14th International Workshop on Confluence

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AProVE25: Confluence Analysis in a Termination Tool

UnRAVeL Research Training Group – Uncertainty and Randomness in Algorithms, Verification, and Logic

RWTH AACHEN UNIVERSITY

AProVE

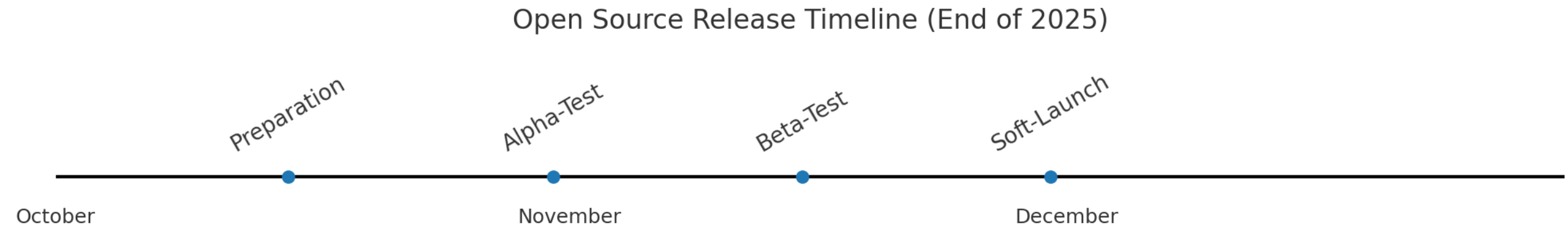
- **AProVE (Automated Program Verification Environment)**:
  - Automated Termination, Complexity, and Safety Prover for Java, C, **Term Rewriting**, Integer Programs, etc.

  - **Confluence Analysis**:
    - Orthogonality Check
    - Strong Confluence Check
    - Modularity Results:
      - Disjoint Union
      - Constructor Sharing
      - Compositable
    - Newman Lemma Check (WCR + **Termination**)

    - Disproving Confluence by Searching for Counterexamples

- **Open Source Release: End of This Year**

Open Source Release



Target License: **LGPL (Lesser General Public License)**

- You can **use, modify, and redistribute** LGPL software (for free or commercially).
- If you **modify the LGPL-covered code itself**, you must release those modifications under the LGPL.
- If you **just use the library** (e.g., link to it in your own code), your own program does *not* have to be LGPL/GPL.

- **Future Ideas:**
  - Probabilistic Rewriting and Confluence
    - Newman Lemma for Probabilistic Rewriting? (Hard Open Problem, [Faggian 2022])
  - Probabilistic Rewriting and Reachability / Infeasibility (Current Research)
    - **Given**: Terms s, t and probability p.
    - **Question**: Does there exist a substitution σ such that $s\sigma \to t\sigma$ with at least / at most probability p?