



Resilient Architectures

A Study of Security Vulnerabilities on Docker Hub

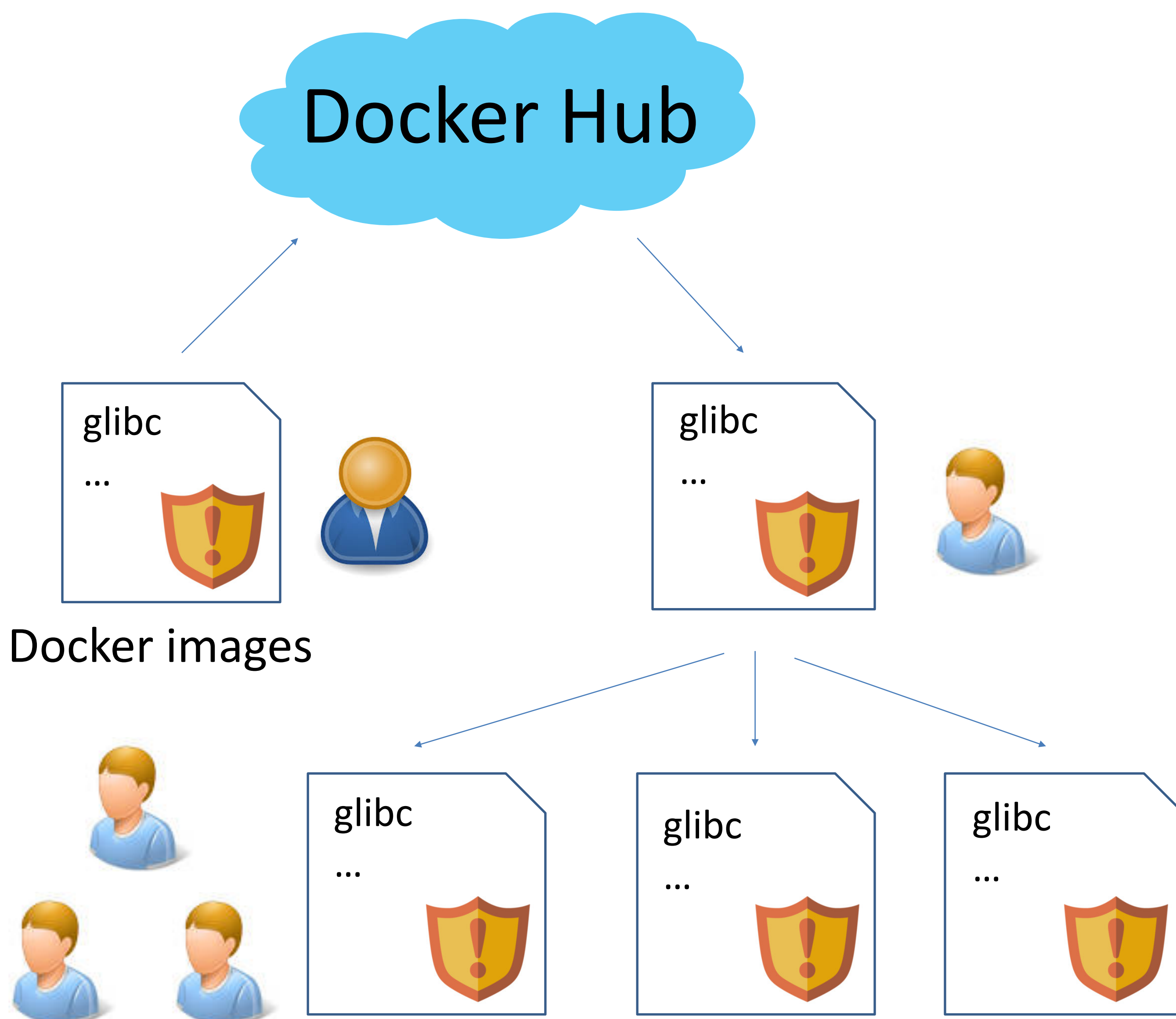
