IMAN1 Project

Jordan's First Super Computer

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Introduction to IMAN1

IMAN1 -- Jordan’s First & Fastest Supercomputer!

The Goal of the project was to achieve “Supercomputing Power” within the most economical parameters.

This Goal was achieved by building IMAN1 using 2260 PlayStation3 devices, basically turning a video gaming console into a supercomputer powerhouse!

Peak performance of **25 TeraFLOPS**

Introduction to IMAN1

The Project Started in January 2011 and went live in mid. 2012.

IMAN1 was designed, engineered, and developed completely in Jordan by Jordanian resources.

IMAN1 was built for a small fraction of the price of other supercomputers.

End result -> a supercomputer with one of the best Price per Performance ratios in the HPC Market.

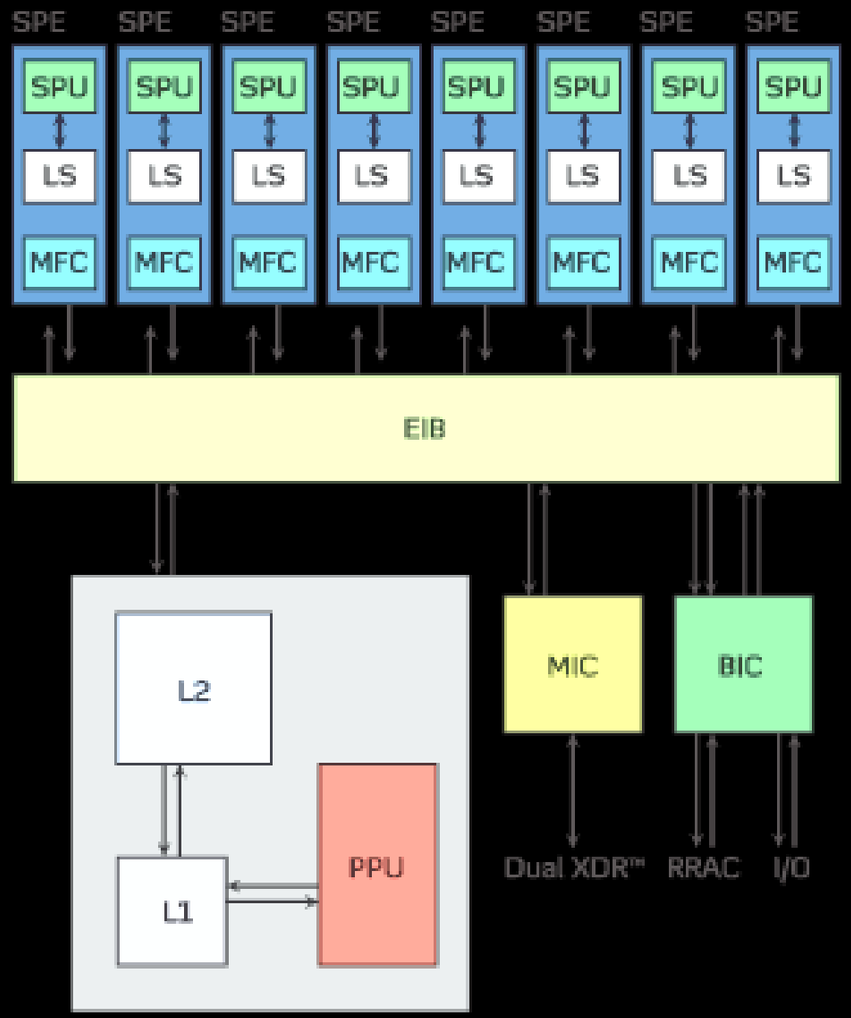
Why we used the PS3?

1) PS3 is an open platform

2) It has a revolutionary processor called the IBM Cell Processor

3) It is cost-effective

The IBM CELL Processor



1 PPE (Power Processing Element)

- 64-bit PowerPC
- SMP (2 threads)
- 3.2 GHz
- 256MB XDR DRAM

8 SPEs (Synergistic Processing Element)

- 256 KB SRAM
- 3.2 GHz with VMX vector unit
- 128-bit Vector Registers

EIB (Element Interconnect Bus)

- Interconnects PPE, SPEs, Memory, I/O
- Simultaneous Read/Write

MIC (Memory Interface Controller)

- Interfaces to XDR Memory

IMAN1 Software

Yellow Dog Linux 6.2

- Open source
- Built upon the RHEL/CentOS core
- The world's leading Linux for the Power architecture

