
Core C++ 2024
How a 43-year-old software company keeps its code fresh and maintainable
Haim Cohen

How a 43-year-old software company keeps its code fresh and maintainable

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Core C++ 2024
November 28, 2024

Haim Cohen, Engineering Team Leader, Ticker Plant
(with contributions from Lainey Donovan)

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About the speaker & contributor

Haim Cohen

Lainey Donovan

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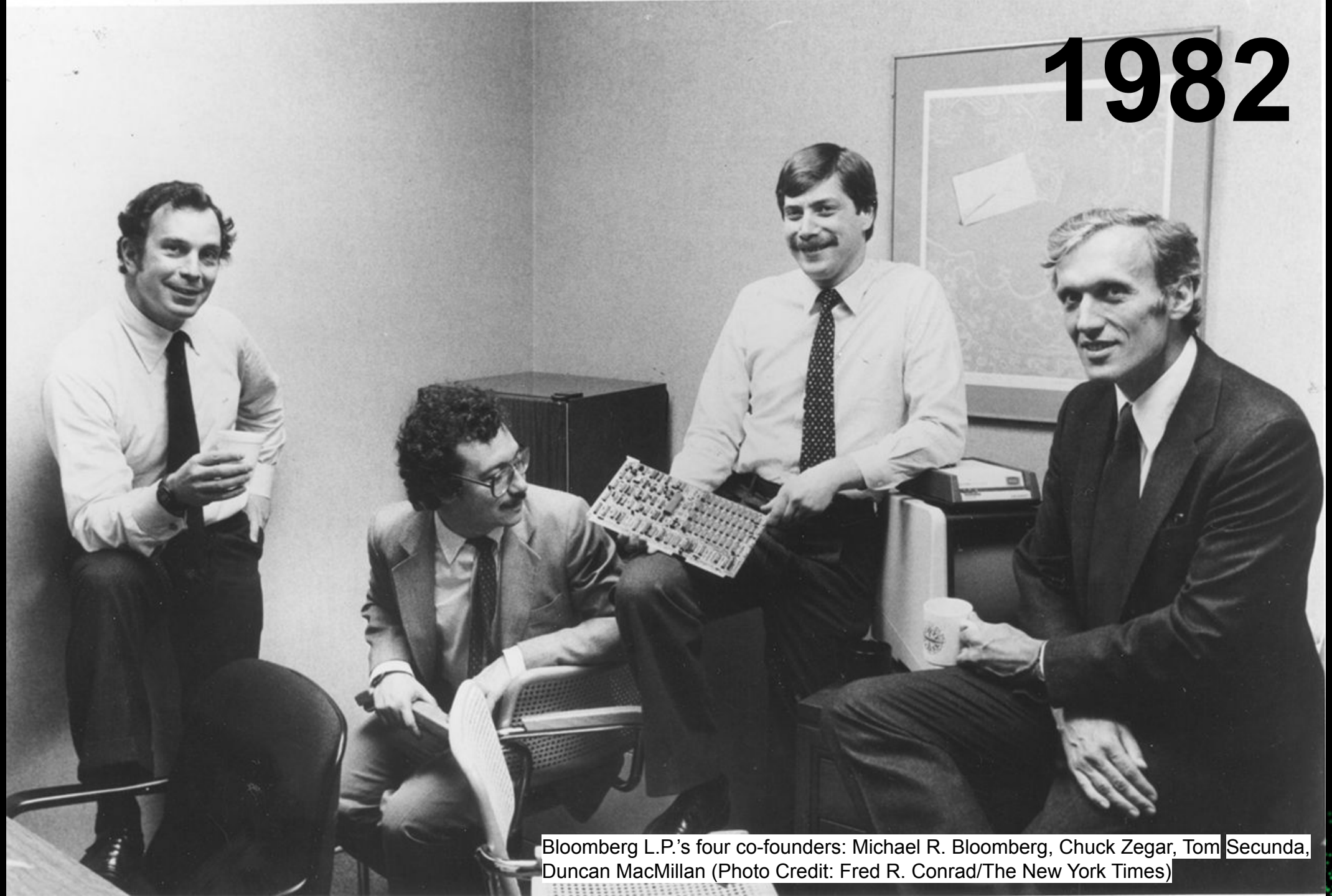

Bloomberg L.P.’s four co-founders: Michael R. Bloomberg, Chuck Zegar, Tom Secunda, Duncan MacMillan (Photo Credit: Fred R. Conrad/The New York Times)

