CMS Centres Worldwide

How to create a CMS Centre @ My Institute

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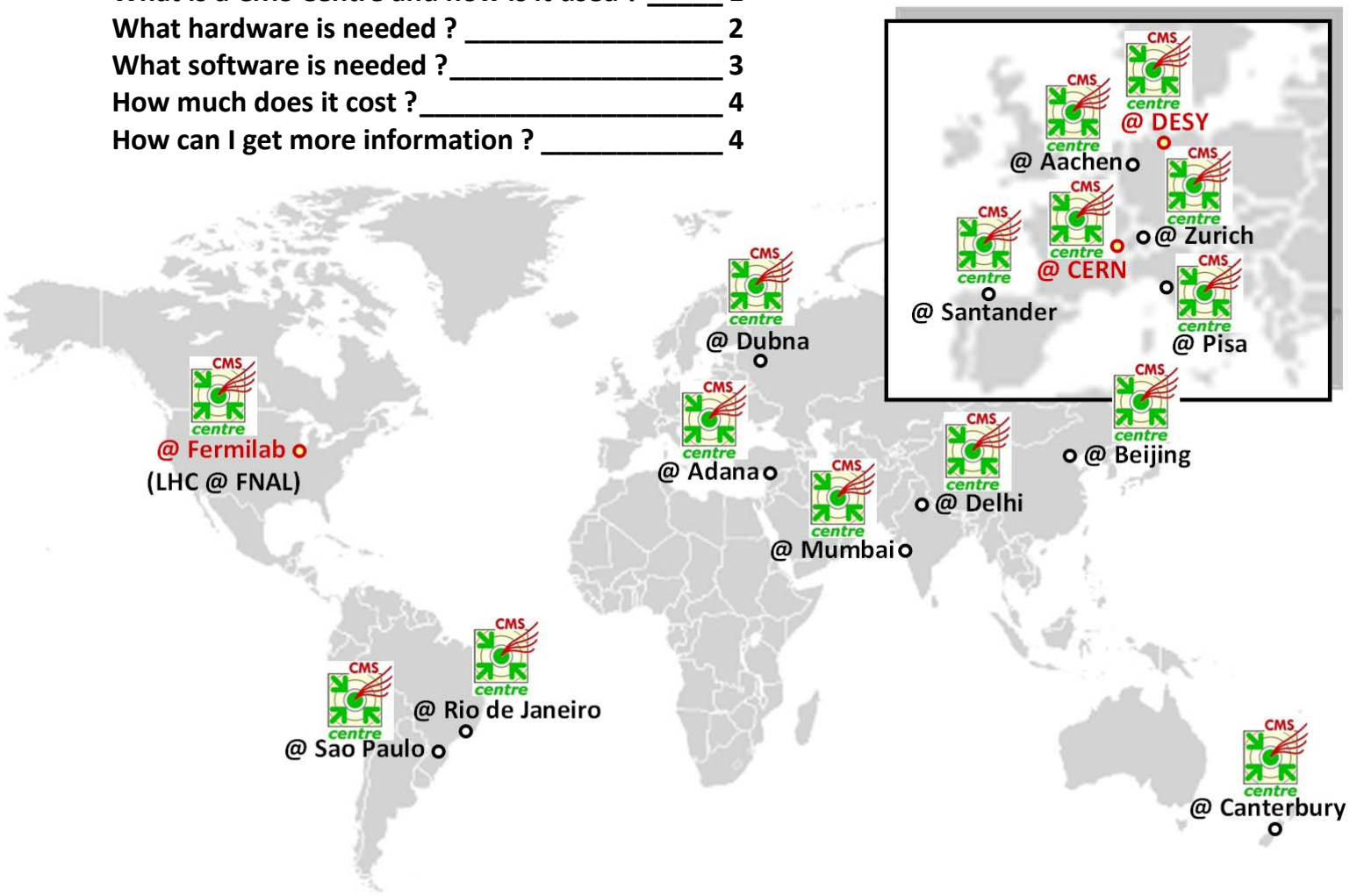
This paper addresses the following frequently asked questions:



What is a CMS Centre and how is it used ?

CMS is establishing a network of "CMS Centres Worldwide" at CERN, in the Americas, Asia, Australasia, and Europe; the current locations are shown above. The goal is to help all collaborators to participate effectively in the CMS research programme, irrespective of location.

