

Replicating and Sharing Computer Security Laboratory Environments

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Introduction

- Creating lab environments
- Time and cost
- Learning curve
- Lessons learned

Laboratory Descriptions

- **United States Military Academy**
 - Information Warfare Analysis and Research Lab (IWAR)
- **University of New Mexico**
 - Anderson School of Management Virtual Lab (ASM-VLAB)
- **Carnegie Mellon**
 - Software Engineering Institute (SEI)
- **University of Alaska Fairbanks**
 - Advanced Systems Security Education Research and Training (ASSERT)

Laboratories Comparison

	IWAR	ASM-VLAB	SEI	ASSERT
Distributed structure	X	X		
Centralized structure			X	X
Isolation	X	X	X	X
Physical hosts/net integration	X			X
SAN storage	X	X	X	X
Distance education support		X	X	X
IA courses only	X			X
VMware tools (free)	X	X	X	
VMware tools (cost)			X	X
MS AD Management	X	X		X

Observations

- Scalability
 - Memory, CPU, Servers, Bandwidth and Storage
- Concurrent Access
- Flexibility and Realism
- Teaching Environment
- Time Investment
 - Administration and Lab Development
- Challenges and Limitations

Future Considerations

- Exploit economies of scale
- Parallels to supercomputing
- Reduce support and administrative costs
- Small number of high capability virtual labs
- Nationwide availability to institutions
- Support for other areas