Open MPI

- Open source MPI-2 implementation
- Used by many TOP500 supercomputers

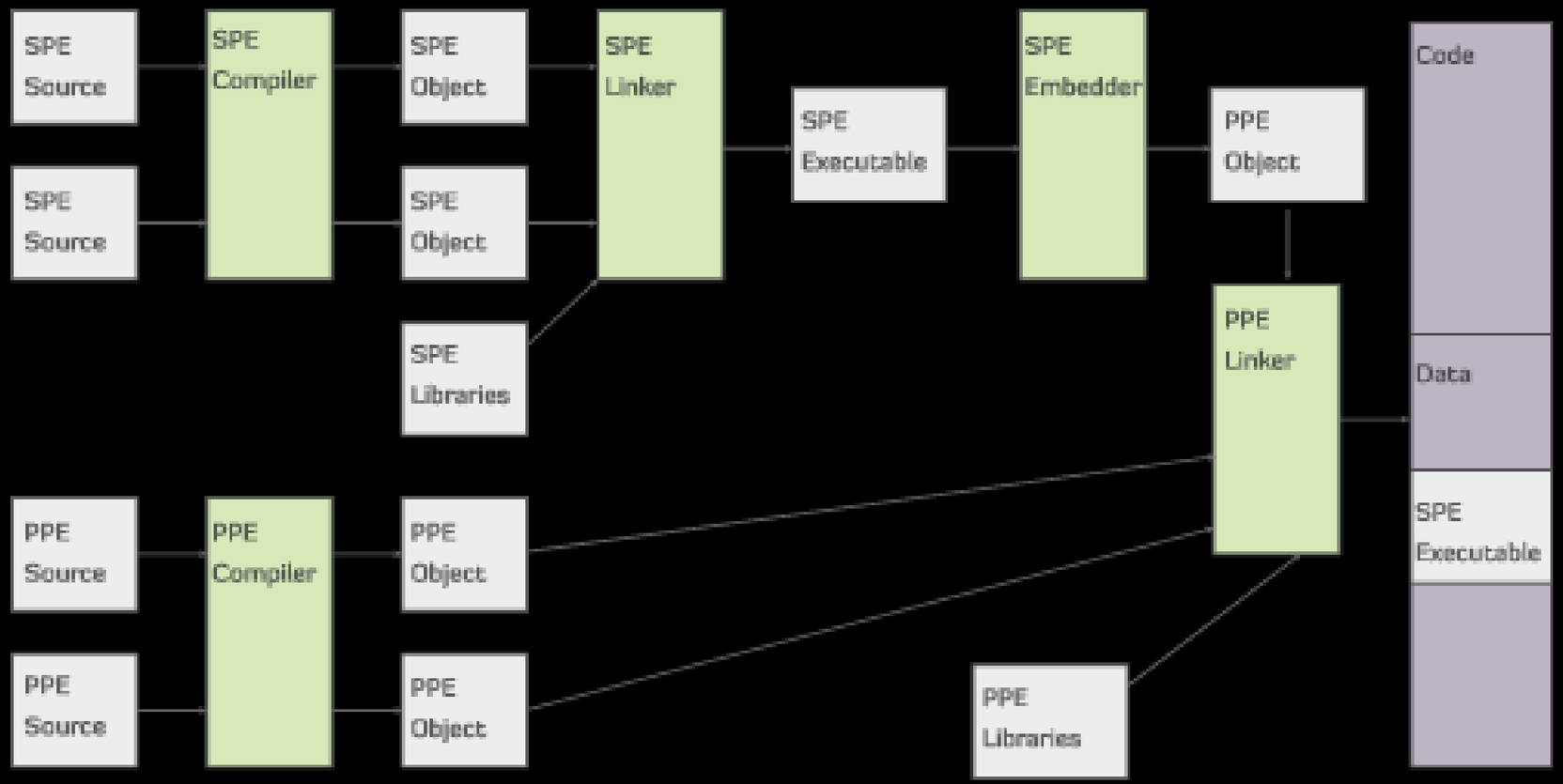
The GNU Compiler Collection

- GCC, G++, etc

Cell SDK (Software Development Kit) Version 3.1

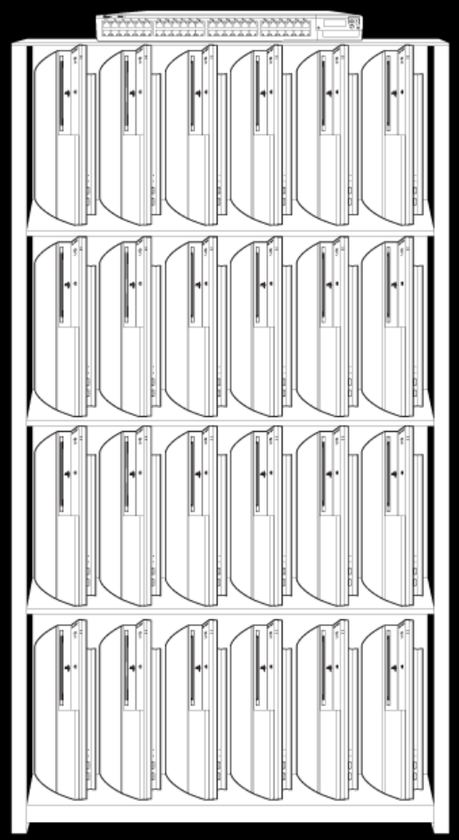