Almost 43 years later…

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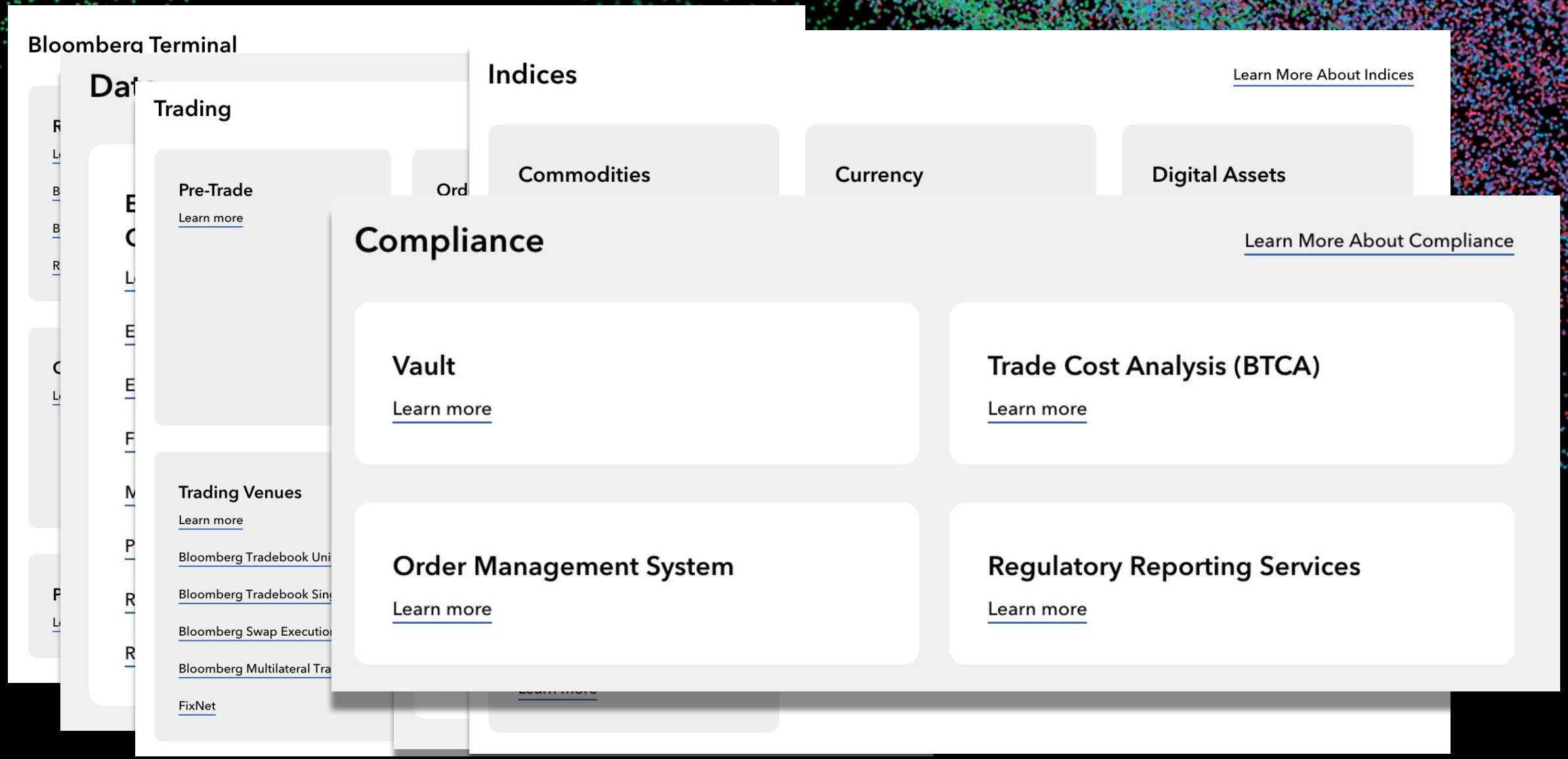

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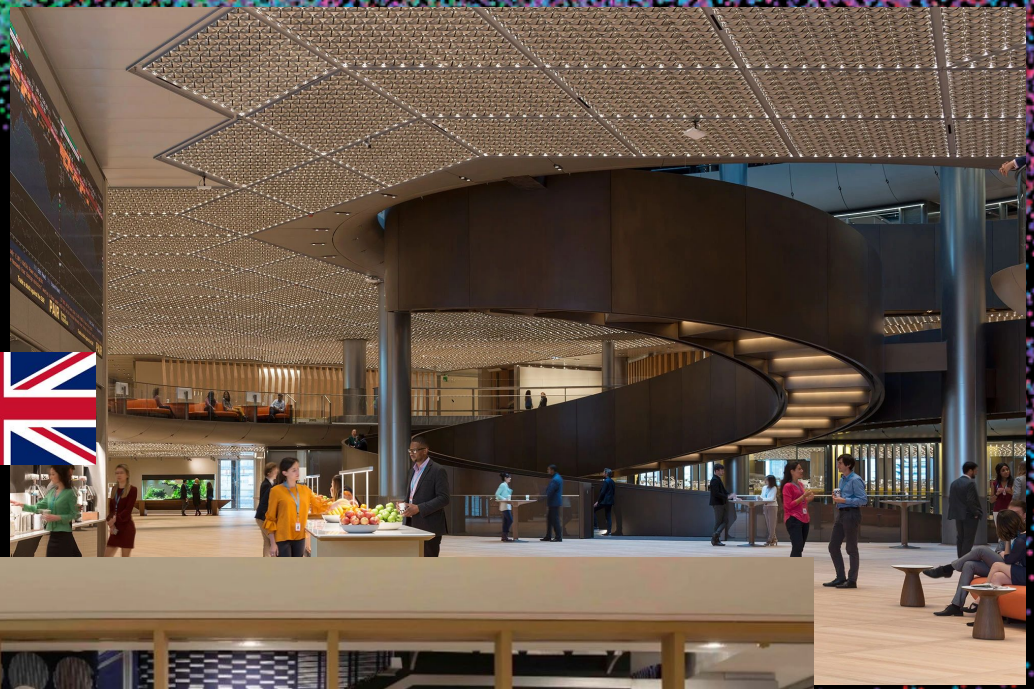