A CMS Centre is a communications focal point for students, post-docs and faculty. It is a common (physical and virtual) work place with easy access to up-to-date information via (Web) services. As shown in the photo below of the CMS Centre@CERN, there are numerous status and monitoring screens, interactive consoles, high quality video-conference systems, meeting rooms and outreach displays.

CMS Centres are used for CMS operations, sub-detector data quality monitoring

(DQM), data analysis, and outreach. They may also participate in CMS computing (grid) operations. When CMS running stabilizes, remote shifts may become possible for certain tasks (e.g. computing operations or DQM) but this is not guaranteed from the outset.

A CMS Centre increases CMS visibility in the institute, helps attract new students, and supports outreach activities such as tours, discussions with physicists, live displays, posters, and other exhibits.

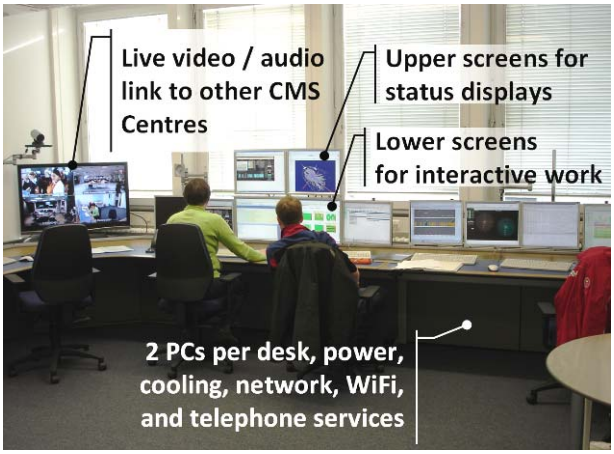
CMS Centres may also be used for media events. For example, on the LHC First Beam Day event of 10th Sept. 2008, the world's largest scientific press event since the moon landing, 37 media organizations visited the CMS Centre @ CERN from where BBC TV News broadcast worldwide throughout the day (photo).

What hardware is needed ?

A CMS Centre at an institute is a scaled-down version of a major centre. It requires a room of 20 sq. m or more with electrical power, networks, lighting, cooling, heating, and ventilation systems consistent with a modern office.

Computing systems

A CMS Centre has a number of computing consoles or desks (photo). Each console has



two lower screens for interactive work connected to one Linux PC. The two upper screens, connected to another non-interactive PC, show displays of the LHC and CMS status, detector monitoring pages, event displays, etc. The content on all the upper screens is served and configured through the ci2i Web application (described below); no mouse or keyboard is

connected to the upper screens' PC. Each console requires about ten power sockets (total 2 kW) and four network sockets: two for the PCs, one with DHCP for a laptop, and one spare, e.g. for a printer.

Videoconferencing systems

The major CMS Centres (CERN, FNAL, DESY) are linked to the CMS Control Room and each other by a permanently-running, high-definition, commercial videoconference system. One can just approach the TV and talk to remote people (see photo).

Smaller CMS Centres use a software video system (EVO) to connect to remote locations as needed. It is foreseen to establish permanent EVO meeting rooms for various CMS communities.

Outreach

There should usually be two large computer (TV) displays or projectors for top-level status and outreach material. These are connected to a single PC which typically runs the Web-based CMS-TV system (described below). Additional posters or detector exhibits may be desirable.

Other Considerations

The room should preferably be centrally located and close to the CMS users and a meeting room. Issues to bear in mind include: acoustics; security; storage; kitchenette; access to a printer, scanner, fax machine, photocopier, and toilets; whiteboard; and a web camera.

What software is needed ?

The PCs usually run CERN-standard Linux. This is not a rigid constraint as most applications are Web-based, as described below.

Monitoring Web Applications

There are various Web applications to help follow CMS operations, notably the DQM system used by all CMS sub-systems:

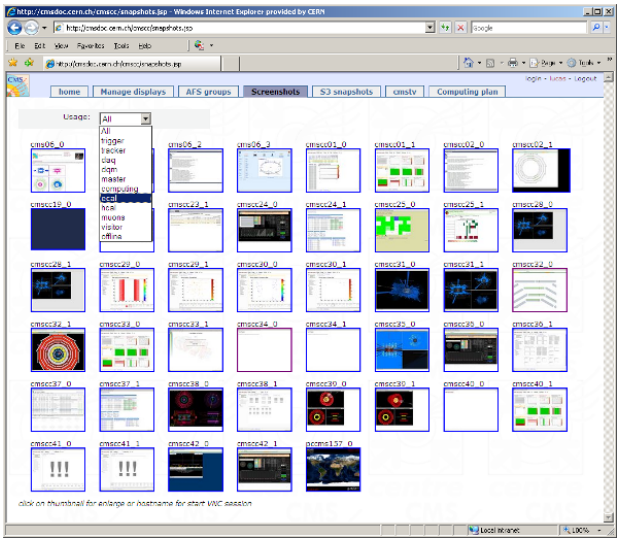
http://cmsdoc.cern.ch/cms/performance/commissioning/monitoring.html).

ci2i (see eye to eye) Web Application

This tool enables many CMS Centre tasks to be managed from a Web browser:

http://cmsdoc.cern.ch/cmscc/ e.g.

