

AccessionIndex: TCD-SCSS-T.20121208.099

Accession Date: 8-Dec-2012

Accession By: Dr.Brian Coghlan

Object name: csTCDie GPU Cluster

Vintage: c.2011

Synopsis: 64-core/32-GPU/16-node cluster using 1Gbps Ethernet interconnect.

Description:

The first Irish Beowulf cluster was constructed in 1997 by the School of Cosmic Physics in the Dublin Institute for Advanced Studies. The second Irish Beowulf cluster was constructed in the middle of the same year by the Department of Computer Science in Trinity College Dublin, a highly experimental configuration of 4-nodes that used a SCSI interconnect, the first of a number of clusters constructed by the department, some very production-oriented, others more adventurous, see elsewhere in this catalog.

In 2011 the last of these, this GPU cluster, was constructed by Dr.B.A.Coghlan for grid access via the Grid-Ireland infrastructure (see elsewhere in this catalog). After the closure of the Grid-Ireland infrastructure in 2012 the GPU cluster was dedicated to postgraduate research, in particular by John Walsh, who was and remained leader of the EGI task force on GPUs.

The GPU cluster consisted of sixteen Intel Sandybridge compute nodes, each with four cores and two GPUs, for a total of 64 cores and 32 GPUs, using a switched 1Gbps Ethernet interconnect. The nodes were distributed over two large custom shelving units. It was essentially a traditional Beowulf cluster [1], but with two nVidia GPU accelerators per node. Subsequent related research focussed on virtualising the accelerators within the grid infrastructure to enable remote submission of jobs that were dependent on the accelerators while remaining within the existing grid information standards. This was the subject of Dr. John Walsh's 2016 PhD thesis *Accelerated Computing on Computational Grid Infrastructures* [2].

This cluster was decommissioned on 16-Jun-2018, but one node, wn124, has been preserved in this Collection, see Figs.5-8 below.

The homepage for this catalog is at: <https://www.scss.tcd.ie/SCSSTreasuresCatalog/>
 Click 'Accession Index' (1st column listed) for related folder, or 'About' for further guidance.
 Some of the items below may be more properly part of other categories of this catalog,
 but are listed here for convenience.

Accession Index	Object with Identification
TCD-SCSS-T.20121208.099	csTCDie GPU Cluster, 64-core/32-GPU/16-node cluster using 1Gbps Ethernet interconnect, c.2011.
TCD-SCSS-T.20121208.099.01	csTCDie GPU Cluster node wn.124, GPU Cluster node, c.2011.
TCD-SCSS-T.20121208.094	Experimental SCSI Cluster, 4-node prototype cluster using SCSI as interconnect, the first cluster constructed in the Department of Computer Science, Trinity College Dublin, and second cluster constructed in the Republic of Ireland, 1997.
TCD-SCSS-T.20121208.095	csTCDie Beowulf Cluster, Departmental cluster using 100Mbps Ethernet as interconnect, the second cluster constructed in the Department of Computer Science, Trinity College Dublin, 1998.
TCD-SCSS-T.20141120.003	csTCDie Grid-Ireland SCI Cluster, 16-node cluster using 400MB/s SCI switched interconnect, the third cluster constructed in the Department of Computer Science, Trinity College Dublin, c.1999.
TCD-SCSS-T.20121208.097	VREngine, 9-node virtual reality engine using 600MB/s SCI 2-d toroidal interconnect, c.2005.
TCD-SCSS-T.20121208.098	csTCDie Grid Site Beowulf Clusters and Datastore, Complex of clusters & storage (1500 cores/600 TB) using 1Gbps Ethernet interconnect and 10Gbps backbone, participant in DataGrid, EGEE, EGI, and CERN LHC computing. From 2013 repurposed as SCSS Cloud, c.2009.
TCD-SCSS-T.20121208.106	csTCDie PS3 Cluster, Ten nodes from a 16-node Sony Playstation PS3 cluster plus build machine, using 1Gbps Ethernet interconnect and running Yellow Dog Linux, c.2009.

References:

1. Wikipedia, *Beowulf cluster*, see: https://en.wikipedia.org/wiki/Beowulf_cluster
 Last browsed to on 30-May-2023.
2. John Walsh, *Accelerated Computing on Computational Grid Infrastructures*, School of Computer Science and Statistics, Trinity College Dublin, 2016, see: <http://www.tara.tcd.ie/handle/2262/77671>
 Also see: <https://www.cs.tcd.ie/coghlan/PhDtheses/JohnWalsh-final-submitted-PhD-thesis-20161020-1106.pdf>
 Last browsed to on 31-May-2023.



Figure 1: csTCDie GPU Cluster



Figure 2: csTCDie GPU Cluster left three-quarter view



*Figure 3: csTCDie GPU Cluster right three-quarter view
(one node out of service at time of photograph)*



Figure 4: csTCDie GPU Cluster closeup



Figure 5: csTCDie GPU Cluster node wn124, front view



Figure 6: csTCDie GPU Cluster node wn124, rear view



Figure 7: csTCDie GPU Cluster node wn124, rear upper closeup



Figure 8: csTCDie GPU Cluster node wn124, rear lower closeup