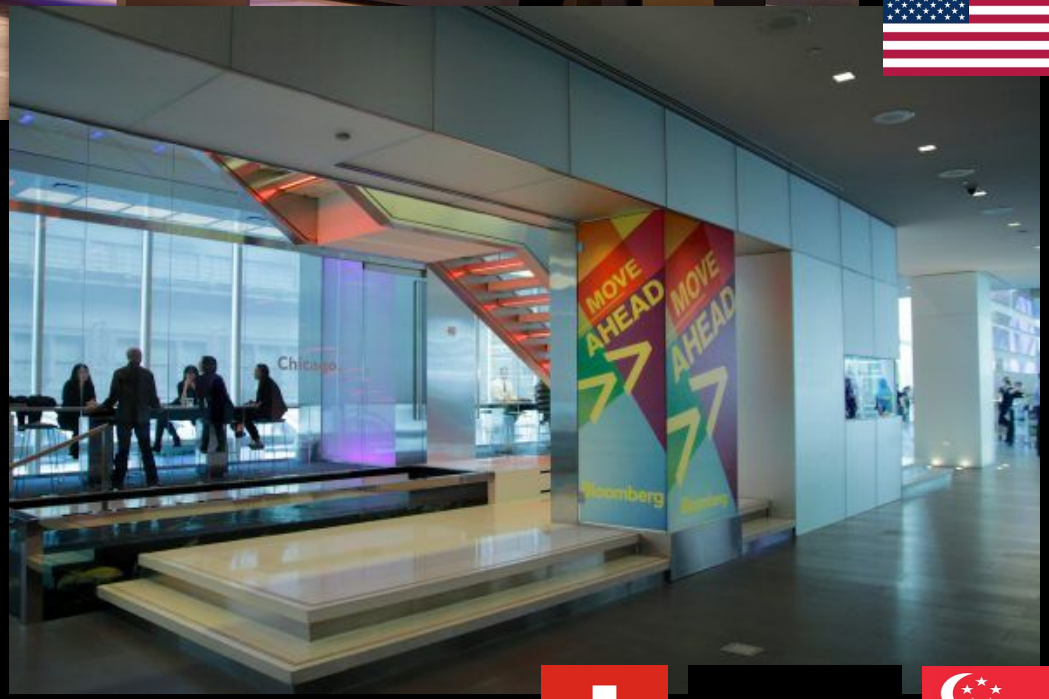

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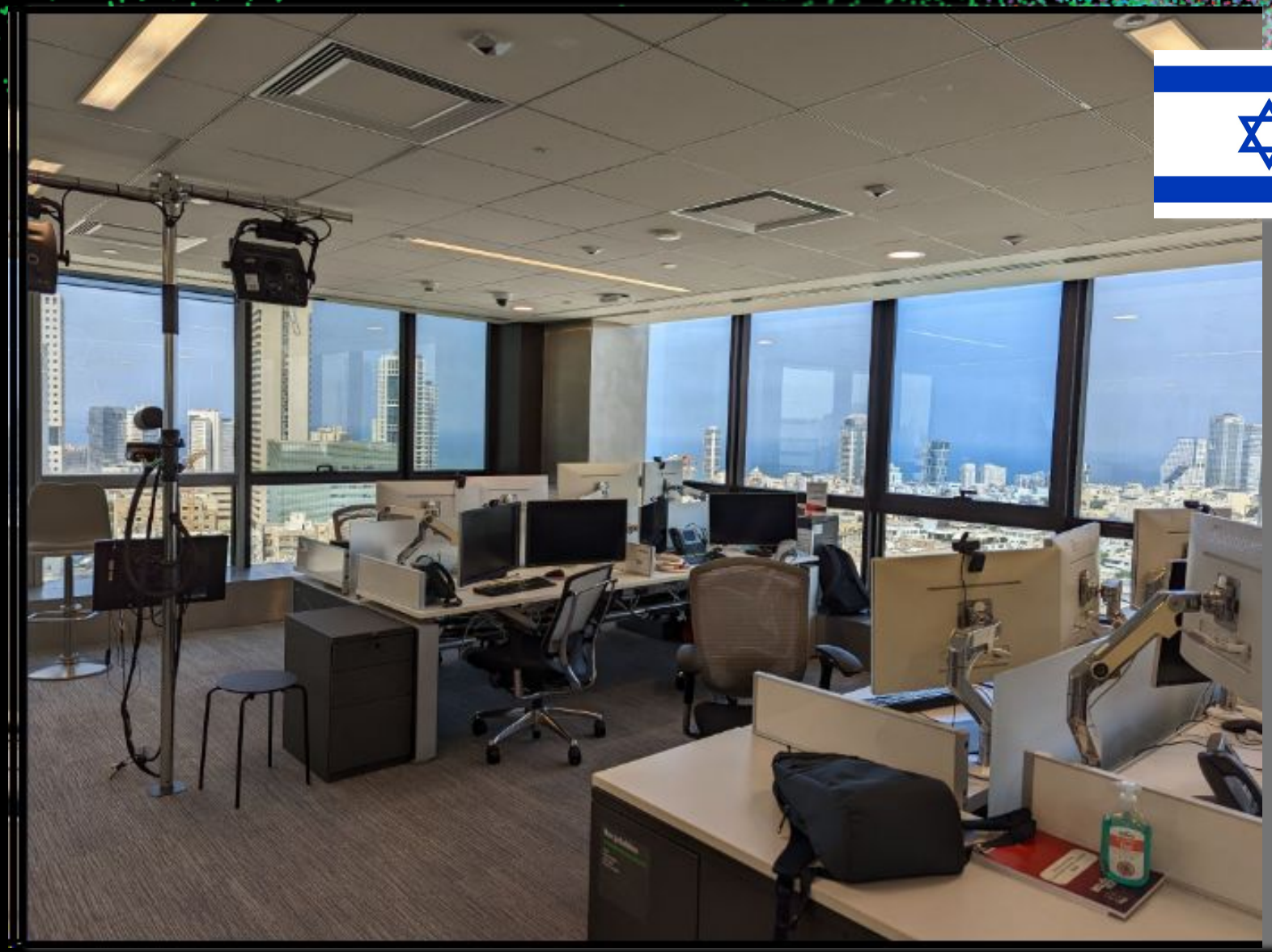

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Bloomberg Engineering's Tel Aviv Office!

