

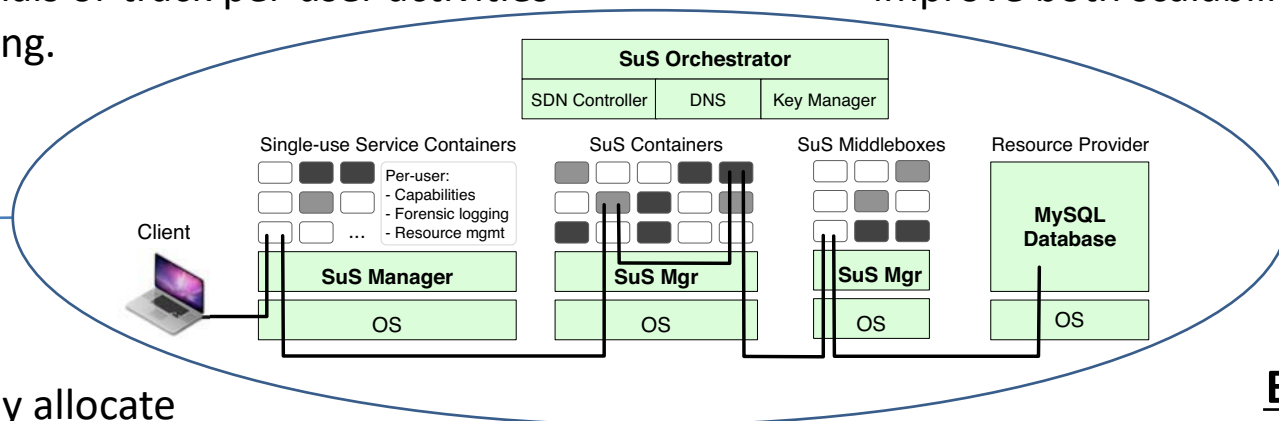
# Fine Grained Protection for Scalable Single-Use Services

## Challenge:

Web application servers are accessed by many clients simultaneously, allowing a single malicious user to affect the service for legitimate customers. Current isolation technologies (VMs, containers) do not scale well to support finer grained isolation, nor can authentication services effectively assign per-user credentials or track per-user activities for forensic logging.

## Scientific Impact:

- Advances fine-grained capability management, resource accounting, and container management techniques
- Defines new virtualization and network stack architectures to improve both scalability and security



## Solution:

- Automatically allocate lightweight “single use” containers for each user to increase isolation
- Provide per-user capabilities, forensic logging, and resource management
- Leverage SDN, NFV, and programmable NICs to ensure secure, scalable, and high performance network IO

## Broader Impact:

- Prototype will demonstrate securing WordPress, a web framework used by 24 million sites worldwide
- Educational activities include 4 undergraduate projects and 4 graduate students across GW and WPI

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