

# Active Code Generation and Visual Feedback for Scientific Workflows using Tigres

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**Abstract**—Scientist centered design - other workflow tools have failed because they are bulky, require specific languages or otherwise have a high cost of adoption. /SCD keeps the user in mind. The goal of the Tigres project is to provide an API in the spirit of MapReduce that gives scientists the framework needed to develop complex workflows on their desktop for final execution on an HPC system. Tigres provides advanced monitoring and error handling making debugging simpler. This monitoring can be complemented with real-time graphical feedback and code generation with the 'active notepad'. This rich and immediate feedback has the potential to accelerate workflow creation while providing a solid visual waypoint.

## I. INTRODUCTION

Preliminary: in order to become familiar with the Tigres API, I did extensive work to come up with fresh ways of visualizing data. In particular, I employed the DOT programming language (old telephone network visualization tool) to output static models of a Tigres workflow.

To expand user interactivity with Tigres and to drastically speed up the production of workflows, a console and 'active notepad' application are developed to quickly generate python and produce visualizations in parallel.

Additionally, I built upon the standard test cases to produce a module that can create large and intricate workflows on the fly. With this functionality, it became trivial to put my graph generation through stress tests.

Example cite [?]

## II. RELATED WORK

Related Work: use this space to describe the outcome of the paper 'Scientist-centered Design for eScience: A Tigres Case Study' This paper examines the how/why. Key Points: similar to MapReduce with added functionality for various workflows. Integrated Monitoring. Written in standard programming languages.

Identify user needs/expectations of the tool at the earliest stages of development. Goals: 1)ease of composition 2)scalability 3)light-weight execution Discuss the applications of Tigres in the context of the user-groups.

## III. VISUALIZATIONS

Visualization stuff here: Write about early work with DOT - excellent vehicle for learning how Tigres works. Write about experiments with javascript, html and D3

## IV. ACTIVE CONSOLE

Describe the near term goal: acceleration of workflow development. Describe the long term goal: Tigres may be a part of an integrated environment. Having an active code editor will enable a user to get visual feedback in real-time.

## V. CONCLUSION

In conclusion python is great, graphs are fun/pretty to look at and Tigres is an excellent tool for building scientific workflows.

The purpose of my graphs was (to visualize workflows in Tigres) and I used (DOT, Javascript, D3) to make them. The result of having real-time graph generation is (it helps the user make sense of workflows/build them quickly and with fewer errors).

The purpose of the Tigres console was to (generate large chunks of python with minimal input). The purpose of this is to (speed up workflow development and provide a secondary function of the dynamic notepad.)

The purpose of the Active Notepad was to (take minimal input (as in the Tigres Console) but to generate the graphs in real-time, IE no execution between commands - simply write the code to get results.)

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