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2022

How do we keep our code easy to work with?

Successful Code is “Messy”

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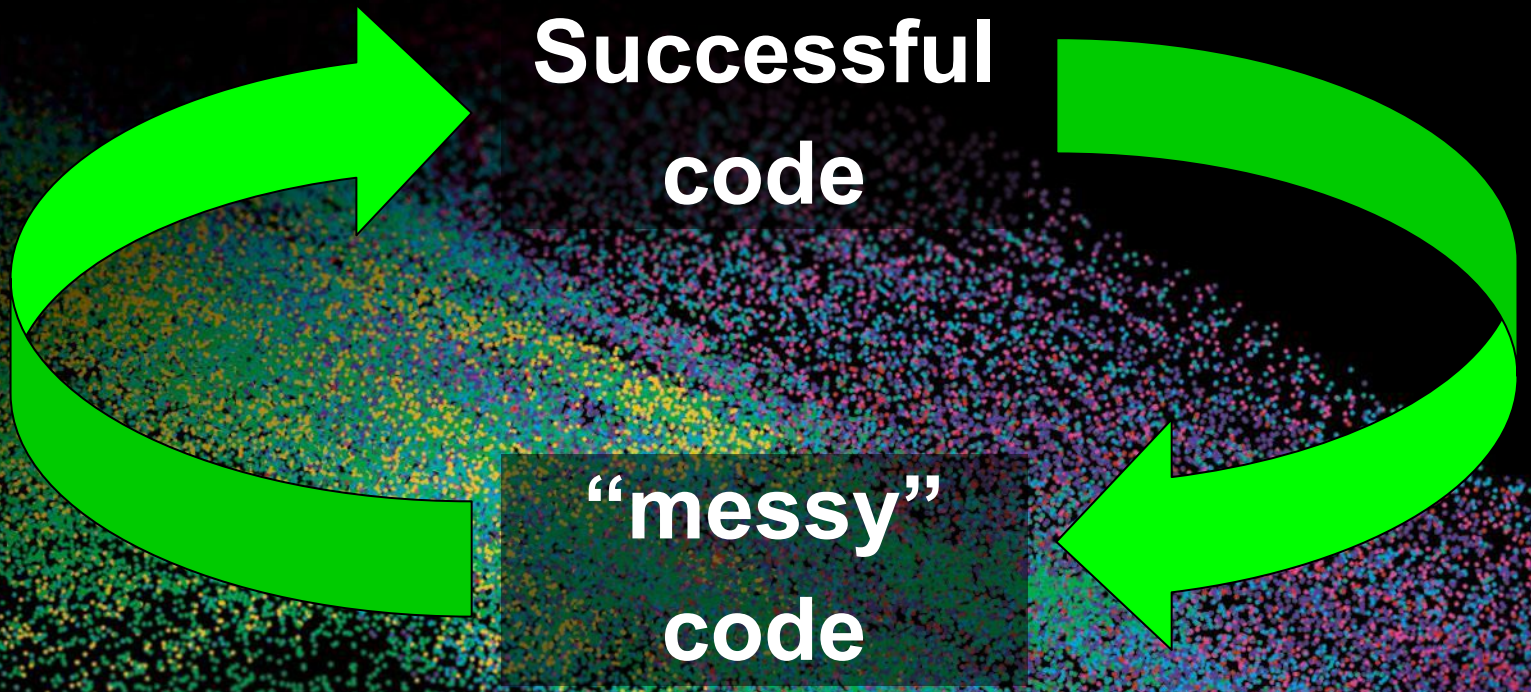

