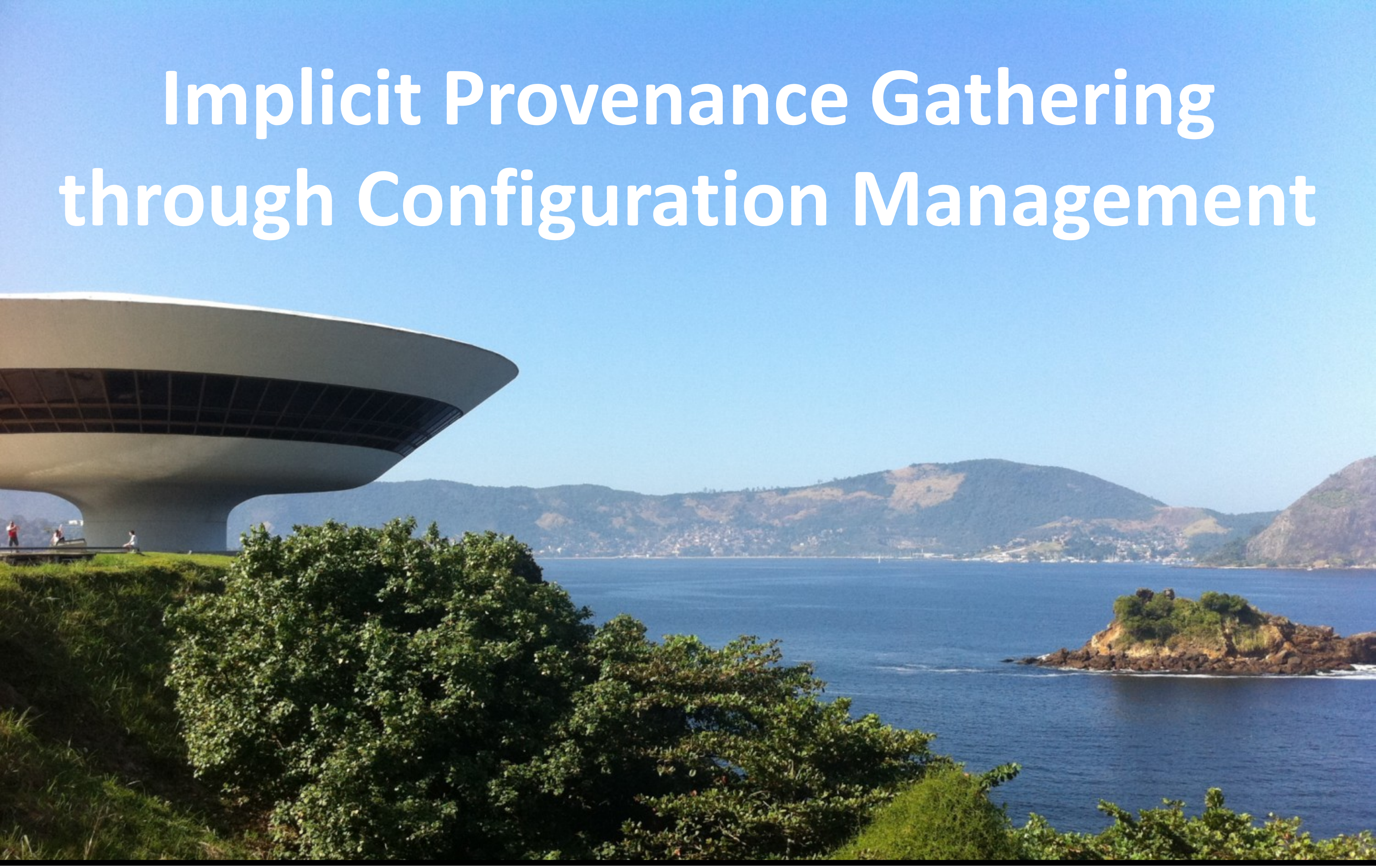
Implicit Provenance Gathering through Configuration Management



