SixDesk

Version 1.0

the Simulation Environment for SixTrack

User's Reference Manual

R. De Maria, M. Giovannozzi, E. McIntosh, A. Mereghetti, F. Schmidt, I. Zacharov

Updated by: P. D. Hermes, D. Pellegrini, S. Kostoglou

Abstract

SIXTRACK [1] is a single particle tracking code widely used at CERN. One of its most important applications is the estimation of the dynamic aperture available in large storage rings like the Large Hadron Collider (LHC) or the Future Circular Collider (FCC). These studies require massive computing resources, since they consist of scans over large parameter spaces probing non-linear beam dynamics over long times. The SIXDESK [2, 3] environment is the simulation framework used to manage and control the large amount of information necessary for and produced by the studies.

This document updates the previous documentation, and describes how massive tracking campaigns can be performed with SIXTRACK starting from a MADX "mask" file. The SIXDESK environment is an ensemble of shell scripts and configuration files, aimed at easing the everyday life of the user interested in performing large parameter scans with SIXTRACK.

Acknowledgement

Some acknowledgements.

Contents

CONTENTS

Chapter 1

Introduction

1.1 Work Flow

Show workflow of production of results, both for BOINC (including "processed" folder) and HTCondor. Retrieval of results depends on the submission platform:

- `run_results`: BOINC

- `run_status`: HTCondor, HTBoinc

1.2 The BOINC Platform for Volunteering Computing

BOINC vs local batch system (e.g. HTCondor)

1.3 Pre-requisites

SixDesk is native to `lxplus.cern.ch`. Hence, for running in such an environment, the user does not need to set up anything. On the contrary, in case of a local machine or other distributed resources,

Table 1.1: Pre-Requisites

Component	reason
kerberos	to renew/check credentials via `klist` and `kinit`
AFS (local mount)	retrieval of optics files
	submission to BOINC via spooldir
HTCondor (local installation)	submission of jobs to local batch system
`python2.7`	SixDB
	computation of floating point scan parameters

Chapter 2

Giudelines and Common Pitfalls

2.1   Choice of Platform

HTCondor is convenient when:

1. results should be collected quickly. This can be the case when the user has short time to collect data or the simulation set-up is being defined. In the second case, indeed, one does not want to wait too long for proceeding;

2. short or few jobs per study. This can be the case when re-submission of selected cases is necessary, e.g. to complete a study when few points in the scan are missing;

The BOINC platform for volunteer computing is convenient in case of large simulation campaigns, i.e. when simulations are long or they are in high number (e.g. hundreds of thousands of jobs).

Bibliography

[1] F. Schmidt, "SixTrack: Version 4.7.16, Single Particle Tracking Code Treating Transverse Motion with Synchrotron Oscillations in a Symplectic Manner, User's Reference Manua", CERN/SL/94–56 (AP), CERN, Geneva, Switzerland (2017), http://sixtrack.web.cern.ch/SixTrack/docs/user_full/manual.php

[2] M. Hayes and F. Schmidt, "Run Environment for SixTrack", LHC Project Note 300, CERN, Geneva, Switzerland (2002), https://cds.cern.ch/record/691785/files/project-note-300.pdf

[3] E. McIntosh and R. De Maria, "The SixDesk Run Environment for SixTrack", CERN-ATS-TE-2012-089 TECH, CERN, Geneva, Switzerland (2002), https://github.com/SixTrack/SixDesk/blob/master/sixjobs/doc/sixdesk_env.pdf

[4] "Berkeley Open Infrastructure for Network Computing", http://boinc.berkeley.edu

Bibliography

List of Tables