A PIE slice is a standard payload processing element designed to support an experiment to a simplified bus interface

- **Payload Interface Controller (PIC):** Standard full-featured processing board dedicated to payload application
- **Payload Interface Mezzanine (PIM):** Unique interface board for specific I/O or other payload support requirements
- The PIM stacks on top of the PIC, and both are installed into a single enclosure called a “Slice”
- Several slices constitute a “PIE stack”
- Slices are designed to stack onto each ether to create a single unit with multiple slices
- Every PIE slice provides the payload with a complete support platform including: high performance processing, complete with a BSP (Board Support Package), auto-coding support for Matlab and National Instruments high level design software, power control, power monitoring, fault detection & mitigation, telemetry, on-board data storage, high speed serial and Ethernet interfaces, support for direct downlink modulation, data encryption, and user designed hardware interfaces.

**Benefits of the PIE Approach**

- Isolate the bus from low level payload management; reduce payload burden on the bus
- Simplify bus to payload interfaces; avoid the rats-nest of adapter to adapter boxes
- Simplify bus C&DH software; no need for C&DH to perform low level payload operations
- Distributed processing approach -> higher quality, higher reliability software
- Ideal for missions with multiple, disparate payloads/experiments
- Streamlined mission development; less inter dependency between software development
- Significant reduction of payload to spacecraft integration timeline
- Recurring engineering cost (hardware and labor) limited to PIM and payload concept of operations (CONOPS)

**Flight Proven = TRL-9**

- Initial SmallSat flight unit (multiple slices inc. SSDR) successfully on-orbit and functioning for over three years
- Latest engineering units include high-performance multi-core processors, Linux BSP, SpaceWire, SGMII Gigabit Ethernet and CAN. Ideal for hosted payloads
- Next generation technology introduces advanced capabilities including secure boot, encryption, on-orbit reconfiguration, software and hardware processing accelerators
- CubeSat-variant with lower SWaP supports multi-mission busses and CubeSats supporting multiple payloads

**PIE philosophy facilitates independent evolution of PIC and PIM designs to address technology advancements in electronics, software, spacecraft and payload design**

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