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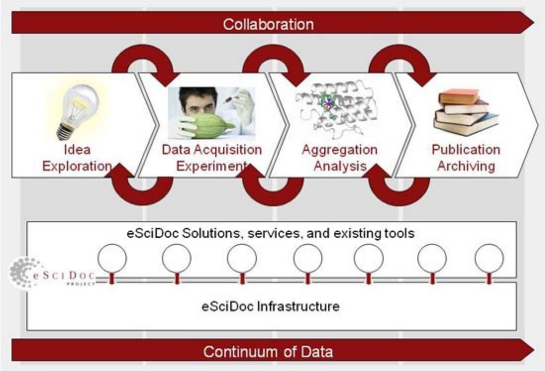
1. Introduction and Background

Scientific experiments

System simulations

Scientific workflows



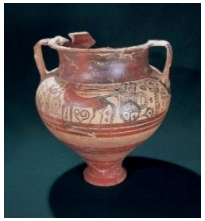
Data transformation

1. Introduction and Background

What is Data Provenance ?

1. Introduction and Background

- Provenance in arts

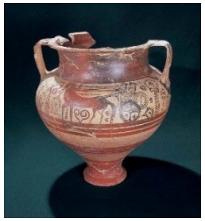


- Data provenance

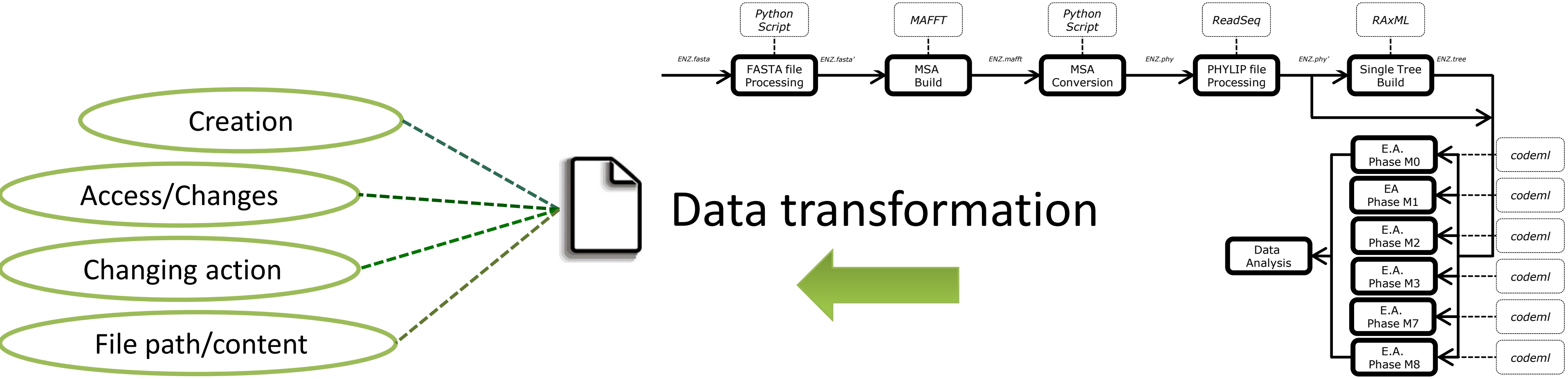
Historical information about data ownership and transformations