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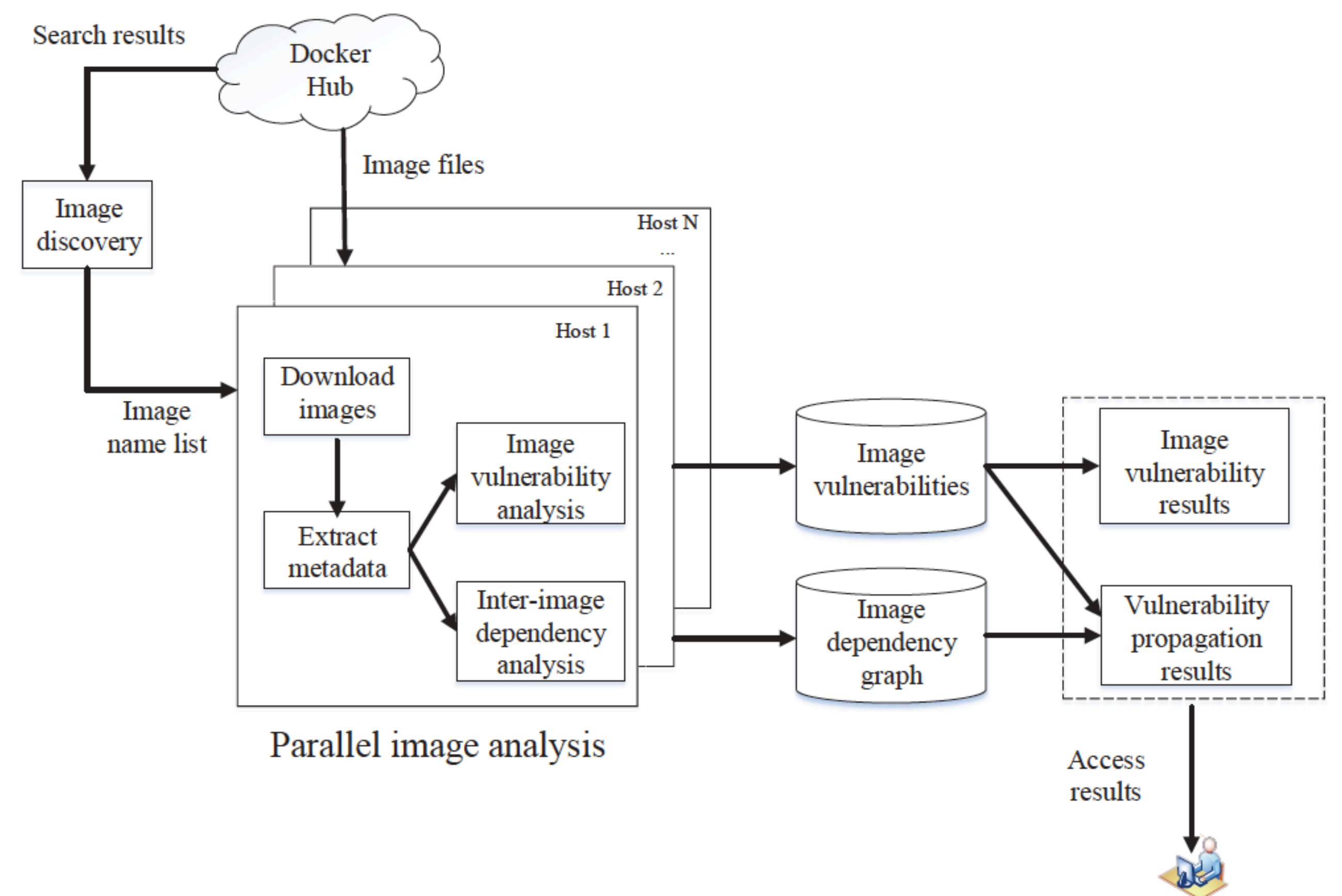
Security Concern

