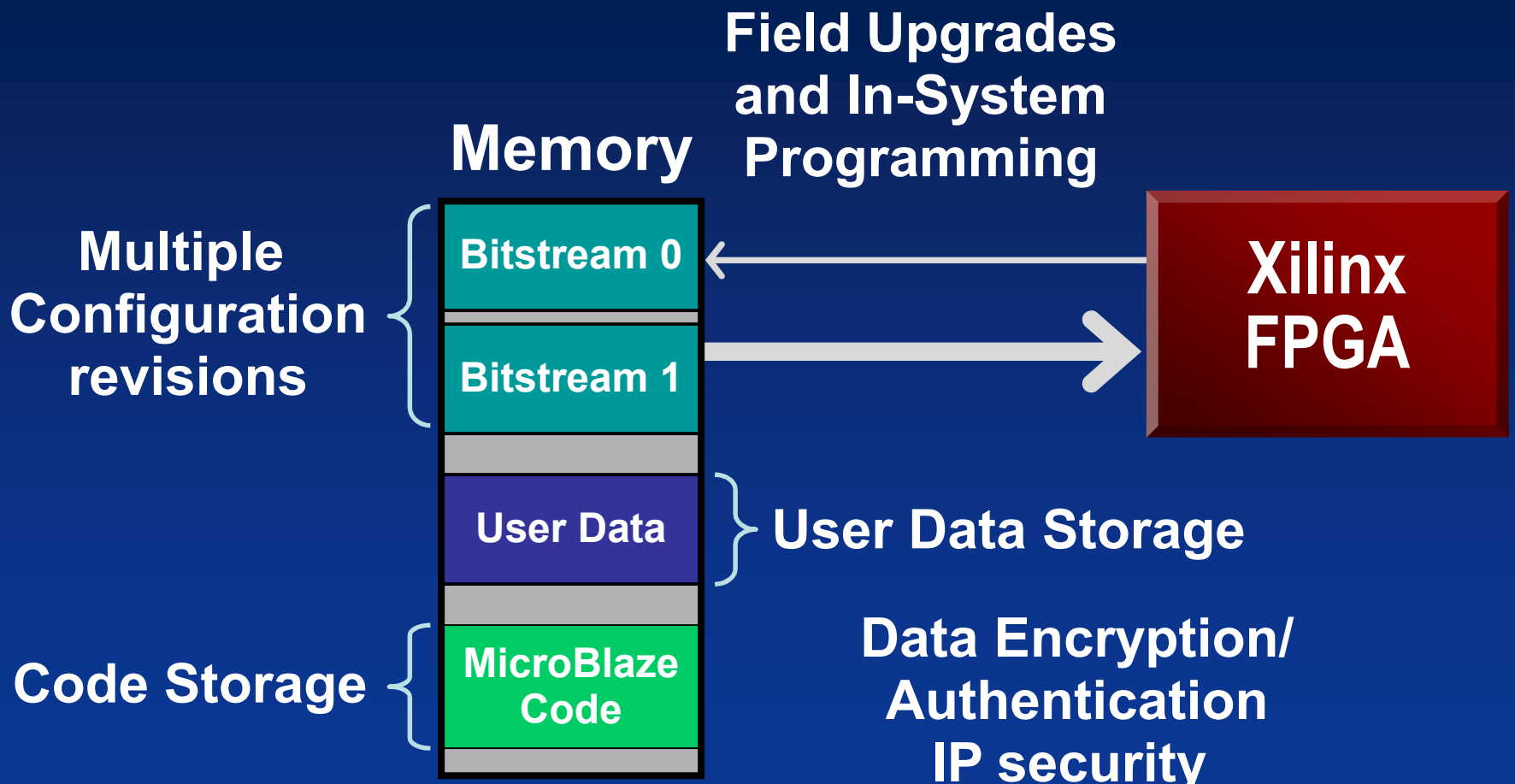
What happens to the FPGA after power up?

