Procedure for Proposing a Tier 1
WLCG Note – 10th March 2012

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This note outlines the procedure and requirements for a grid site desiring to become a WLCG Tier 1. It should be read together with the Memorandum of Understanding[1] (MoU) that sets out specific requirements not duplicated here.

Process

A Tier 1 site has a number of significant roles and responsibilities. In the set up of the WLCG the first 11 Tier 1 sites went through several years of testing and ramping up of resources and services, and training of the Tier 1 staff in order to achieve the performance and reliability goals. Thus it is important that proposed new Tier 1 sites understand that there is a responsibility to demonstrate that they are able to achieve the same level of service and performance. Of course the experience and expertise of several years of operation of the existing Tier 1s can be used to aid in this process. A site that has shown itself as a very reliable and usable Tier 2 will clearly have already achieved some of the necessary levels of service.

The process to be followed is:

1. The site should prepare with the WLCG Management Board (MB) a detailed plan that explains which experiments will be hosted and how it will demonstrate the functionality, performance, and reliability appropriate to a Tier 1 site, including a timeline and milestones to be achieved along the guidelines set out in this document.
2. The plan will be presented to WLCG Overview Board (OB) which will recommend to the WLCG Collaboration the acceptance or otherwise of the proposal, contingent upon the milestones and key metrics proposed being achieved. At this point the centre in question will assign the MoU as an *associate* Tier 1.
3. The WLCG Management Board will monitor progress on ramping up to a full service level, and will report progress to the Overview Board.
4. When all the milestones have been declared to have been achieved by the WLCG MB, a final report will be presented to the WLCG OB which will recommend that the associate Tier 1 should become a full Tier, or otherwise. Normally the timescale for satisfying the milestones is expected to be around 1 year.

This process was approved by the WLCG Overview Board at its meeting of March 9th, 2012.

[1] WLCG MoU: http://cern.ch/LCG/mou.htm

Requirements of a Tier 1

The important elements that a Tier 1 must provide are set out in the WLCG Memorandum of Understanding. The conditions of the MoU will not be changed for a new Tier 1 and it will be expected to sign under the same conditions as the existing Tier 1s. There are a number of key requirements and metrics to be achieved and the Tier 1 proposal should describe how the site plans to achieve them and on which timescale. These are:

1. Resources
   - Eventual provision of a dedicated optical connection to CERN at the agreed capacity (currently this is 10 Gb/s). This connection should become part of the LHCOPN and ideally be supplemented by a back-up or alternate connection to CERN in case the primary route is unavailable. This connection is to be used for Tier 0 – Tier 1 or Tier 1 – Tier 1 traffic. This provision should be done in collaboration with CERN. The Tier 1 proposal should describe how the connectivity bandwidth would be implemented during the prototyping stage of the Tier 1. Clearly, initially the dedicated OPN connection may not be available, but the Tier 1 should work with the CERN networking and OPN team to build a plan for connectivity.
   - Traffic to Tier 2 sites should transit via the usual academic Internet. For this reason a Tier 1 site is normally expected to have excellent connectivity to the national academic network backbone. What this means in practice should be discussed with the experiments concerned and their expectations for Tier 1 – Tier 2 traffic. This should be described in the Tier 1 proposal.
   - A Tier 1 should provide a CPU and Disk capacity of a significant fraction of that required by each experiment it will support. Typically this is of order 10% of the global total Tier 1 requirement of the experiment, with the absolute minimum being 5% of the experiment needs as presented to and endorsed by the Computing Resource Review Board. The mix between CPU and Disk should be optimised together with the experiment to ensure a balance to effectively use the resources. The internal networking must be demonstrated to be sufficient to support the anticipated workloads.
   - A Tier 1 must provide a tape archive service. The capacity of the archive must be sufficient to store its share of the raw data of each experiment as well as an agreed share of other data. The site must guarantee the availability of that data for the lifetime of the experiment. The MoU explains what this means and how a Tier 1 could eventually exit from this responsibility.
   - The Tier 1 must demonstrate that it is capable of accepting a copy of an agreed fraction of the raw data of the experiment and be able to write that to tape at a rate that is consistent with a delay defined in agreement with the experiments concerned. Since the copy of the raw data at a Tier 1 is the assurance that there are 2 copies this is normally expected with a very few days. The exception if the Heavy Ion data for ALICE where the delay is longer due to the high data acquisition rate.
2. Services
   - The site must run the set of Tier 1 services for the target experiments as agreed with the WLCG MB and the experiments.

- The site must provide the agreed level of support for those services, as set out in the MoU. Typically this means providing on-call support for key services year-round.
- The Tier 1 must demonstrate the appropriate level of availability and reliability of its services as set out in the MoU. The site must install the agreed set of WLCG monitoring sensors and agree to allow test sensors to run which will independently determine the availability and reliability of the site. These data will be published to the WLCG collaboration each month.
- The Tier 1 must provide the interface to the WLCG accounting services and publish accounting data on all of the work performed by the supported experiments. These data are also published monthly.
- A Tier 1 is expected to support a number of Tier 2 sites. How this is done depends on the national and regional structure, and on agreement with the experiment(s) supported. Such support implies providing technical support and help to the Tier 2 sites, as well as acting as a data source according to the computing model of the experiments.