The 3 AVD Containers Problem

Three Containers - Endless Possibilities

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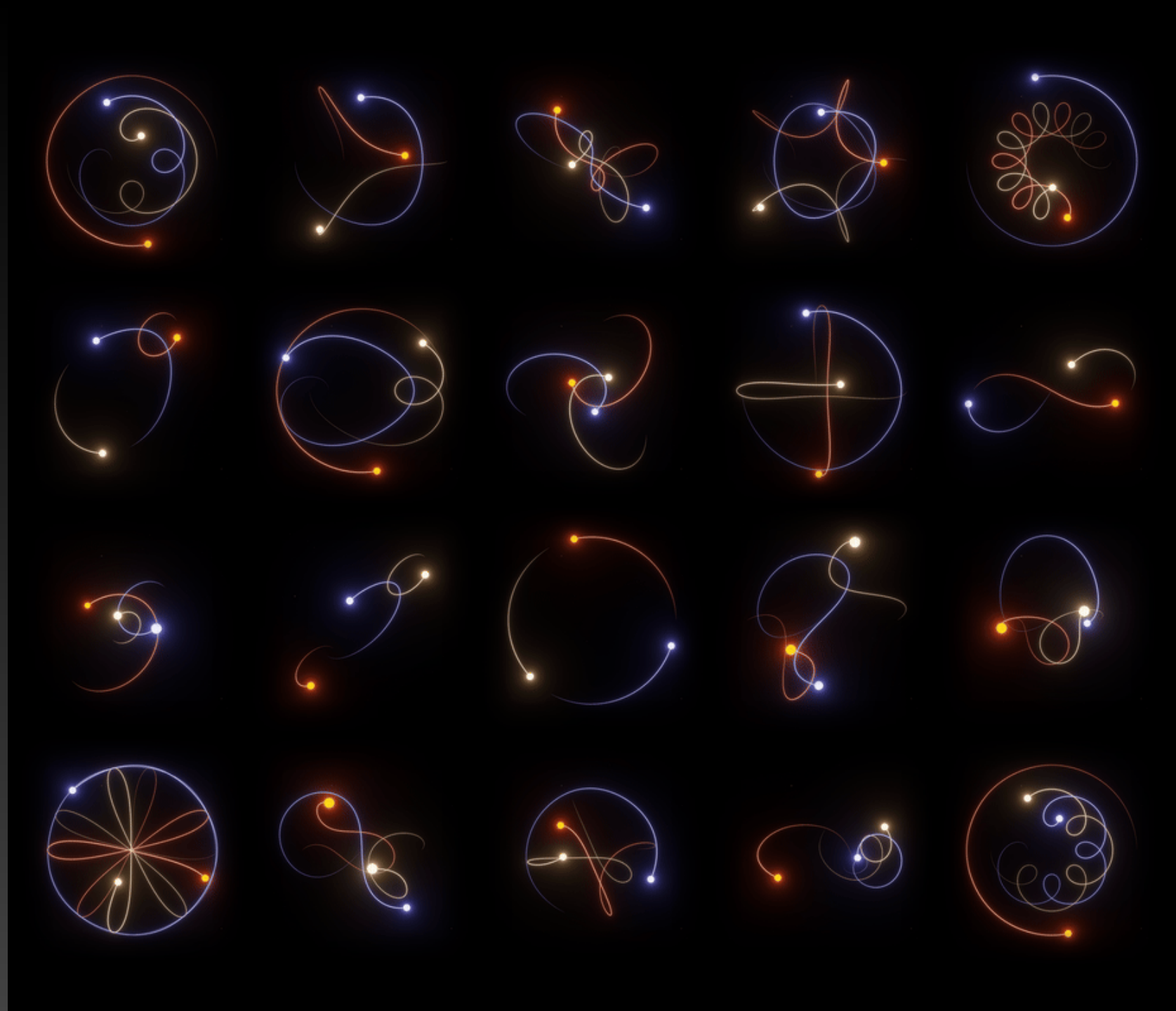

Origins

- Arista AVD collection can be installed manually
  - Very feasible in many cases and not going anywhere
  - Do this at your own risk. You may encounter weird problems, especially if environment has some history
- AVD all-in-one container
  - Was never officially documented or advertised, but quite actively used anyway. Around 60K total downloads so far.
  - Can be used as dev container (with some modifications) or standalone
  - It was never integrated with AVD CI and must be manually updated on every release
  - A lot of complexity to maintain
  - No plans to support it long term
- Ansible Automation Platform
  - Out of scope. For customers heavily relying on RedHat support and internal Ansible ecosystem

Motivation

- Better integration with AVD with automated image build on every release
- Must be documented and known to AVD users
- Reuse work done by Microsoft. It's not perfect for every use case, but quite a few developers are working on dev container features. Their contribution is appreciated and must not be wasted
- Better VSCode integration

> **WARNING**: AVD dev containers are in the preview phase. They are working well, but breaking changes can happen and they must not be advertised to customers as fully supported solution.