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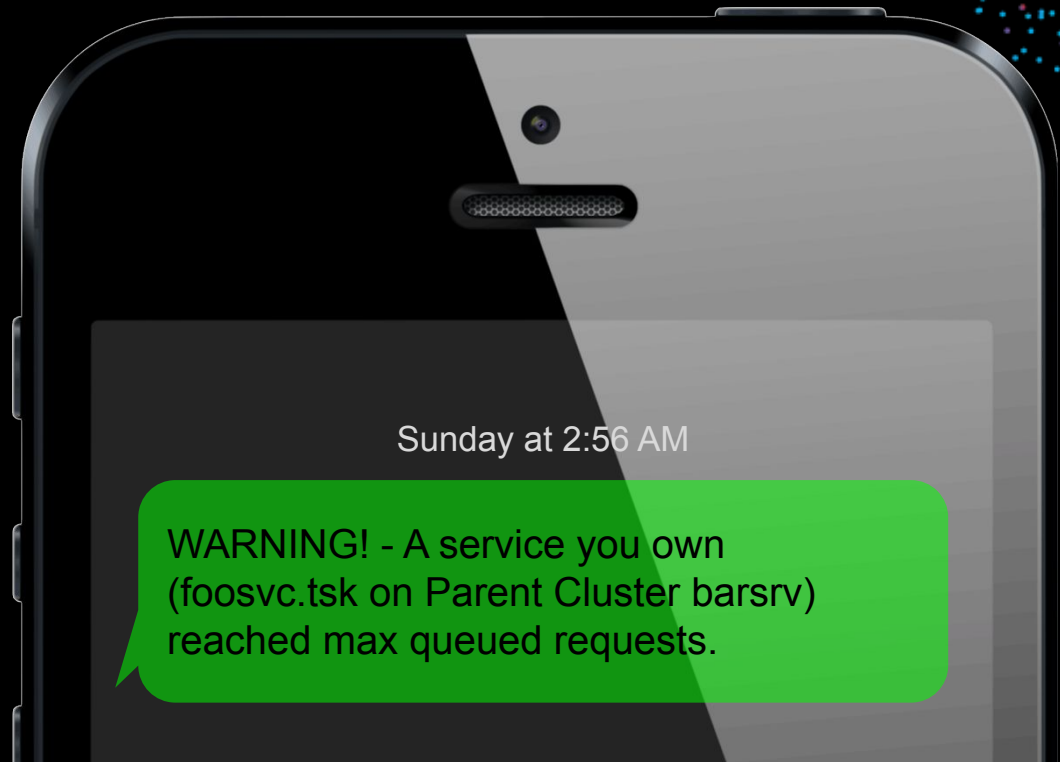
Imagine you’re on call, and you get called off-hours for an issue with code you’re unfamiliar with…



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The Hero Engineer

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- Knows lot of details about a specific system
- Can quickly address any outage
- Can fix any bug
- Can evolve the system
- Rarely good for your organization long-term

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So… what *can* we do?

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Appreciate the code that got us here

- A full rewrite is rarely the right answer
- Expensive
- New code is just future legacy code
- Many bugs have already been fixed

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Invest in Restoration!

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- Improving documentation
- Adding modern conveniences
- Standardization

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Enter: TSAM

Threshold for Stability and Maintenance

1. Standardized source control location
2. Removal of any duplicate copies from source control
3. CMake build
4. Continuous integration of build and unit tests
5. Automated formatting applied
6. Automated package creation
7. Purpose-level documentation*
8. Documented post-deployment validation process*

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McALDO Standard

Module, Component, & Application-level Documentation

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- Any engineer, including a new engineer fresh out of training, should be able to read and understand what the code generally does and how to work with it
- Robust standard developed for application READMEs
- Defines formatting rules, required sections, terminology to use for post-deployment check (PDC) instructions, etc.