1. Introduction and Background

- Provenance in arts



- Provenance in the Experiment context



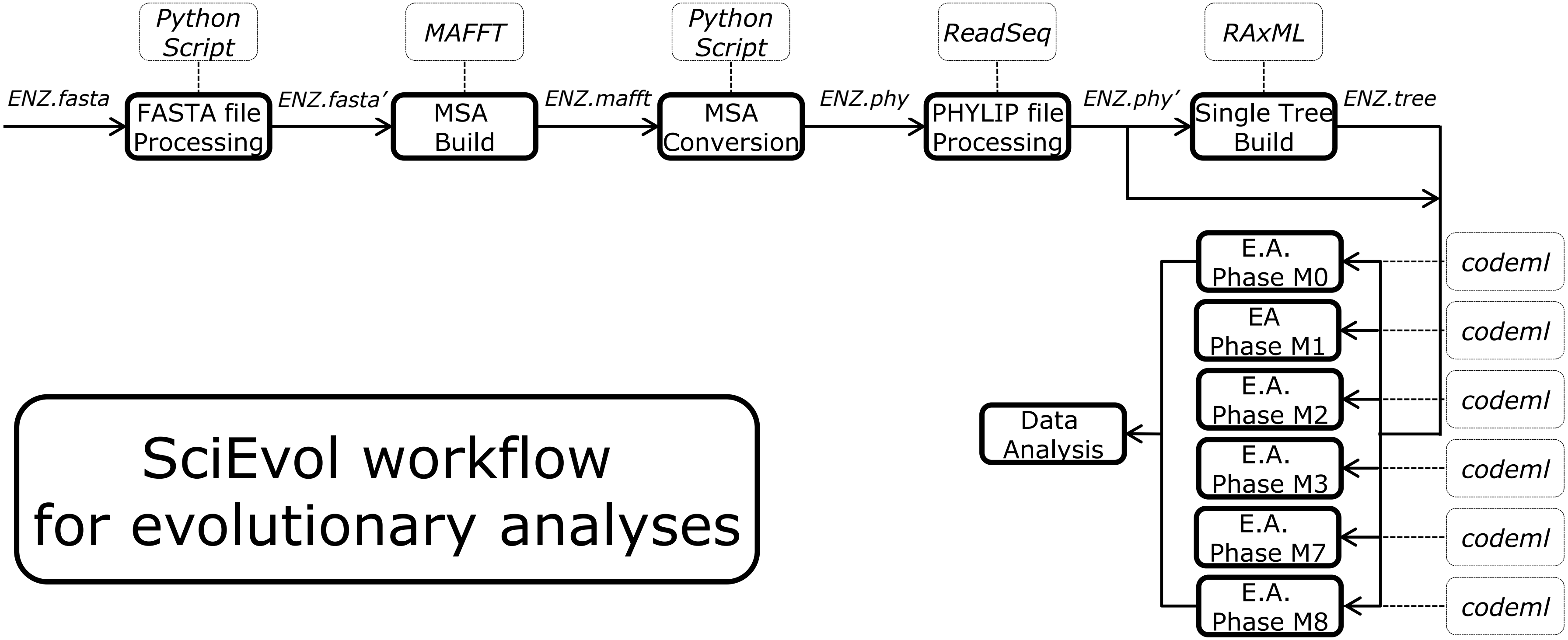
2. Problem Statement

- Provenance gathering goals:

  - Identify the action responsible for data transformation during workflow execution.