- Vulnerability Propagation



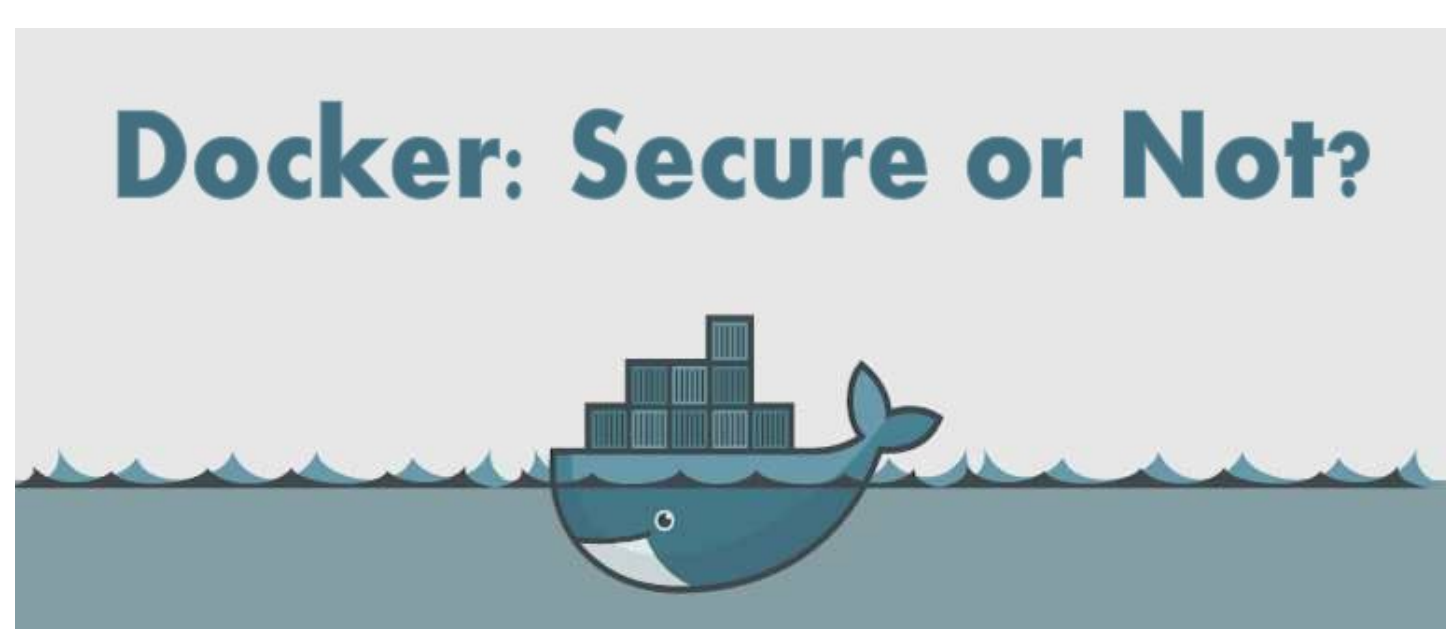
DIVA Framework

- Image Discovery – Dictionary Attack
- Image Vulnerability Analysis – Clair
- Inter-Image Dependency Analysis – Graph Theory



Experiment & Findings

- **86,066** repositories, **356,218** images
- Both official and community images contain more than **180** vulnerabilities per image on average when considering all versions
- Many Docker images have not been updated for hundreds of days
- Vulnerabilities commonly propagate from parent images to child images



Future Work

- Dynamic detection of vulnerabilities introduced by the package update to running Docker containers
- Effective and practical security patching solution to address issues such as resource overhead and application service unavailability
- Encourage the participation from image publishers, image users, and repository maintainers to improve the whole ecosystem