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Anatomy of a McALDO README

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Anatomy of a McALDO

Description

`mifid-close-eligible` contains a post processing script, `mifid_close_elig.pl`, for `{FUPC 96 MIFID_CLOSE_ELIG}`, which is related to the Mifid composites queues. Each exbyte has a configuration fla… `{FUPC}` Key 1 with the identifier `EX68` - "Eligible for MiFID Closing Price". The `MIFID_CLOSE_ELIG` dump takes the set of exbytes which… all feeds machines. When a feed handler runs, a framew… queue, and the exbyte being ticked is in the list, then th…

More info here.

`mifid-close-eligible` is run everyday on `{RHST TPSRVP…` `/bb/bin/fupc_gen_dump.sh MIFID_CLOSE_ELIG` comman…

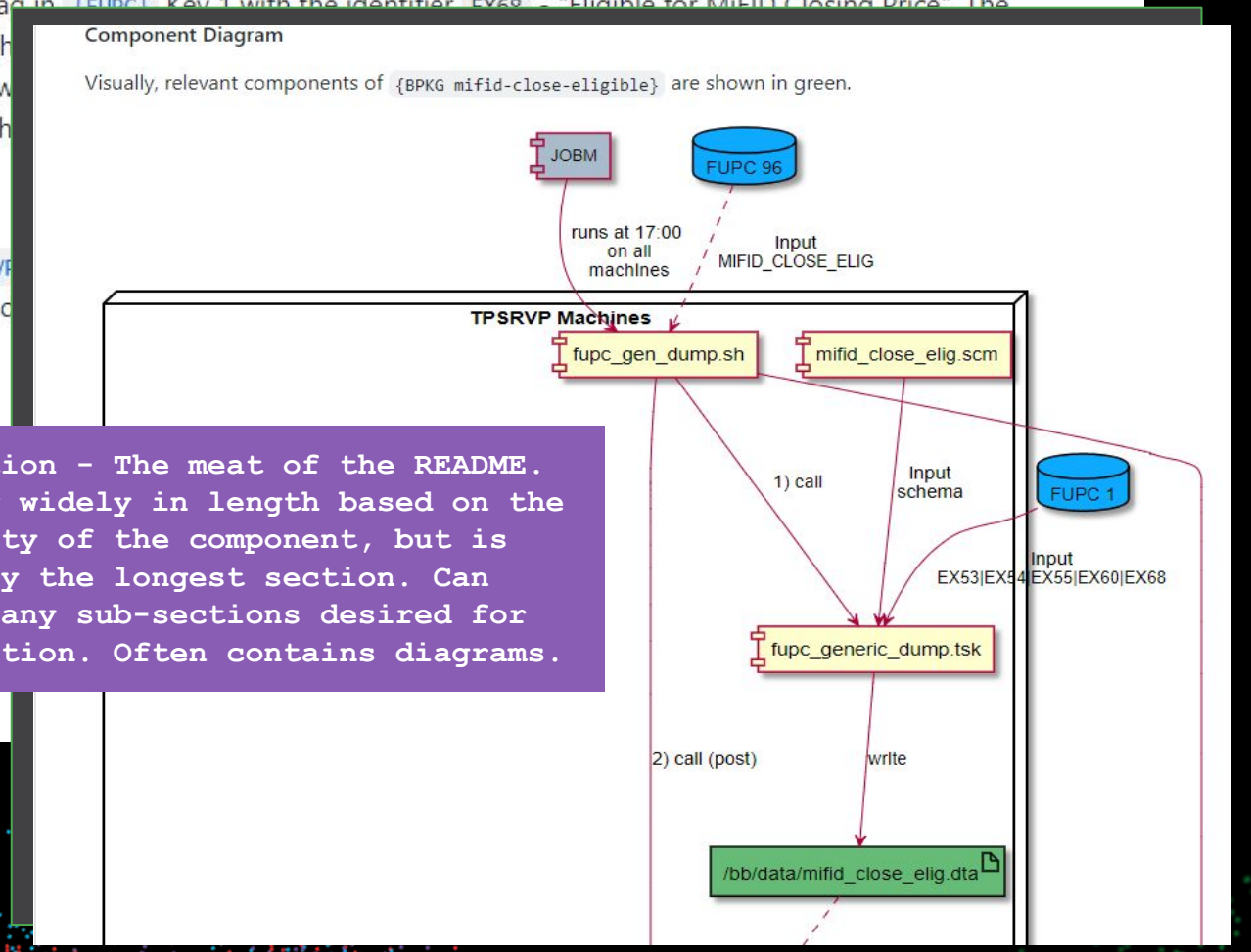
Usage

```
Usage: /bb/bin/mifid_close_elig.pl <
Where:
      name is `MIFID` (not used)
      unfiltered file is the input f
```

Operation

…

Description - The meat of the README. Can vary widely in length based on the complexity of the component, but is typically the longest section. Can contain any sub-sections desired for organization. Often contains diagrams.



Anatomy of a McALDO

Building

Please follow the standard tpdc-all build instructions.