  - **Gather data files transformations, even when not explicitly specified.**

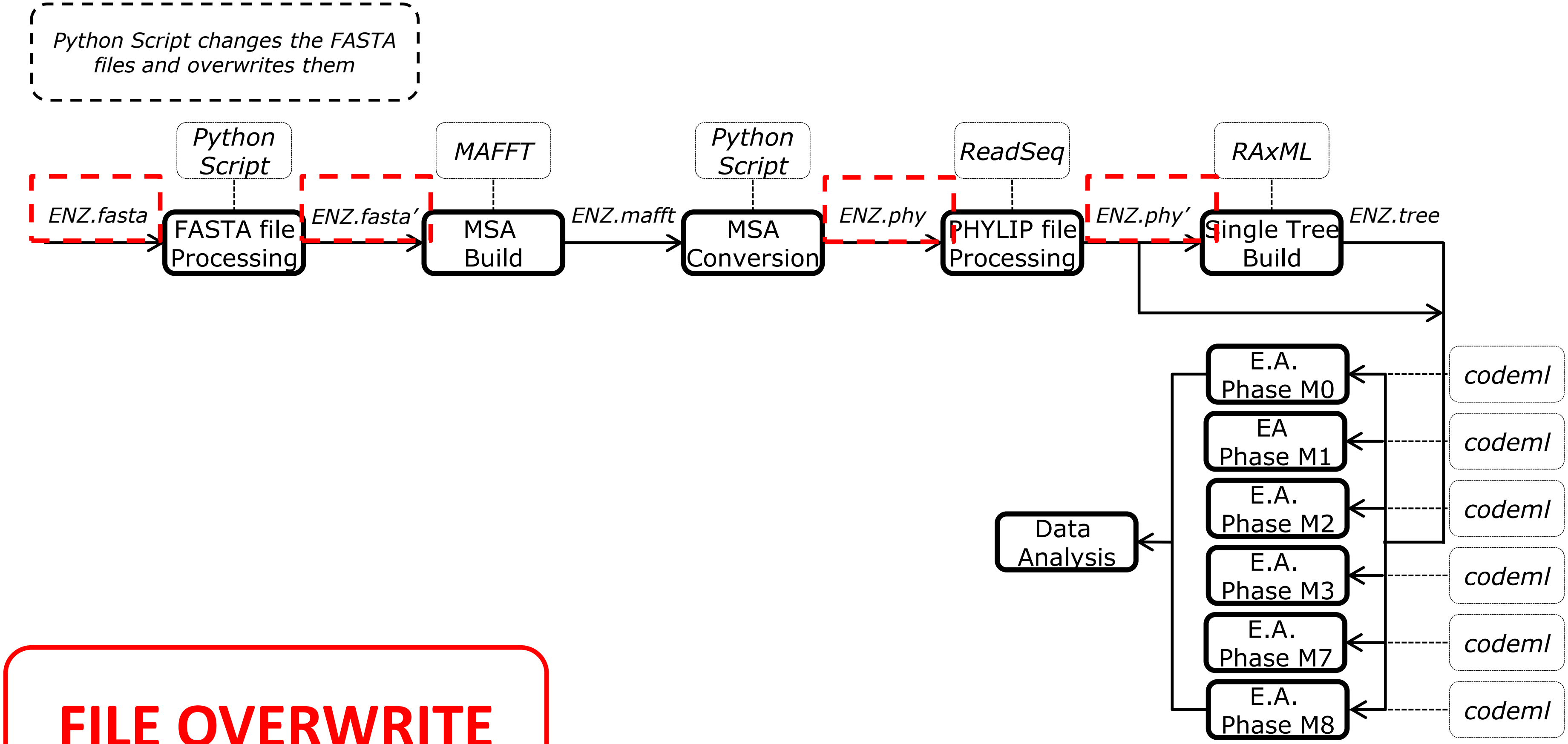
2. Problem Statement



SciEvol workflow
for evolutionary analyses

K. A. C. S. Ocaña, D. de Oliveira, F. Horta, J. Dias, E. Ogasawara, and M. Mattoso, Exploring Molecular Evolution Reconstruction Using a Parallel Cloud-based Scientific Workflow, *Advances in Bioinformatics and Computational Biology*, vol. 7409, Springer Berlin Heidelberg, 2012, p. 179-191.