- Two Different Compilers for PPE and SPE.

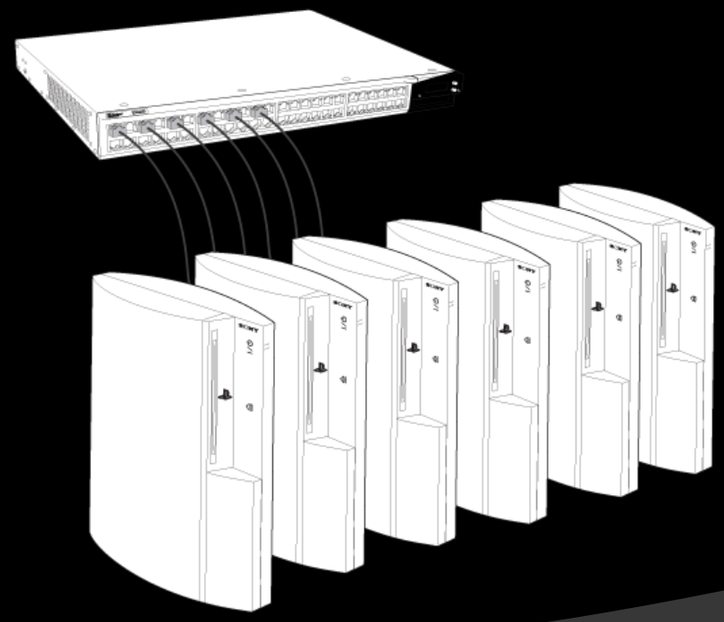
- SDK Includes Compilers and Debuggers, SIMD Libraries, Full System Simulator, etc



IMAN1 Structure

- 110 cabinets, each cabinet houses 24 PS3s
- Maximum capacity = 110 x 24 = 2640 PS3s