Build instructions

Deployment

- **Destination:** BPKG Intended Deployment
- **Step Stratification:** By stage
- **Step Content:** MOVE
- **Cadence:** One step per workday

Deployment Configuration Parameters

Testing

This service has unit tests run by ctest. To run the unit tests, change to the `applications/s_fupcadsvc/unit_tests` subdirectory in the build directory and run `ctest fupcadsvc_unittests.tsk` on the command line. For end-to-end functional tests, follow the steps of the Post Deployment Check.

Information on existing tests

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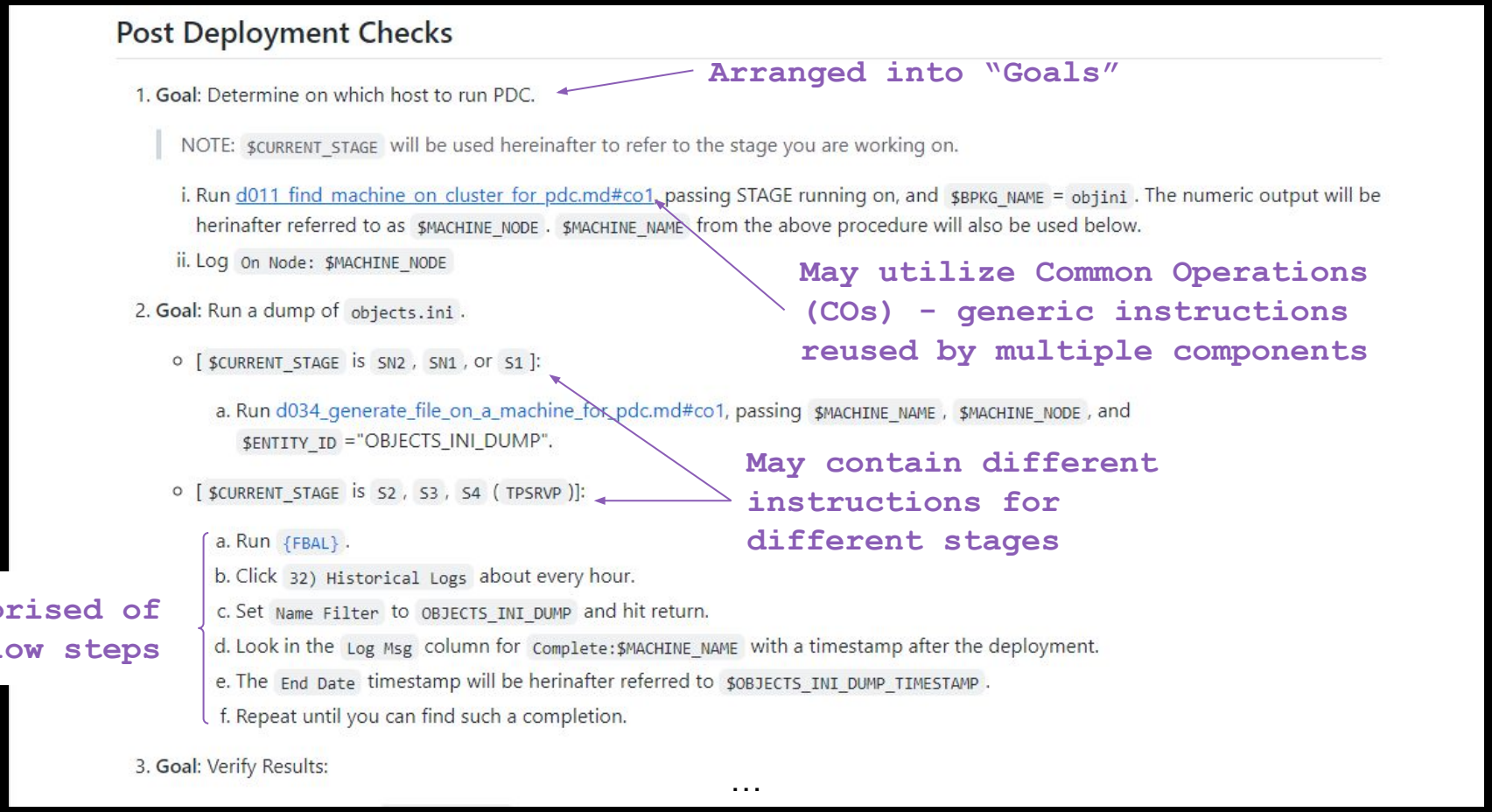
Anatomy of a McALDO



Post Deployment Checks

1. **Goal**: Determine on which host to run PDC.

> NOTE: `$CURRENT_STAGE` will be used hereinafter to refer to the stage you are working on.

i. Run d011_find_machine_on_cluster_for_pdc.md#co1, passing STAGE running on, and `$BPKG_NAME` = `objini`. The numeric output will be herinafter referred to as `$MACHINE_NODE`. `$MACHINE_NAME` from the above procedure will also be used below.

ii. Log `On Node: $MACHINE_NODE`

2. **Goal**: Run a dump of `objects.ini`.