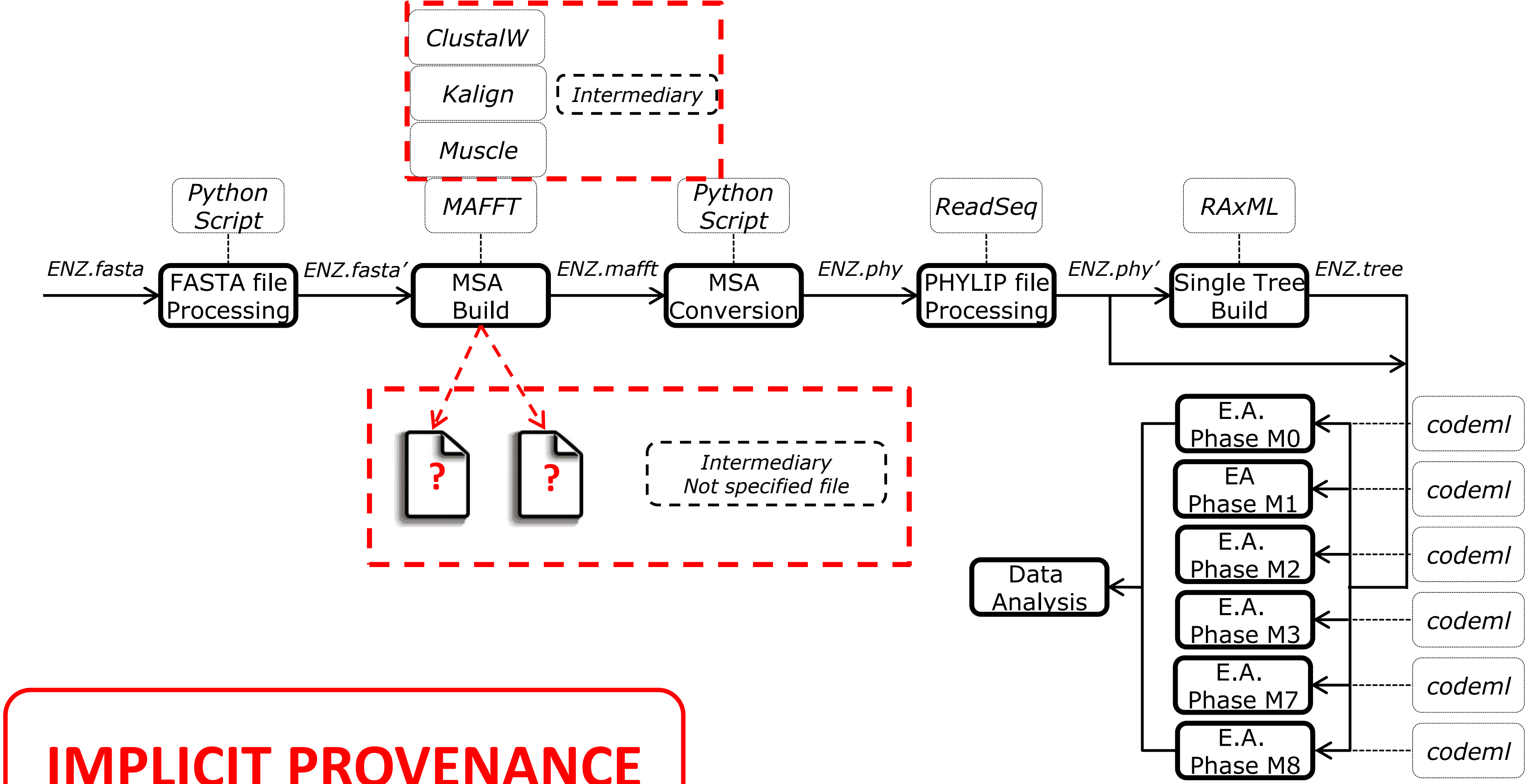
2. Problem Statement



FILE OVERWRITE

K. A. C. S. Ocaña, D. de Oliveira, F. Horta, J. Dias, E. Ogasawara, and M. Mattoso, Exploring Molecular Evolution Reconstruction Using a Parallel Cloud-based Scientific Workflow, *Advances in Bioinformatics and Computational Biology*, vol. 7409, Springer Berlin Heidelberg, 2012, p. 179-191.

2. Problem Statement



IMPLICIT PROVENANCE

K. A. C. S. Ocaña, D. de Oliveira, F. Horta, J. Dias, E. Ogasawara, and M. Mattoso, Exploring Molecular Evolution Reconstruction Using a Parallel Cloud-based Scientific Workflow, *Advances in Bioinformatics and Computational Biology*, vol. 7409, Springer Berlin Heidelberg, 2012, p. 179-191.