- viewing of remote displays (photo);
- mapping of monitoring content (URLs) to local or remote displays;
- hardware configuration;
- group accounts and user privileges;
- screen snapshot services; and
- operations planning tools.



"CMS-TV" Web Application

"CMS-TV" shows displays (e.g. CMS page 1, event displays, etc.) on large screens in CMS Centres. It is a bit like a TV news channel that repeatedly cycles through news, business, sport, etc. It aggregates a set of URLs to form a single new URL, or "TV channel," viewable in a Web browser: *http://cmsdoc.cern.ch/cmscc/cmstv/cmstv.jsp?channel=1* (F11 for full screen and change channel with upper links). New "TV channels" can be set up easily using ci2i.

How much does it cost ?

General equipment costs 7.3 kCHF and the consoles are 3.6 kCHF each (see table), so the total cost is approximately

Cost ≈ 7.3 + (3.6 × no. consoles) kCHF.

Thus a CMS Centre with two full consoles costs 14.5 kCHF, or less if some equipment is re-used. To equip all 182 CMS institutes with a CMS Centre would cost 2.6 MCHF.

How can I get more information ?

- L. Taylor et al., "*Functions and Requirements of the CMS Centre at CERN*", CMS NOTE-2007/010, 16 March 2007
- L. Taylor et al., "*CMS centres for control, monitoring, offline operations and prompt analysis*" Proc. of CHEP '07, 2–7 Sept. 2007, Victoria; J. of Phys: Conf. Series, Vol. 119, 2008.
- *http://cmsdoc.cern.ch/cmscc/index.jsp*

Who to contact

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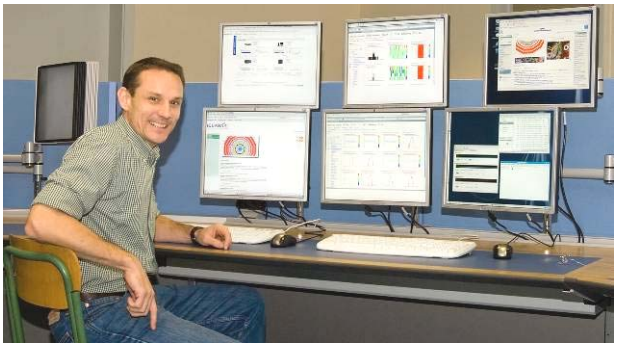

Cost of general equipment		Unit cost (CHF)	Quantity per centre	Total Cost (CHF)
Large screen displays	LCD / plasma display (> 40") or projector + screen for showing LHC/CMS status, event displays, etc.	1500	2	**3000**
Linux PC	To drive display screens	900	1	**900**
Outreach displays	For example posters	500	1	**500**
Video conference system (low-end - see footnote*)	PC running EVO (software) coder/decoder	900	1	**900**
	Camera, e.g. Logitech PRO 9000 or QuickCam Vision Pro (high definition)	140	1	**140**
	Echo-cancelling microphone (e.g. PHOENIX Duet Executive USB/RJ11 or ClearOne Chat 150 USB)	360	1	**360**
	Display TV with built-in speakers	1500	1	**1500**
Total cost of general equipment				**7300**

Cost per console		Unit cost (CHF)	Quantity per console	Total Cost (CHF)
Linux PC	One for interactive work (on lower row of screens) One for status displays (on upper row of screens)	900	2	**1800**
LCD flat screen (e.g. 19")	Two for interactive work (lower row of screens) Two for status displays (upper row of screens)	375	4	**1500**
Multi-screen support	Physical support for 2 x 2 array of screens	300	1	**300**
Total cost per console				**3600**

* Alternative option: higher quality H.323 hardware coder/decoder (connected point to point or via MCU), camera, microphones, etc. (e.g. Tandberg, Polycom, or Aethra). Need a PC if using EVO. 5600