The Network Structure

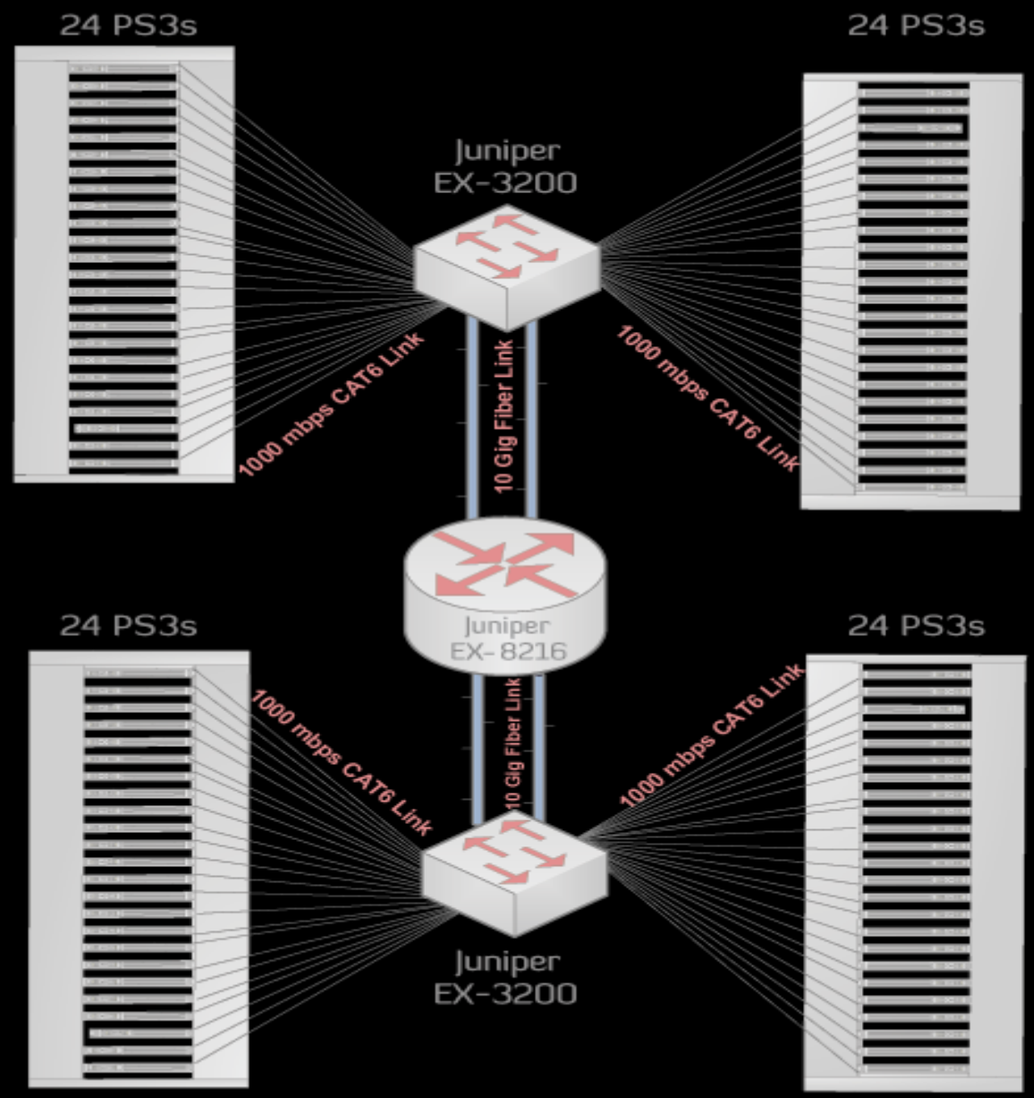
The network structure is based on the following 2 Layers:

1) Distribution Layer
2) Core Layer

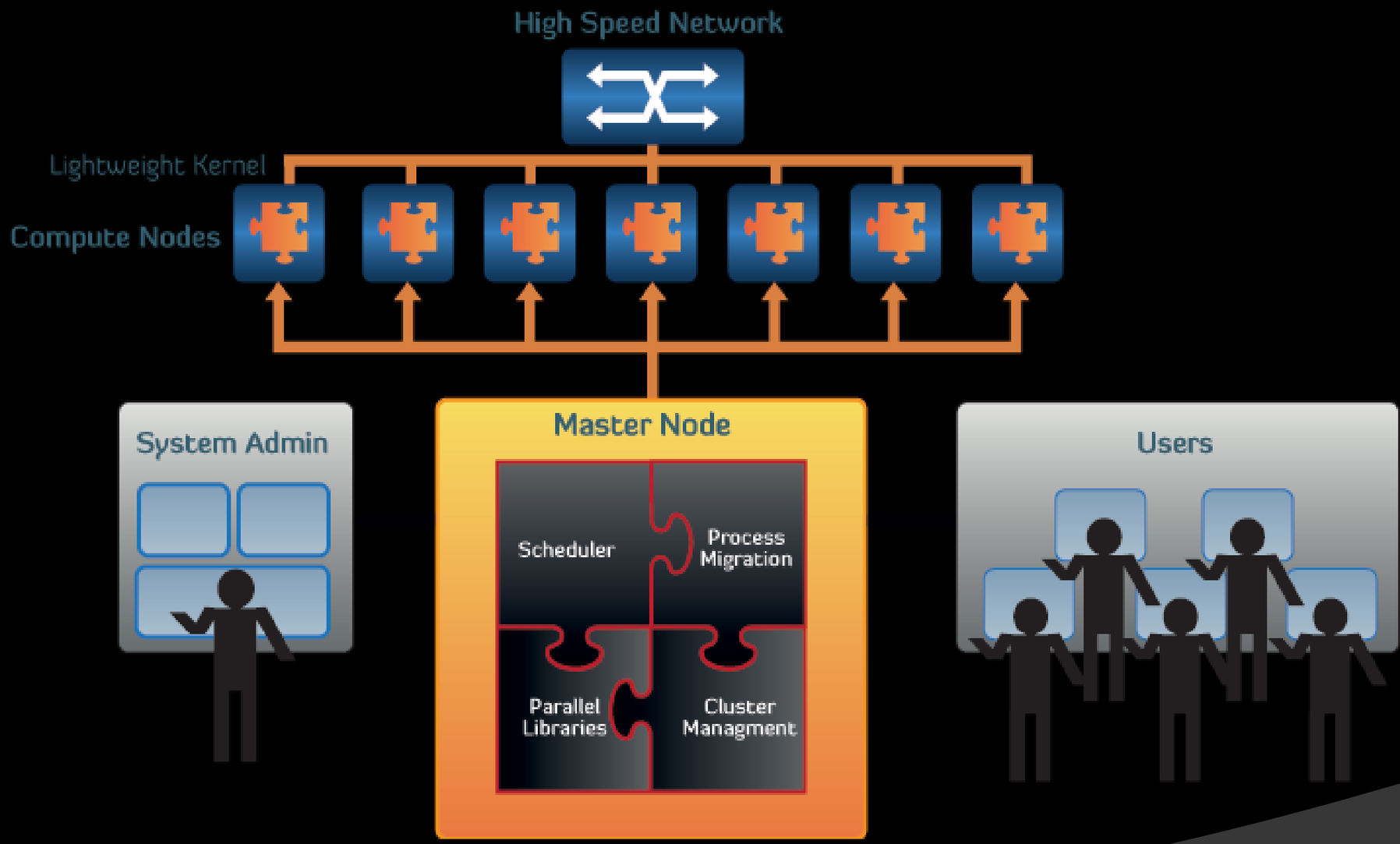
Juniper EX3200, 48-Port Switch

Juniper EX-8216 Switch

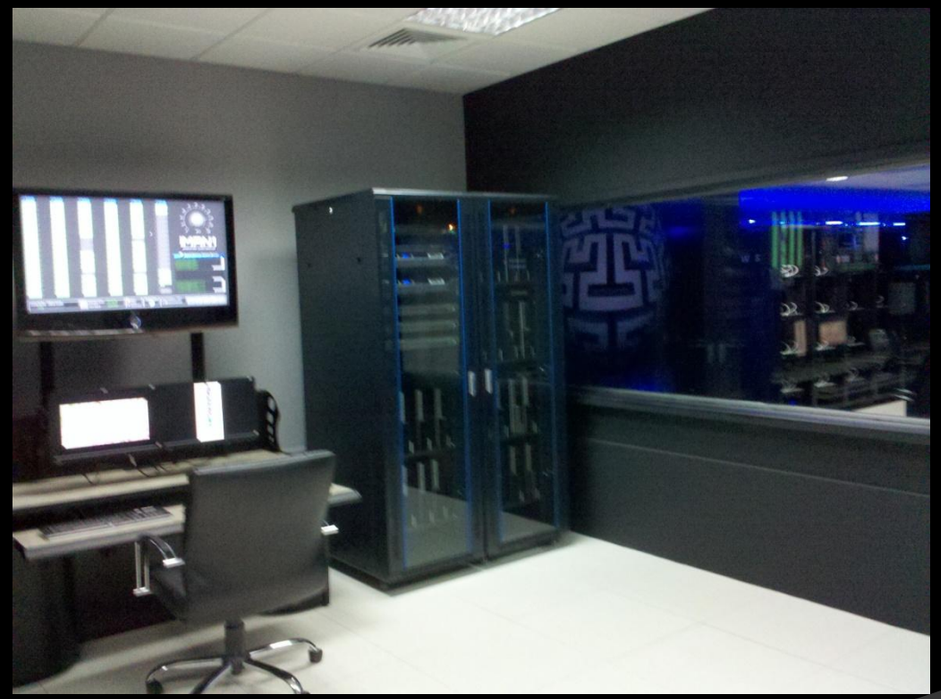
The Network Diagram



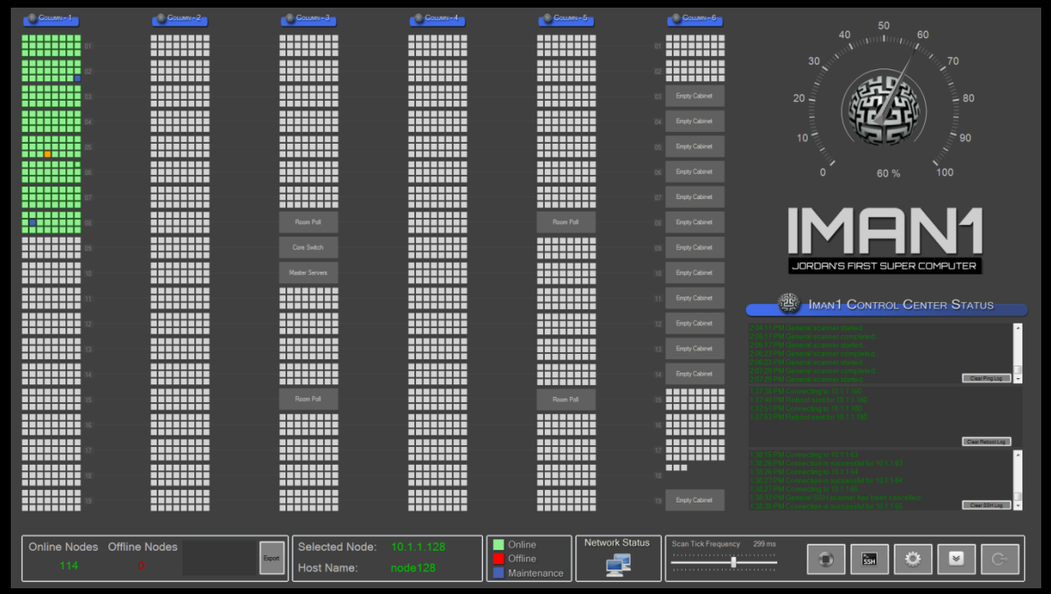
The Master Node