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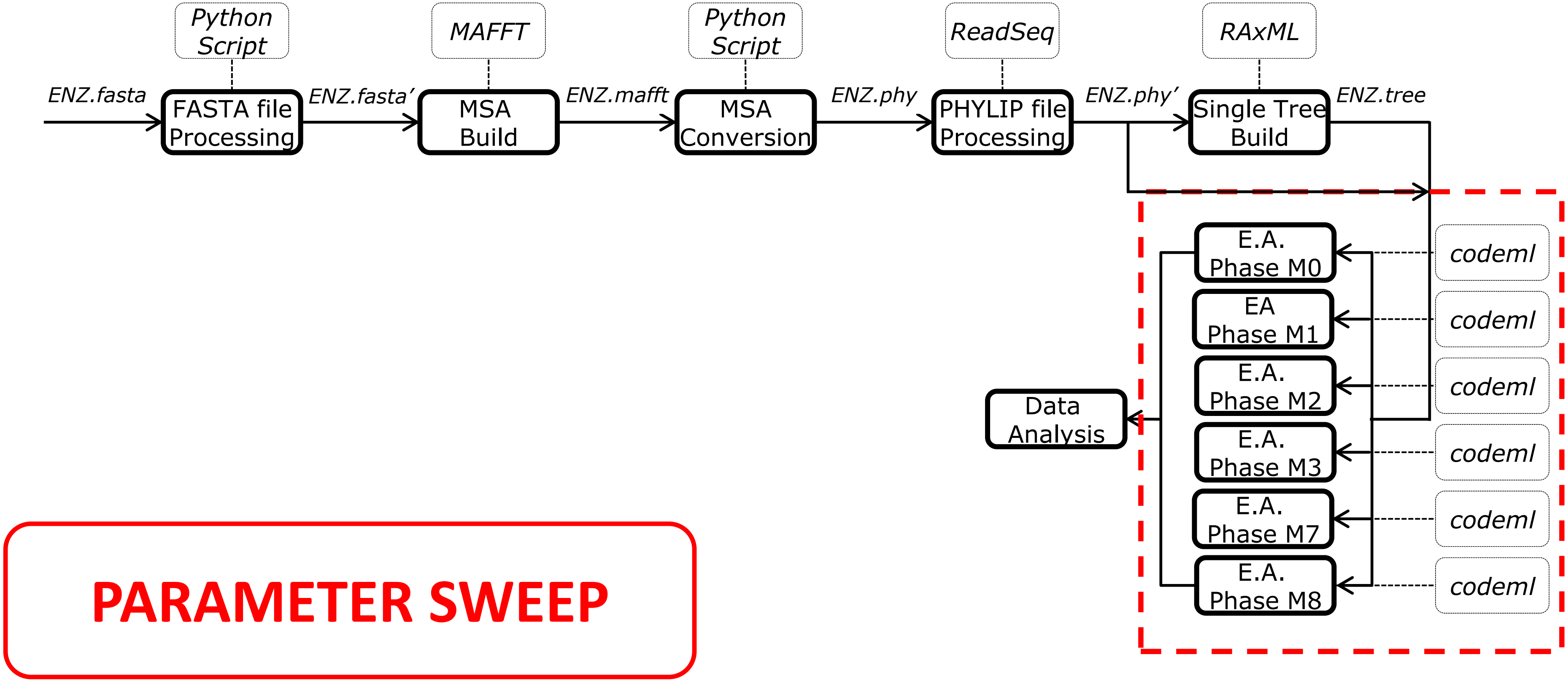


PARAMETER SWEEP

K. A. C. S. Ocaña, D. de Oliveira, F. Horta, J. Dias, E. Ogasawara, and M. Mattoso, Exploring Molecular Evolution Reconstruction Using a Parallel Cloud-based Scientific Workflow, *Advances in Bioinformatics and Computational Biology*, vol. 7409, Springer Berlin Heidelberg, 2012, p. 179-191.