AVD Dev Containers

```
python:3.{9-11}-slim-bullseye
│
│               <--- trigger CI on every AVD release, pre-release, merge
│
└> base          :python3.{9-11}, latest
   │
   ├> dev        :python{9-11}, latest
   └> universal  :python3.{9-11}-avd-devel, python3.{9-11}-avd-v4.5.0, latest
```

- Common use cases:
  - `base` - not to be used directly, base for all other images
  - `dev` - AVD contributors and testing new features/branches. AVD collection is not pre-installed
  - `universal` - AVD collection is pre-installed, ready to use
- All containers are multi-platform - linux/arm64, linux/amd64

Demo 01: Universal Basic Use Case

- Add following `.devcontainer/devcontainer.json` to your inventory:

```
{
    "image": "ghcr.io/aristanetworks/ansible-avd/universal:python3.11-avd-v4.5.0"
}
```

- Use VSCode to open your inventory or another tool supporting dev containers. For ex., devcontainer CLI:

```
devcontainer up --workspace-folder /Users/pa/Documents/VSCode/github/avd-dev-container-toi/demo-01
devcontainer exec --workspace-folder /Users/pa/Documents/VSCode/github/avd-dev-container-toi/demo-01 ansible --version
devcontainer exec --workspace-folder /Users/pa/Documents/VSCode/github/avd-dev-container-toi/demo-01 ansible-galaxy collection list
devcontainer open /Users/pa/Documents/VSCode/github/avd-dev-container-toi/demo-01
```

- The commands above are replaced with `make demo={demo-number}`
- Ready to go. Build some configs using AVD, etc.
- Start demo 🚀

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Demo 02: Fixing Deprecation Warnings

- Install `passlib` inside the container:

```
{
  "image": "ghcr.io/aristanetworks/ansible-avd/universal:python3.11-avd-v4.5.0",
  // fixing deprecation warnings
  "onCreateCommand": "pip3 install passlib",
  // you can also add some VSCode extensions
  "customizations": {
      "vscode": {
          "extensions": [
              // excalidraw, drawio and tldraw
              "pomdtr.excalidraw-editor",
              "hediet.vscode-drawio",
              "tldraw-org.tldraw-vscode"
          ]
      }
  }
}
```

- Check dev container metadata reference for more customization options
- Start demo 🚀

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Demo 03: Advanced Customization With Dockerfile

- You can define your own Dockerfile to customize the container

```
{
  "build": {
      "dockerfile": "Dockerfile",
      "args": {
          "_AR_FILE_PATH": "/support/download/EOS-USA/Active Releases/4.30/EOS-4.30.3M/cEOS-lab/cEOS-lab-4.30.3M.tar.xz",
          "_ARTOKEN": "${localEnv:ARTOKEN}"
      }
  },
  "onCreateCommand": "docker import /home/vscode/tmp/ceos-lab-temp ceos-lab:latest; rm -rf /home/vscode/tmp/"
}
```

```
FROM ghcr.io/aristanetworks/ansible-avd/universal:python3.11-avd-v4.5.0

ARG _ARTOKEN
ARG _AR_FILE_PATH

RUN bash -c "$(curl -sL https://get.containerlab.dev)"; \
  pip3 install passlib cookiecutter; \
  sudo apt-get update; sudo apt-get -y install xz-utils

# add ceos-lab image is _ARTOKEN is not empty
RUN if [ ! -z ${_ARTOKEN} ]; \
    then \
    ARTOKEN=$(echo -n "${_ARTOKEN}" | base64) \
    && ARSESSION=$(curl -X "POST" "https://www.arista.com/custom_data/api/cvp/getSessionCode/" -H 'Content-Type: application/json'   -d "{\"accessToken\": \"$ARTOKEN\"}" | sed -n 's|.*"session_code":"\([^"]*\)".*|\1|p') \
    && FILE_PATH=${_AR_FILE_PATH} \
    && DOWNLOAD_URL=$(curl -X "POST" "https://www.arista.com/custom_data/api/cvp/getDownloadLink/" -H 'Content-Type: application/json' -d "{\"sessionCode\": \"$ARSESSION\", \"filePath\": \"$FILE_PATH\"}" | sed -n 's|.*"url":"\([^"]*\)".*|\1|p') \
    && mkdir -p /home/vscode/tmp \
    && curl "$DOWNLOAD_URL" --output /home/vscode/tmp/ceos-lab-temp \
    ; fi
```

- This is usually helpful for advanced use cases, like installing cLab with images, etc.
- Start demo 🚀

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Demo 04: Installing AVD Collection From Any Branch

- The `entrypoint.sh` script provide with AVD container can install collections automatically when container is created
  - If `AVD_GITHUB_REPO` and `AVD_BRANCH_NAME` env variables are defined, AVD collection will be installed from the specified Github repository
  - If env variables are not defined, AVD collection will be installed from the mounted repository (contributor mode)
- VSCode overrides container entrypoint. If `"onCreateCommand": "/bin/entrypoint.sh true"` is not defined - the container will start without any AVD installation
- An updated `devcontainer.json` example

```
{
    "image": "ghcr.io/aristanetworks/ansible-avd/dev:python3.11",
    "containerEnv": {
        "AVD_GITHUB_REPO": "aristanetworks/ansible-avd",
        "AVD_BRANCH_NAME": "devel"
    },
    // Run entrypoint script manually as it's ignored by dev container CLI otherwise.
    // The dev entrypoint is used to install ansible collections and requirements, as they are not included with the dev version.
    // "true" is required to exit "onCreateCommand" without entering ZSH.
    "onCreateCommand": "pip3 install passlib; /bin/entrypoint.sh true"
}
```

