Version Control for Data Analysis

at Sheffield City Council

Laurie Platt

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Preface

This documentation is at a very early stage of development.

This document includes good practice for using version control for data analysis at Sheffield City Council. In particular, it provides suggestions and requirements on how the data being analysed is handled by version control.

In addition to good practice, the guidance will also provide some pointers on getting started and links to other resources.

If you're reading this from the PDF version you can view the online version here scc-pi.github.io/version-control.

If you're reading this from the online version you can view the PDF version via the small Adobe Acrobat icon next to the title in index pane on the left, or by using this URL: scc-pi.github.io/version-control/Version-Control-for-Data-Analysis.pdf.

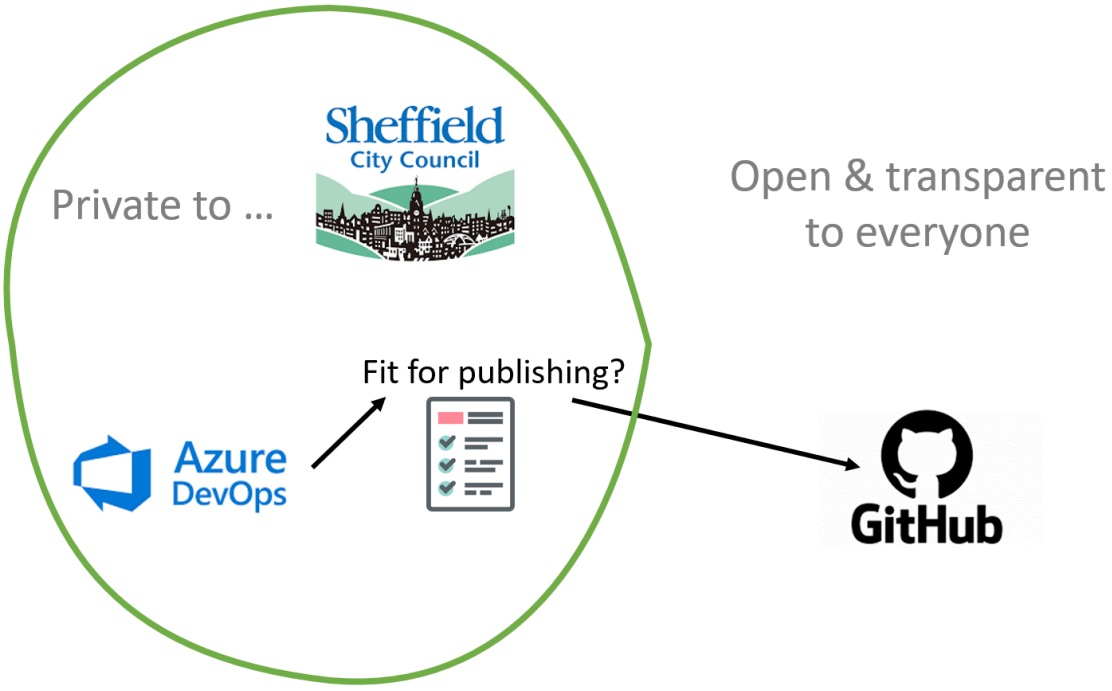
How this guidance is published is detailed in the repository README.md: github.com/scc-pi/version-control#readme

The expectation is that this book, its repo, along with most repos in this GitHub organisation, will move to an Azure DevOps within the Council's secure Azure Tenant. Establishing the Council Azure DevOps for data analysis is currently on hold whilst a new data platform is established.

1 Introduction

A Show and Tell of version control was provided for data analysts at Sheffield City Council in August 2023. A recording and the slide deck is available from the Council's Data Network Sharepoint Site.

1.1 Version control infrastructure



We intend for Azure DevOps to be our default for hosting version control repositories. This will enable us to securely share code with data analysts across the Council.

Making code open and transparent to everyone, not just other Council Officers, is considered best practice. Making a repository publicly available will be done by publishing it on GitHub, but only if it passes a "fit for publishing" checklist.

Our adoption of Azure DevOps is currently on hold whilst we setup a new Data Platform. Until then, GitHub remains our current option. GitHub is subject to more data protection

considerations, so until Azure DevOps is available version control by more Council data analysts is not being encouraged.