- FPGAs are volatile by design
- FPGAs needs to receive “configuration data” that defines the specific resources and interconnect used for a design
  - The FPGA can actively obtain its data from a memory device or
  - The FPGA can be sent data from a microprocessor or similar source
- FPGA configuration data is often stored in flash memory
- Once all configuration data is received, a short startup sequence in the FPGA makes the device operational



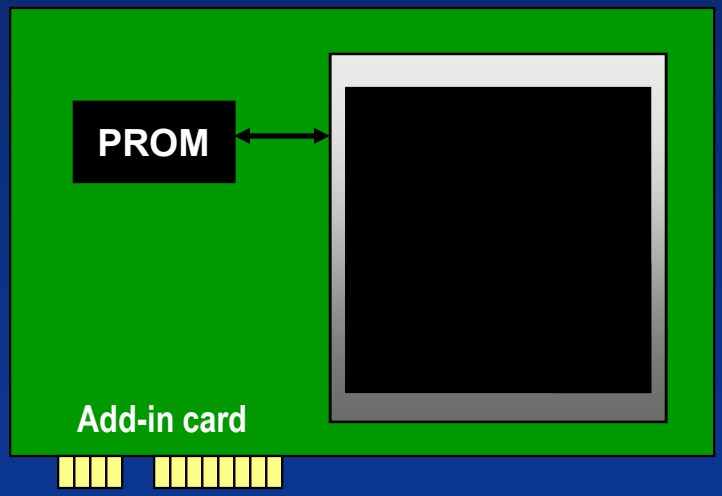
What is memory used for after configuration?



Multiple uses for flash even after initial configuration

Fast Configuration and Instant-ON Applications

- PCIe applications require FPGA to load in <100ms
- CAN Network application require FPGA to load in <100ms
- Handheld and consumer applications require fast start-up
- High speed flash, QSPI and burst Parallel NOR help FPGAs meet fast start up requirements



High speed flash: QSPI and burst Parallel NOR help FPGAs meet fast start up requirements

Partial Reconfiguration

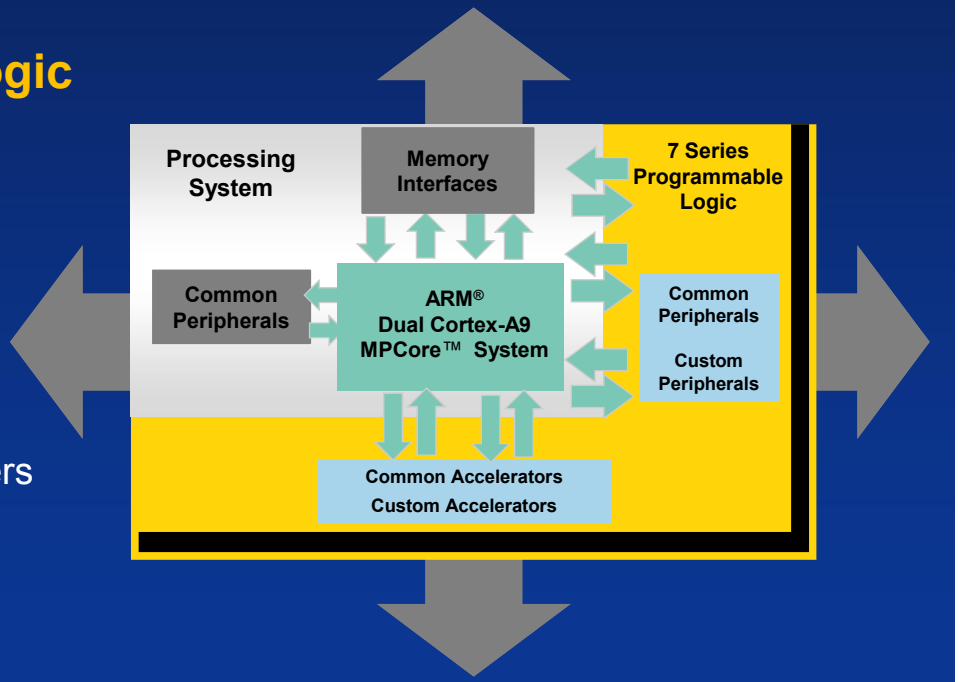
- Partial Reconfiguration dynamically modifies logic blocks while the remaining logic operates without interruption
- Store partial bit files in flash memory
- SWAP (*Size, Weight, and, Power*)
- Perform multiple tasks on fewer or smaller FPGAs
- Power Reduction
  - Via smaller or/and fewer devices
  - Swap out power-hungry tasks