- In a real case scenario that will be someones fork and a different branch, as there is a pre-build `universal` image for AVD devel branch. It's only used for this demo as it's guaranteed to exist.
- Start demo 🚀

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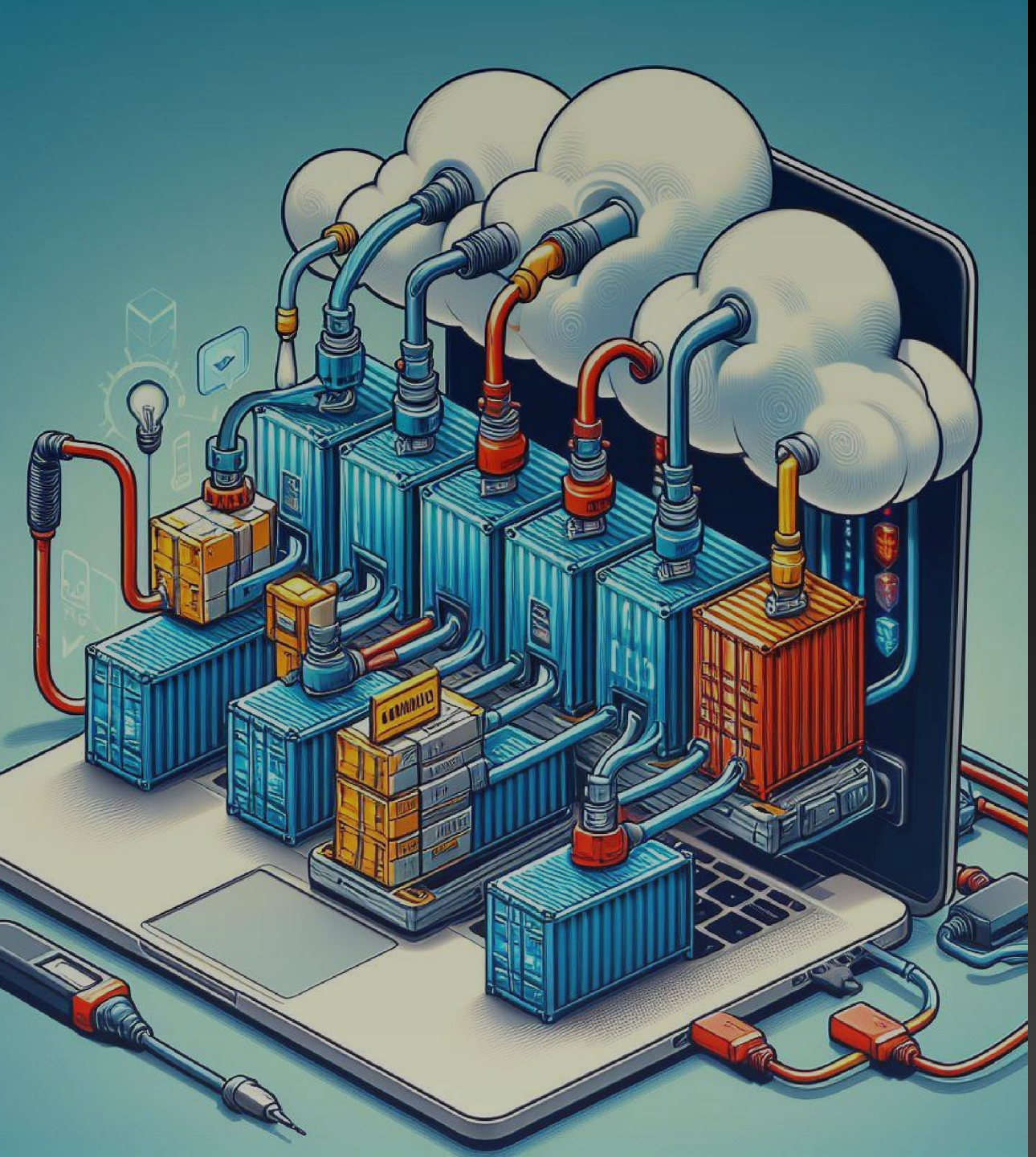

Roadmap

- Testing and bugfixes
- Integrating with Github Codespaces for 1-click PR review
- Reviewing dev workflow and updating shortcuts to match container setup
- Testing and supporting standalone container use (with dev container supporting tools)
- Security scanning
- This TOI will be converted to a workshop and moved to Netdevops Community over time to support AVD docs

> So far there is a single contributor for AVD containers. Help of any kind is very welcome!

Questions?