3. The ProvMonitor Approach

- Provenance and CM analogy

  - □ CM perspective
    - ❖ What and Why: issue -> commit

→ workflow activity = issue to be tracked

→ experiment data = configuration item

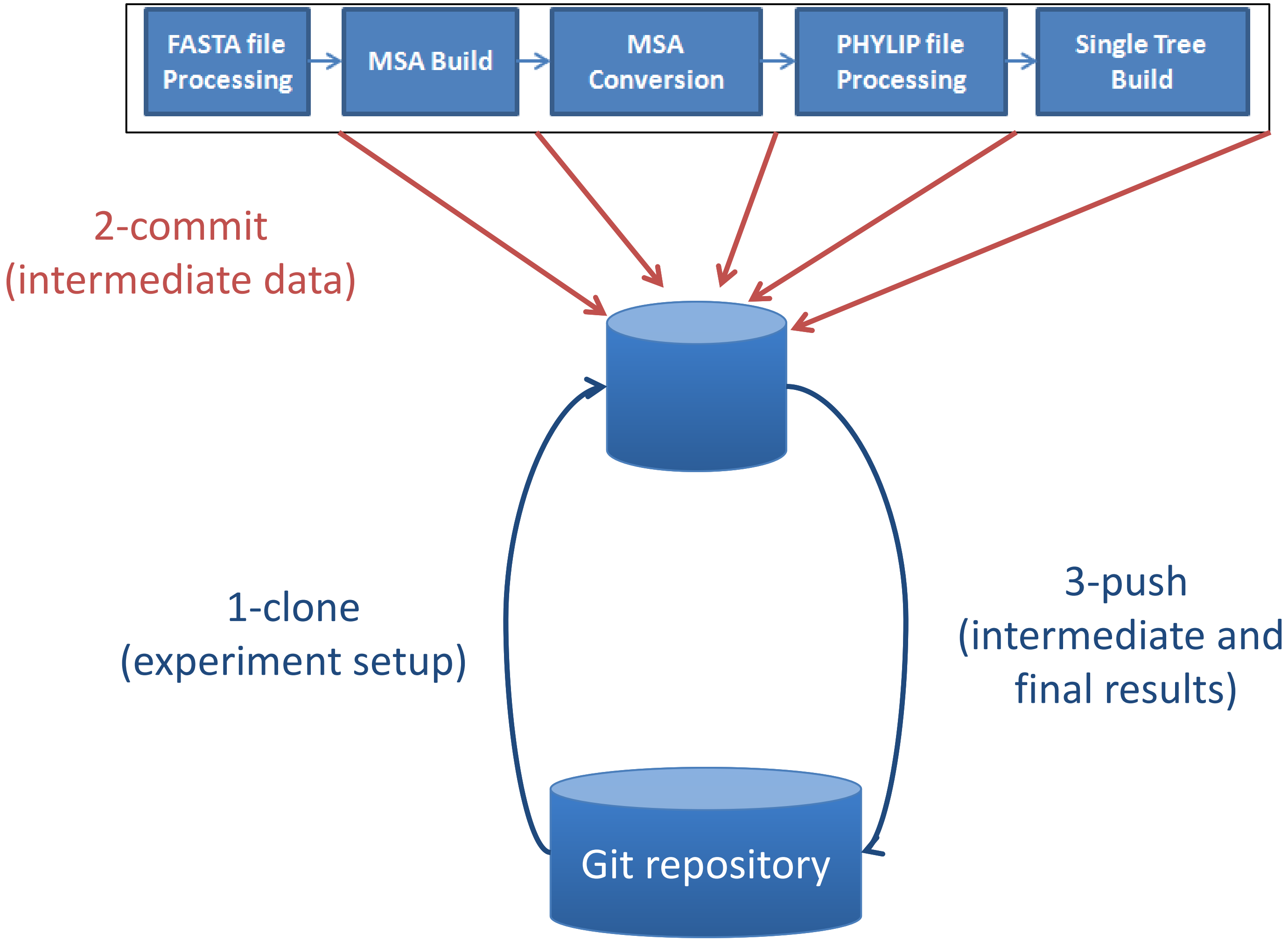
  - □ Provenance perspective
    - ❖ workflow activity -> provenance ≈ issue -> commit

3. The ProvMonitor Approach

- **Our strategy:**
  - Gather Provenance through a Configuration Management perspective.