Unique Xilinx FPGA feature brings flexibility, cost, and power reduction

Zynq-7000 Family Highlights

- **Complete ARM®-based Processing System**
  - Dual ARM Cortex™-A9 MPCore™, processor centric
  - Integrated memory controllers & peripherals
  - Fully autonomous to the Programmable Logic
- **Tightly Integrated Programmable Logic**
  - Used to extend Processing System
  - Scalable density and performance
  - Over 3000 internal interconnects
- **Flexible Array of I/O**
  - Wide range of external multi-standard I/O
  - High performance integrated serial transceivers
  - Analog-to-Digital Converter inputs

Execute in place from flash memory



Flash memory utilized for XIP with embedded processors in the FPGA

7 Series FPGA Family Highlights

Next Gen Wired Communications

Next Gen Wireless Communications

High Performance Computing

Consumer

ARTIX-7	KINTEX-7	VIRTEX-7
Lowest Power and Cost	**Industry's Best Price-Performance**	**Industry's Highest System Performance and Capacity**
• Portable/handheld ultrasound • 3D cameras & camcorders • D-SLR still cameras • Software defined radio • 3DTV • Portable eReaders • Automotive Infotainment • Multifunction printers	• Wireless LTE infrastructure • 10G PON OLT line card • LED backlit & 3D video displays • Video-over-IP bridge • Cellular radio • Medical & Avionics imaging • Set top boxes • Motor control	• 400G & 100G line cards • 300G Interlaken bridge • Terabit switch fabric • 100G OTN • MUXPONDER • RADAR • ASIC emulation • Test & Measurement

Aerospace & Defense

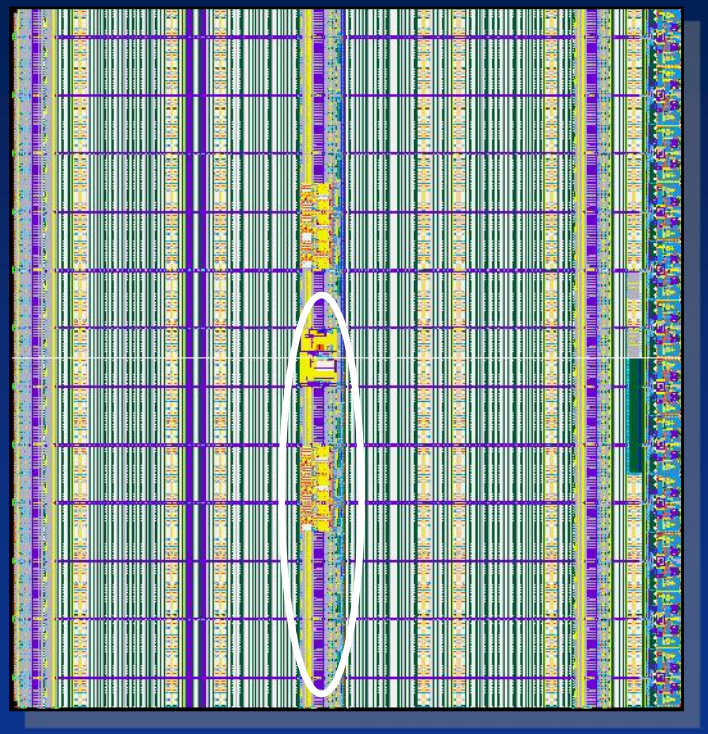
Audio Video Broadcast

Test & Measurement

Medical Imaging

7 Series FPGAs and Zynq-7000 Family Configuration Solution

- SPI x1, x2, and x4 interfaces
- Parallel NOR interface with burst modes
- NAND Interface
- Configuration via PCIe
  - Host reads flash and sends to FPGA
- Configuration via Ethernet
  - Host reads flash and sends to FPGA
- Supports configuration from processor
  - Processor reads from flash and sends to FPGA
- AES-256 bit Encryption
- Partial Reconfiguration



Xilinx gives you more flexibility with configuration solutions for all applications

Thank You