Introducing the Basil Semi-Automatic Containerization System

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What is containerization?

- The "containerization" of software applications future-proofs them, helps in their long-term preservation, makes them portable across different hardware platforms, ensures reproducible results, and makes them convenient to disseminate.

- Docker and Singularity are two popular software technologies for containerizing scientific applications and are widely supported on different hardware platforms.

What are some of the challenges associated with Using Docker and Singularity?

- Their adoption involves a learning curve, especially when it comes to developing **secure and optimized images** of the applications of interest.
  - For example, setting up your notary servers for signing images with Docker Content Trust may need some trail-and-error

- You need root permissions on a system for creating images

- For applications involving MPI, it is important that their images are built with an MPI library that is Application Binary Interface (ABI) compatible or the version of MPI inside the container is same as the version of the MPI outside the container (on the host system)

What is Basil?

Basil is a tool for semi-automatic containerization, deployment, and execution of applications and workflows on cloud computing and supercomputing platforms.

It is the first tool of its kind that can semi-automatically generate secure, optimized, and trustworthy container images with clear information on how to use the images under appropriate licenses.

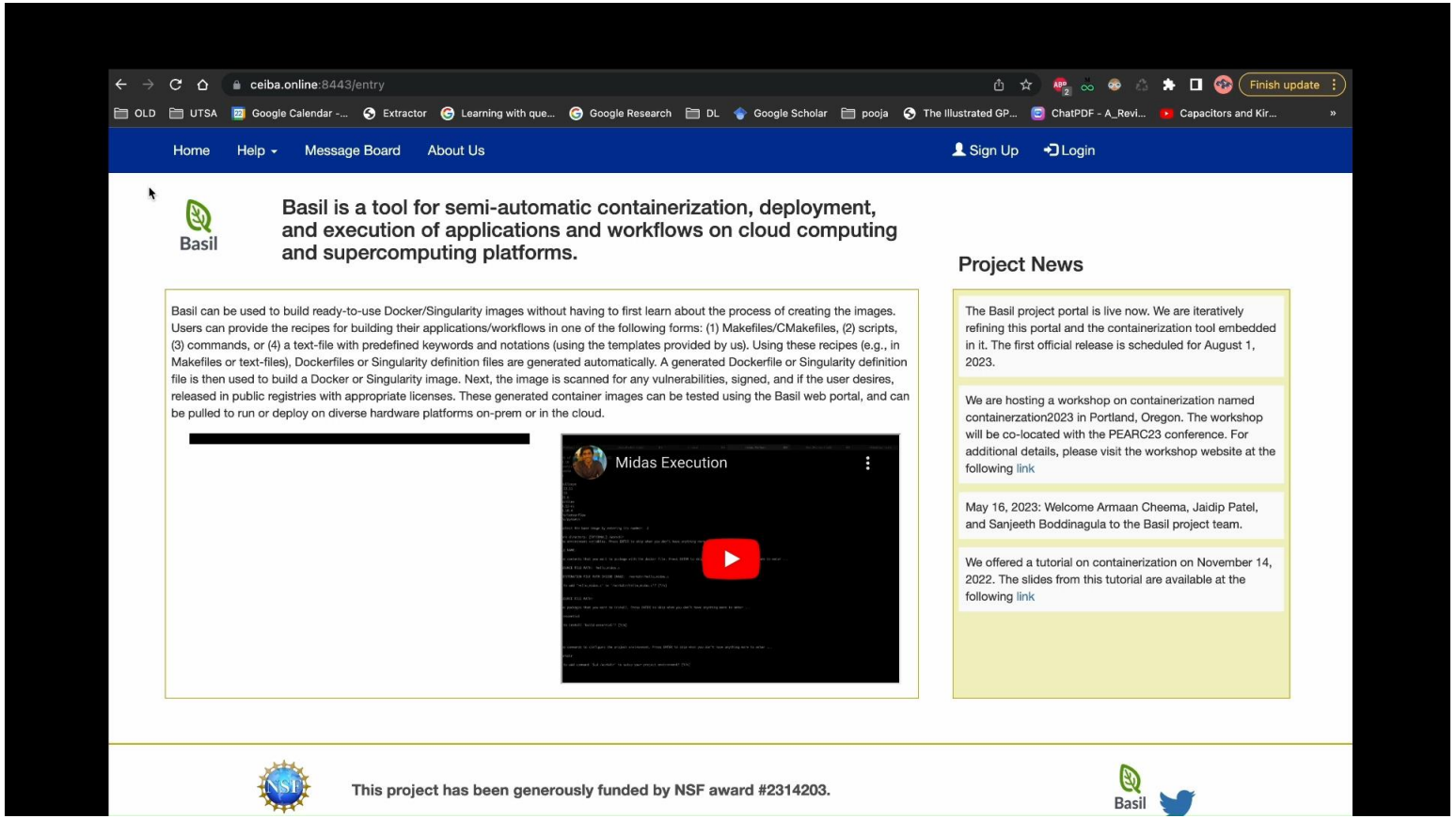
How will Basil work?

- Users of the BASIL tool will provide the recipes for building their applications/workflows in one of the following forms: (1) Makefiles/CMakefiles, (2) scripts, (3) commands, or (4) a text-file with predefined keywords and notations using templates provided by the project team.
- These recipes will be parsed, and Dockerfiles or Singularity definition files will be generated. The parser developed in this project will be another novel contribution of the project.

- Using a generated Dockerfile or Singularity definition file, a Docker or Singularity image will be built. Next, the image will be scanned for any vulnerabilities, signed, and if the user desires, released in public registries with appropriate licenses. These container images can be tested using the BASIL web portal, and can be pulled to run or deploy on diverse hardware platforms.
  - https://icompute.us

- The rules for optimizing the images are being derived from expert knowledge and best practices, such as multi-stage builds and reordering the sequencing of commands to take advantage of caching so that the overall time involved in building the images is reduced.

A quick demo from the development web



An email like the one shown below comes with the link to download but is not shown here in the video. In the video we directly work with the downloaded file that was created using Basil.

[EXTERNAL] Get your Docker Image

R rcsgutsa@gmail.com
To Ritu Arora

Reply | Reply All | Forwa
Sat

Translate message to: English | Translation preferences

EXTERNAL EMAIL
This email originated outside of The University of Texas at San Antonio.
Please exercise caution when clicking on links or opening attachments.

Your docker image is available here. Find the docker file: https://nam11.safelinks.protection.outlook.com/?url=http%3A%2F%2Fceiba
3A5000%2Fapi%2Fgreyfish%2Fdownload%2Fritu.aroraut%2Ffckwigueoz7m4nhy6vja921l%2Fhome%2Fgib%2Fhome%2Fgib%2Fautoc
2Fmidas-image-1690032037.tar.gz&data=05%7C01%7Critu.arora%40utsa.edu%7C756b1b0ebbc94a01b2a908db8ab6ece2%
7C3a228dfbc64744cb88357b20617fc906%7C0%7C1%7C638256290485636644%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAw
joiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=K%2BG3ECMdQEgO0YJ5DG8leLEvJKoD0%2BliCFGDiLdI
served=0

- The first release of the software and go-live date on the production website is August 2023

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- We are grateful to ACCESS for supporting us with the allocation on the Jetstream2 cloud computing system.

Thanks!

Any Questions, Comments, or Concerns?

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