1.2 Risks and benefits

The risks of version control are mainly to do with exposing confidential data, whether it's commercially sensitive or PID (Personal Identifiable Data). Other risks are noted in the Fit for Publishing Checklist

To understand both the benefits of sharing code and how to manage the risks, we'll be leaning heavily on resources from: NHS RAP Community of Practice Government Analysis Function Guidance Hub

1.3 ToDo

- Some form of "Getting Started", so subsequent content makes sense. Links to other resources and training?
- Once this guidance is moved to Azure DevOps, include Show & Tell URL.
- Re-write chapter when Azure DevOps available.

2 Data protection

Using version control for data analysis requires data protection to be front and centre of your considerations, as it has to be with any form of data handling. That said, a lot of the risk mitigation will be undertaken as part of an unobtrusive version control workflow, once the workflow is established and well practised. Our procedures will also prompt for particular data protection considerations at different stages:

1. Project initiation and repository creation.

2. Code reviews with a colleague.

3. Fit for publishing checklist.

2.1 Confidentiality risk

The principal data protection risk is confidentiality. Confidentiality is defined as unauthorised disclosure of, or access to, personal data.

Version control for data analysis has three types of confidentiality risk. These relate to what a data analyst may inadvertently include in a **public** version control repository:

1. Data file (e.g. a spreadsheet) with personal data.

2. Some personal data in data analysis output or a script.

3. Secret (e.g. a password) in a script that compromises the security of, for example, a database containing personal data.

These risks are less relevant for SQL scripts than for R and Python scripts, and SQL scripts are more likely for new Council users of version control.

Our Azure DevOps repositories will not be public. Only our GitHub repositories will be public, so the GitHub repositories are the main risk.

2.2 Information Management notes

Once we move to Azure DevOps we may take advantage of the project management tools. However, for now we'll keep track of actions on this page.

Preliminary discussions with the Council's Information Management team have been held. Below are notes of (italicised) questions raised and (bulleted) actions agreed.

1. Are there retention schedules for scripts (and their versions)?
No. Current housekeeping is to periodically (maybe every 6 month) review the list of GitHub repos (repositories) and archive what's no longer in use.

- Formalise and document proposed housekeeping, including retention schedules.
- Extend periodic reviews of repos to include what should be archived, and what should be deleted from the archive.

2. When you publish your data analyses do you indicate anything about the script, its version and a plain English statement?
Each repository includes, as a minimum, a README.md file with a plain English statement. It will also often include further documentation about the data analysis pipeline. The current version and previous versions are an intrinsic aspect of GitHub and Azure DevOps.

- Include the README.md and documentation requirements in the version control housekeeping documentation.

3. When you publish to GitHub (in future) is it checked? attributed to SCC? and come with a disclaimer?

- Unit tests and code reviews are RAP (Reproducible Analytical Pipeline) practices that we're considering adopting.
- Our GitHub repos are held under the scc-pi GitHub organisation and are clearly attributable to SCC.
- Need to consider the different licenses that can be applied to published repos and whether this would cover the disclaimer.

Main action from meeting Information Management:

- Complete mini 2-page DPIA and make MW aware. It might sit under the full DPIA of the new Data Platform.

Other actions:

- Move GitHub repos to Azure DevOps.
- Draft a fit-to-publish (publically on GitHub) checklist.
- pre-commit checks (scripts) or "hooks" that screen for CSVs, PID, {secrets} (e.g. passwords) etc.
- Code review by another analyst will also lessen the risk of inadvertently including data.
- Publish guidance and tools for annonymising datasets for data analysis to encourage working with PID as only by exception.
- Protocols in case of a data breach from incorrect use of version control.

2.3 Other ToDos

- Replace readme with quarto doc and outline quarto book and github actions??
- Move version control content from pinsheff.
- Link to related unmoved pinsheff content.
- Note Version Control Show & Tell e.g. .gitignore /data.

2.4 ToDo

- What are the connotations of personal data being available to someone in the Council who doesn't need access to it? For example, via Azure DevOps?
- Once this guidance is moved to Azure DevOps, include mini-DPIA PDF download URL.

3 Training

4 Code reviews

5 Anonymise

6 .gitignore

7 Repository template

7.1 ToDo

8 Secrets

8.1 ToDo

9 Fit for publishing checklist

10 GitHub roles

10.1 ToDo

- https://docs.github.com/en/organizations/managing-peoples-access-to-your-organization-with-roles/roles-in-an-organization
- https://docs.github.com/en/code-security/getting-started/best-practices-for-preventing-data-leaks-in-your-organization

11 Breach protocol

11.1 ToDo

References