- [`$CURRENT_STAGE` is `SN2`, `SN1`, or `S1`]:

  a. Run d034_generate_file_on_a_machine_for_pdc.md#co1, passing `$MACHINE_NAME`, `$MACHINE_NODE`, and `$ENTITY_ID` ="OBJECTS_INI_DUMP".

- [`$CURRENT_STAGE` is `S2`, `S3`, `S4` (`TPSRVP`)]:

  a. Run `{FBAL}`.
  b. Click `32) Historical Logs` about every hour.
  c. Set `Name Filter` to `OBJECTS_INI_DUMP` and hit return.
  d. Look in the `Log Msg` column for `Complete:$MACHINE_NAME` with a timestamp after the deployment.
  e. The `End Date` timestamp will be herinafter referred to `$OBJECTS_INI_DUMP_TIMESTAMP`.
  f. Repeat until you can find such a completion.

3. **Goal**: Verify Results:

...

Arranged into "Goals"

May utilize Common Operations (COs) - generic instructions reused by multiple components

May contain different instructions for different stages

Goals comprised of easy-to-follow steps

PDC Instructions

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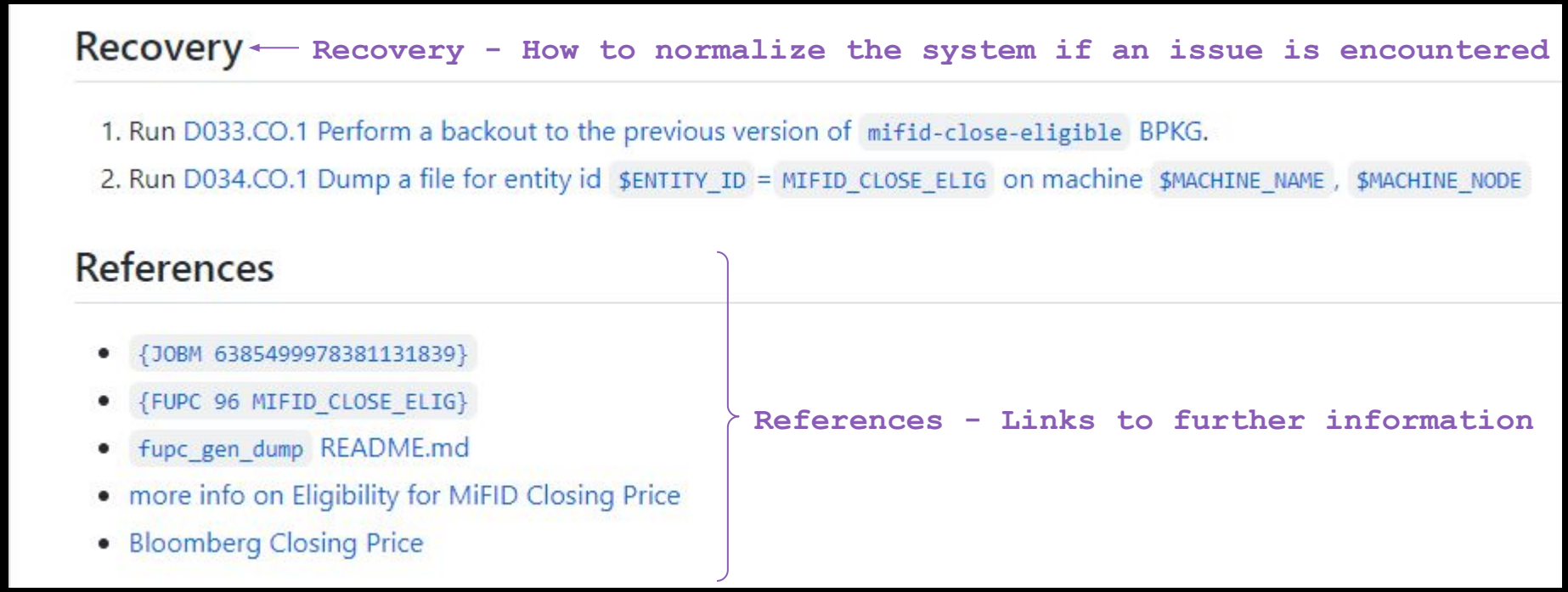

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What can you do now?

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Measure the problem - For what % of your software can you answer what it does and how to build, deploy, and validate it, without digging for more information?

Try and TSAM one of your applications

Adopt a robust documentation standard

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Takeaways

- Relying on a single person’s knowledge of a codebase is unwise
- Legacy code doesn’t need to be rewritten to be great
- A little TLC goes a long way to making legacy code more pleasant to work with
- Standardization is powerful
- The SME fallacy: SME with (Skills > Information)
- Breaking knowledge silos

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Open Engineering Positions

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