



## Project Statement

Design, implement, and ship Metro II, a software implementation of a platform based design framework, by July 31, 2007. Metro II is a rewrite of Metropolis, we intend to design Metro II taking into account lessons learned from Metropolis and add functionality in three new areas. When compared to Metropolis, Metro II will be simpler, less confusing and easier to use (as measured by a survey). The team consists primarily of 5-10 graduate student developers able to devote 10 hours each per week (the total expected effort is 1000-1200 hours), with no additional funding.

## Executive Summary

Embedded system design and is becoming very difficult because of more complex designs, shorter time-to-market, and the virtualization of design teams. The platform-based design (PBD) methodology addresses these challenges by separating concerns into an architectural platform and the corresponding functionality. A previous software package, the Metropolis design framework, implemented at University of California, Berkeley, implements PBD and the orthogonalization of concerns. Lessons learned from the Metropolis indicate the need for three new features:

- 1) support importation of pre-designed intellectual property,
- 2) separating cost from behavior when carrying out design and
- 3) exploring the design space in a structured manner.

Metro II is a rewrite of Metropolis that will include these three new features. We intend to ship the following releases:

- an alpha on March 13,
- a beta on June 4 and
- a final release on July 31.

## Customers

Our customers are:

- the students themselves (so they can do research, write papers, Masters reports and Ph.D. theses),
- our corporate sponsors (taking our ideas and putting them into products) and
- the public at large (increasing knowledge for the greater good).

Metro II will be used by embedded systems designers and researchers who are interested in simplification of the embedded design process. The principal investigator (PI) faculty member is our project sponsor, he would like to see smooth, orderly, on-time development and delivery. In addition, the PI would like to increase visibility of the project (as measured by citations in Citeseer and by increased web traffic) and identify a more productive software development process for the academic environment as measured by an anonymous survey of team members.

## **Project Approach**

The product is a major reimplementations of an older product, so we will use a spiral development methodology using rapid prototyping of the core architecture and parallel development of the three new features. We will use iterative software management techniques that are focused on continuous integration relying on nightly builds with regression tests for validation.

The project team will consist of

- One Principal Investigator Faculty Member (0.05 FTE, where 1 FTE = 40 hrs/ week)
- Five to Ten University Students (roughly 1.2-2.5 FTE)
- Two Staff Members (0.15 FTE)

Project management will be provided by the staff. The project sponsor is the faculty member. The sponsor has agreed to meet review milestones and to authorize alpha, beta and final releases.

## **Organizational Objectives**

These are organizational objectives are not being promised, but are hoped for:

- Decrease the amount of stress and chaos involved in creating a software release.
- Involve students more directly in the production of the release.
- Deliver a high quality release with well written documentation and few bugs.
- Deliver prereleases to our academic community at a conference in March.
- Provide a basis for research by incoming graduate students.

## **Project Deliverables**

### **Metro II 1.0:**

- A schedule along with time estimates.
- A prioritized list of features.
- An alpha release in time for the March 13 meeting. This release will consist of a source tar file download from the website.
- A beta release of the full product in time for the June 4 meeting. This release will consist of a source tar file download from the website.
- A final release on the website by July 31 that will include completed documentation.

### **Customer's Acceptance Criteria:**

Positive feedback about Metro II's ease of use in real world situations, (especially in comparison with Metropolis) measured by a short survey (via Survey Monkey) of previous Metropolis users outside of the group.

### **Stakeholder's Acceptance Criteria:**

A 10% increase in the number of academic citations of papers written by the group measured over 1, 2 and 5 years via Citeseer.

### **Not included:**

- Cell processor demonstration,
- Implementation of the proposed Metro II Constraints feature.

## **Constraints**

- The Faculty member and staff members have responsibilities elsewhere, so they will have very little time to supervise or otherwise participate in the development and release process.
- The graduate student programmers have limited time as well (25% utilization or 10hrs/week).
- The March 13 and June 4 deadlines are fixed deadlines.
- Because of budgetary and contractual reasons, hiring out significant portions of the development is not possible.

## **Risk and Feasibility**

- If we choose to include too many features, we may end up including features that either .that are either incomplete or buggy.
- If we choose to include too few features, then there will be little difference between this release and previous releases.

We plan to mitigate these risks by planning early and becoming more restrictive to change requests as we get closer to release dates. Identifying problematic features early in the development process will help us meet our deadlines. We intend to use ad hoc meetings and the wiki to update maintain status reports. Regular meetings and feedback will help avoid problems with this very loose reporting structure.

The project is feasible in that it is very likely, barring an act-of-god catastrophe, that we will ship product on the appropriate date. Our nightly build system provides good quality source trees which allow us to create releases in roughly 1 week. If need be, we can delay the release of the final documentation.