Network Function Fault Isolation in a Single Address Space

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Problem

- Virtualized vs un-virtualized network functions
- Virtualized NFs - VMs and Containers:
  - Provides performance, memory, and fault isolation.
  - Incurs substantial overheads - packet copying, context switching.

- Un-virtualized NFs - NetBricks framework - running in single address space:
  - Provides performance, memory isolation using language features.
  - Provides 4-6X performance with chaining.
  - Running in single address space - should provide fault isolation.

Idea

Software based fault isolation with per NF fine-grained fault domains:
- Fault domains created using address space.
- Signal handlers capture and isolate faults per NF.

Approach

- Operating systems have no mechanism for fault isolation in single address space.
- Dynamic NF addition for chaining – address space isolation?
- In a single chain, fault isolation at function-level granularity.

Challenges