TCSS 562: SOFTWARE ENGINEERING FOR CLOUD COMPUTING

Group Presentations - I

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OVERVIEW

- Tutorial 7 & 8 are posted

- Only 7 tutorials are required
  - Additional tutorials beyond 7 provide extra credit

- Term project paper template – to be posted over Thanksgiving

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PRESENTATION TIPS

- Include slide numbers on slides
  - Helps with pacing, and when audience asks questions
- Do not read slides
- Use short phrases, not complete sentences on slides
  - Consider differences from presenting vs. writing a paper
- Goal is to inform the audience regarding the paper/system
  - Define acronyms on first use
  - Define and describe new systems (don't assume prior knowledge)
- Don't make audience perform your analysis/critique
  - Don't just copy and paste large tables and text from paper to slides
  - For tables, can use popup to focus attention to a certain part
- Best presentations synthesize key points of papers/systems
  - Goal is to maximize accessibility of content

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GROUP PRESENTATION SCHEDULE

Monday November 25
1. Group 6 - Amazon Dynamo DB
2. Group 8 - Paper: Serverless computation with Open Lambda
3. Group 2 - Paper: A Programming Model and Middleware for High Throughput Serverless Computing Applications

Monday December 2
1. Group 9 - Paper: Performance comparison of container-based technologies for the Cloud
2. Group 10 - Paper: An Investigation of the Impact of Language Runtime on the Performance and Cost of Serverless Functions
3. Group 4 - Paper: Exploring Serverless Computing for Neural Network Training

Wednesday December 4
1. Group 1 - Paper: Performance evaluation of heterogeneous cloud functions
2. Group 7 - Amazon Cognito
3. Group 3 - Paper: Serverless computing - economics and architecture impact

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TERM PROJECT DELIVERABLES

- Nine project teams

- Term project lightning presentations
  - Monday December 9th (5:50-7:50pm)
  - Takes place of final exam
  - Presentation length: 5 minutes + questions, total 8 minutes
  - Format and rubric coming soon

- Term project final paper and source code repository
  - Friday December 13 @ 11:59pm
  - Paper template to be provided

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FEEDBACK FROM 11/20

- **Cloud terminology: what does "persist" mean?**
- Persist means to preserve
- Typically persistent is used in relation to storage (e.g. disks)
- EBS volumes are considered **persistent** storage
- Local NVME SSD disks on c5d instances are called **ephemeral**
  - Ephemeral means temporary

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FEEDBACK - 2

- **http API -> gRPC ?**
- **Docker can be used to host Google RPC APIs in a container**
- **Docker exposes http interface to a GO microservice**
- **This enables containerized microservices without a web application server/container**
  - Less overhead...
- **This is a nice blog on GO, gRPC, and Docker:**
  - https://medium.com/@matzhouse/go-grpc-and-docker-c1fb2ec8e9f0
- **Java microservices w/ Springboot can similarly be hosted by Docker containers w/o a server**
  - https://spring.io/guides/gs/spring-boot-docker/

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TUTORIAL #7
DOCKER, CGROUPS, RESOURCE ISOLATION

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DOCKER CLI

- Docker CLI → Docker Enginer (dockerd) → containerd → runc

- Docker installation
- Docker file
- Docker run
- Docker ps
- Docker exec -it
- Docker stop

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```
Commands:
  attach    Attach local standard input, output, and error streams to a running container
  build     Build an image from a Dockerfile
  commit    Create a new image from a container's changes
  cp        Copy files/folders between a container and the local filesystem
  create    Create a new container
  deploy    Deploy a new stack or update an existing stack
  diff      Inspect changes to files or directories on a container's filesystem
  events    Get real time events from the server
  exec      Run a command in a running container
  export    Export a container's filesystem as a tar archive
  history   Show the history of an image
  images    List images
  import    Import the contents from a tarball to create a filesystem image
  info      Display system-wide information
  inspect   Return low-level information on Docker objects
  kill      Kill one or more running containers
  load      Load an image from a tar archive or STDIN
  login     Log in to a Docker registry
  logout    Log out from a Docker registry
  logs      Fetch the logs of a container
  pause     Pause all processes within one or more containers
  port      List port mappings or a specific mapping for the container
  ps        List containers
  pull      Pull an image or a repository from a registry
  push      Push an image or a repository to a registry
  rename    Rename a container
  restart   Restart one or more containers
  rm        Remove one or more containers
  rmi       Remove one or more images
  run       Run a command in a new container
  save      Save one or more images to a tar archive (streamed to STDOUT by default)
  search    Search the Docker Hub for images
  start     Start one or more stopped containers
  stats     Display a live stream of container(s) resource usage statistics
  stop      Stop one or more running containers
  tag       Create a tag TARGET_IMAGE that refers to SOURCE_IMAGE
  top       Display the running processes of a container
  unpause   Unpause all processes within one or more containers
  update    Update configuration of one or more containers
  version   Show the Docker version information
  wait      Block until one or more containers stop, then print their exit codes
```

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TUTORIAL 7

- Linux performance benchmarks

- stress-ng
- 100s of CPU, memory, disk, network stress tests

- Sysbench
- Used in tutorial for memory stress test

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QUESTIONS

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EXTRA SLIDES

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