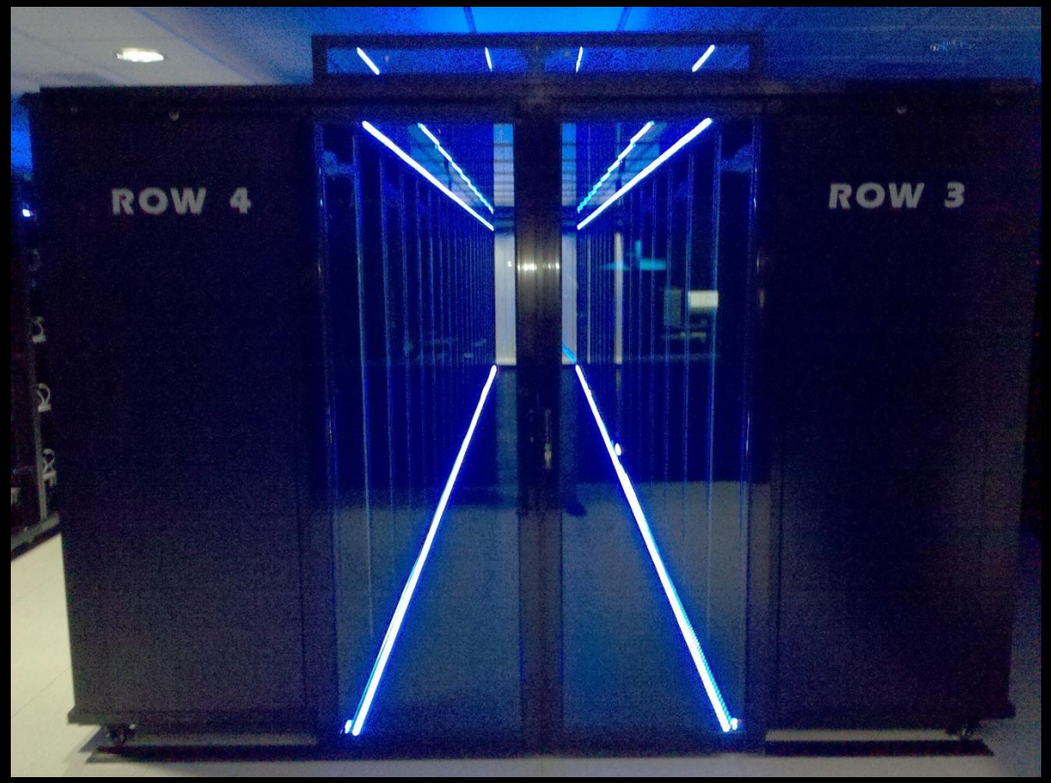
Control Room



Screen Shots



System Room



System Room

Iman1 project embodies the
Jordanian spirit “accomplishing
great things with limited resources
and making the impossible possible”.

THANK YOU FOR YOUR TIME