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Computing and Network structure for Diamond

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Diamond Light Source is a light source synchrotron facility of recent construction.

Computing and networking must support both production and research. Mostly
production in the running of the synchrotron, mostly research in the experimental
beamlines attached to it.

This has required a dual structure, and especially for the beamline system a careful
attention to growth requirement. Existing plans call for experimental data rates in
aggregate approaching those of the LHC at CERN.

Synchrotron computing is based on PowerPC and ARM based control and monitoring
systems and powerful workstations running monitoring software; synchrotron networking
on a multimode fibre, 1gb/s infrastructure and CAT6 1gb/s connections to leaf nodes.

Experimental computing is based on industry standard storage servers, clusters and
GNU/Linux; networking is based on a 10gb/s singlemode fibre infrastructure and 1gb/s
CAT6 links to end nodes, but soon we will have 10gb/s links to servers both on
singlemode fibre and CAT6 when 10GBASE-T products become available.

Interesting challenges and research in the near future as detectors improve resolution
and diffractometers improve sample positioning. A tomography experiment which results
in data rates of 400MB/s for a day is already being investigated.

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