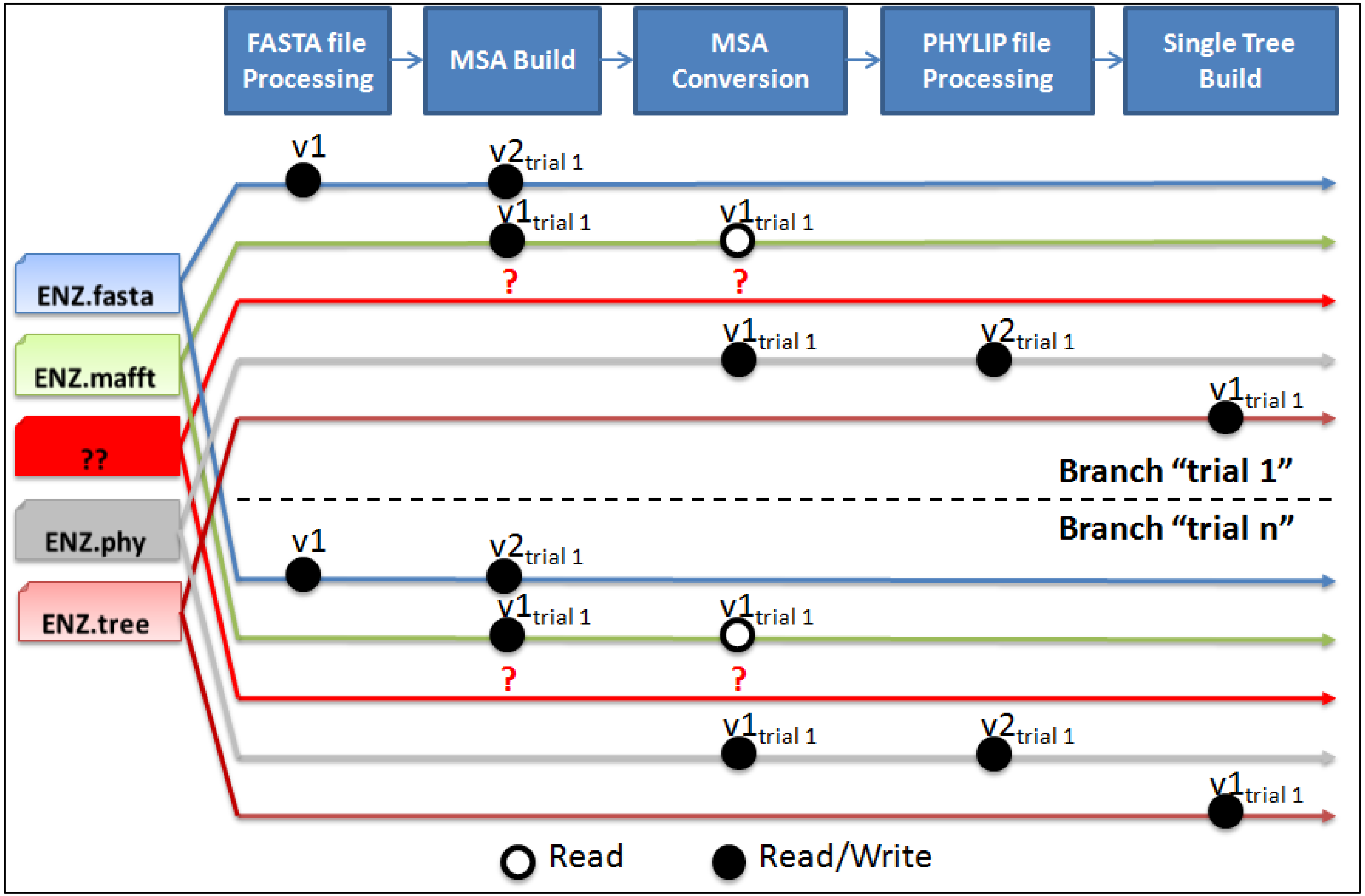
Provenance x CM	
Provenance problem	**CM feature**
File overwrite	Versioning
Implicit provenance	Workspace management
Parameter sweep	Branches

3. The ProvMonitor Approach



3. The ProvMonitor Approach

- Approach gathering and analysis perspective



4. Conclusion

- Main contributions:
  - Implicit provenance definition;
  - Provenance perspective through Configuration Management;
  - Implicit provenance gather mechanism;

4. Conclusion

- Ongoing work:
  - Experiments;
  - New analysis opportunities:
    - Inter-trial;
    - Intra-trial;

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