### **W** DORNER**WORKS**

# seL4 VM Composer

### Why Virtualized Systems?

- Operating Systems have a large footprint which makes designing for security difficult
- Microkernels like seL4 can provide security for real-world systems
  - seL4 ecosystem is still maturing
  - Cannot "drop-in" legacy applications written for other Operating Systems
- Virtualization allows for use of Operating Systems that support these applications
- Where to start?
  - Find a "known-good" configuration, tweak some things, test until it works
  - High barrier of entry

### **DORNERWORKS**

### seL4 VM Composer

### 'Easy Button' Tool for seL4 Configuration:

- **Reduces development costs**
- Accelerates time to market
- Simplifies development by automatically generating system configuration:
  - Memory
  - Physical IO devices ٠
  - Virtual devices
  - Inter-VM communication •
  - Scheduling/Core allocation



It can be challenging to build a secure system for your virtual machines (VMs) from the ground up

The seL4 microkernel enables robust security, and its virtual machine monitor (VMM) can be used to host VMs supporting AMP, SMP, or a mix of both on a multi-core processor, enabling richer software architectures using different operating systems.

DornerWorks Virtual Machine Composer is the "easy button" that will help you develop virtualized high-assurance systems faster and more easily.

#### EASY CONFIGURATION FOR NON-EXPERTS

The VMM automatically: Sets up build environmen

- Produces executables and file systems
- Generates essential configurations

#### **REMOVE OBSTACLES** DEVELOP CONFIDENTLY

#### The VMM provides

- Repository management
- ultiple VM config tracking Identification of components that need
- to be built for the specified target
- Configuration for seL4 and CAmkES Consistency between various software
- nents and configuration files

### SEL4 COMPOSER SDK **PRODUCT FEATURES**

- GUI and CI Linterfaces
- System configurability
- VM configuration options
- Execution environment Software

Supported hardware targets: Ultra96, NASA HPSC, ZCU102, Raspberry Pi 4 unported VM kernels: Linux FreeRTOS RTEMS VxWorks



Ultra96 HPSC 7CU102 Pi

### EMBEDDED VIRTUALIZATION SIMPLIFIED

You shouldn't have to be an expert in every software development tool to configure and build a secure VM solution.

Schedule a consultation with DornerWorks today, find a trusted foundation for your software, and get back to growing your business.

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## VM Composer Simplifies seL4 Configuration





## VM Composer Features

- Supported Platforms:
  - ZCU102, Ultra96v2
- Supported Guest Operating Systems:
  - Linux, RTEMS
- Configure Guest OS Resources
  - Amounts of memory and passthrough devices
- Core Pinning + Scheduling Algorithms
  - Round Robin, MCS

- Virtio-Net Channel between VMs
- Custom Device Tree Support
  - Allows users to take advantage of FPGA fabric and custom PL blocks
  - Allows for custom Zynq Ultrascale+ Hardware targets
- Compile seL4 images and executables
- Validate configurations

## How VM Composer Runs

- Native, desktop application
  - You store/track your own data, configuration, and code
- Utilizes many mainstream tools already in place, e.g. Docker dev environment
  - Workflows are improved instead of completely altered
  - Dependencies very similar to regular build environment
- Runs on Linux

### Find out more

- $\circ~$  VM Composer can be purchased today
- See more here: <u>https://dornerworks.com/vm-composer/</u>