Abusing Docker builds with BuildKit and friends

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I love it when I wait for my containers to build!

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No one ever

Building Docker images

with LOGIC

Agenda

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- Primer on Images, BuildKit and Builders
- Remote caching
- Docker Build Cloud
- Build with LOGIC

Primer on Images, BuildKit and Builders

Images

- Packaging for container applications
- Build once, run everywhere
- Layered copy-on-write format for optimized storage and caching

Dockerfiles

- Recipes for images
- Built with layers in mind
- Support multi-stage builds for more interesting workflows

Example Dockerfile

```dockerfile
FROM ghcr.io/withlogicco/poetry:1.7.1

WORKDIR /usr/src/app
COPY pyproject.toml poetry.lock ./
RUN poetry install
COPY ./ ./

CMD python app.py
```

Example building command

```
docker build -t image-name .
```

BuildKit

- The new, standard, efficient and default builder for Docker (and not only)
- Parallel builds
- Efficient caching
- Multiple builders
- And more…

Builders

- BuildKit daemon instance
- Per-daemon settings
- Remote or local

Remote caching

Remote caching

- Caching layers
- Caching builder with cache mounts
- Caching registries

Caching layers

- Docker attempts to cache every instruction possible
- When an instruction is re-run with the same context, the cache layer is reused
- Cached layers can be stored to remote locations, allowing reusing.

Remote caching layers in GitHub Actions

```yaml
jobs:
  build:
    runs-on: ubuntu-22.04
    steps:
      # …truncated
      - uses: docker/bake-action@v4
        with:
          push: true
          set: |
            *.cache-from=type=gha
            *.cache-to=type=gha,mode=max
```

Remote caching layers with `buildx` to remote registry

```
docker buildx bake \
  --set="*.cache-to=type=registry,ref=logic-nas.local:5001/$(basename $PWD),mode=max"  \
  --set="*.cache-from=type=registry,ref=logic-nas.local:5001/$(basename $PWD)"
```

Caching builder with cache mounts

- Mount directories for caching, without persisting in image
- Requires Dockerfile syntax 1.3 or later
- `RUN --mount=type=cache,target=...`

Example Dockerfile

```
# syntax=docker/dockerfile:1.4

FROM node:16.14-buster-slim as build
WORKDIR /usr/src/app

COPY package.json yarn.lock ./
RUN --mount=type=cache,target=/usr/local/share/.cache/yarn/v6 \
    yarn install --check-files

COPY . /usr/src/app
RUN yarn run build
```

Caching registries

- It’s possible to set up a pull-through cache for Docker registr~~ies~~y (`docker.io`)
- Pull through caches let you pull Docker images faster
- Pull through caches are configured at the daemon level

Pull through cache in `~/.docker/daemon.json`

```
{
  "builder": {
    "gc": {
      "defaultKeepStorage": "20GB",
      "enabled": true
    }
  },
  "experimental": false,
  "registry-mirrors": [
    "http://logic-nas.local:5555"
  ]
}
```

Docker Build Cloud

Docker Build Cloud

- Remote, on-demand builders
- Multiple architectures
- Shared cache between builds and team members

Build with LOGIC

Build with LOGIC

- Fast CI builds
- Faster local builds
- Blazing-fast image pulls

Demo time!

Need help with DevOps or your next web project?

https://withlogic.co/ - hey@withlogic.co