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Pure Power Integrated Manager

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Abstract*: *The need to redefine cloud for small and medium scale businesses coupled with the need for rapid deployment has led to conceptualize and develop a rack based cloud offering. This system provides an application ready environment and is a complete, flexible cloud infrastructure system. This is a fully integrated and optimized solution for all kinds of business needs. There exists no system to provide a seamlessly integrated system where the compute, storage and networking devices are integrated for the Pure Power System. The Pure Power Integrated Manager is a software that helps manage all the compute, storage and networking devices connected to the rack. This system was further extended to offer multi-rack support to integrate and manage all devices within the rack. IBM Rational Team Concert with jazz was used as the code repository.

Keywords: Cloud, Pure power system, Integrated Manager

I. INTRODUCTION

The Pure Power System assists with the executives of large information, web-based social networking, versatile, examination, and the progression of basic data. A Pure Power System can be designed in a moderate section level arrangement in a solitary rack, and it is light sufficiently footed to be extended for adaptable cloud organizations. It has worked in repetition for exceptionally dependable and flexible activity of requesting applications and cloud benefits as required by numerous ventures [1]. It additionally gives the adaptability, adaptability, and flexibility that you interest for business-basic remaining tasks at hand. The Ethernet and capacity region systems are completely excess. The Pure Power System arrangement is a finished foundation stack that can be conveyed in hours as opposed to days [7,8].

IBM Pure Power System is a finished, adaptable cloud framework with incorporated mastery. The framework incorporates and upgrades all figure, stockpiling and net-working assets to convey application-prepared foundation out of the crate [9,10]. These completely coordinated, streamlined arrangements can be designed for your particular business need and might be supplemented by extra help and organization administrations. Pure Power System consists of the following components:

- Enterprise rack
- IBM POWER8 compute nodes
- Management nodes
- Networking and I/O switches
- IBM Storwize V7000 storage enclosures
- Software:
  - IBM Power Virtualization Center (Power VC) Standard Version 1.2.3.2
  - Pure Power Integrated Manager software portal plus Nagios Core open source monitoring
  - Integrated software and hardware
  - Three-year service and support agreement
  - IBM System Lab Services initial implementation and configuration services options

II. LITERATURE SURVEY

Currently people are using different devices like VIOS, Lenovo switch, rack switch, V7000, V5000, HMC for the management of Hardware, PowerVC for virtualization management and control for generation of VMs and Nagios which is used for performance monitoring of various devices [11,12]. So a complete solution is given for all devices using a single management application with a single console to maintain all the devices, where the PPIM (PurePower Integrated Manager) also uses the resources optimally with the features to add and remove device, that is to add the device when it is required and remove the device when not needed, using the PPIM software [2].

The Aim of this thesis is to play an important role in implementing the updates and compliance module, the CLI functionalities and FVT Automation. The different operations include to manage devices, creation of rest layers to return the information fetched from these devices, creation of CLI functionality and Automation scripts that test the developed functionality. The objective is achieved when the code makes it to the release of the product [3].

IBM PurePower provides prebuilt and pre-integrated security at several levels, from the hardware architecture to the software stack [13]. With a cloud infrastructure serving several users, where many different customers share the same physical medium, it is crucial to ensure that all virtual machines are clearly separated from one another and that security exists at all levels, as shown in Figure 1.

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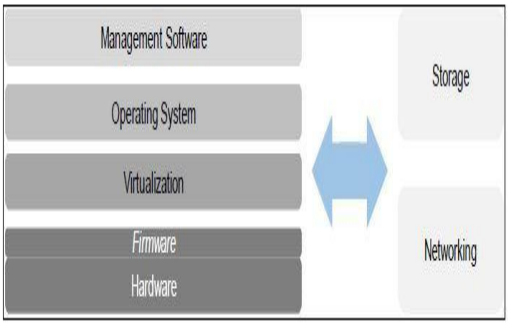


Figure 1: Layers of IBM Pure Power that are related to security features.

IBM Power VM, the Pure Power virtualization software, has a proven track record in security because it is nested in the hardware so that security can be driven from the foundation of the system [4]. The capability to support more LPARs per physical server is also a security benefit [16,17]. Because communication between two LPARs is more secure when they are on the same host, as compared to different hosts (in which the information needs to flow through a network cable), partitions that exchange sensitive data can be kept isolated from the physical network more efficiently [14,15].

Security is also enforced in the main control panel of the system, the Pure Power Integrated Manager (PPIM), which lets users choose between certificates, based on industry authentication standards [18,19]. The management tools, such as the vHMC, Nagios, or Power VC, can be all customized so that only selected users have the access rights. The vHMC administrator can also hide specific functions from the view of specific users (for role-based access control, or RBAC) [5]. Pure Power also includes Nagios, a tool that is widely used in the open source world for resource monitoring, including complete monitoring of security logs and security data. It alerts users via SMS or email when a predefined log pattern is detected.

III. SYSTEM DESIGN

This section describes the physical system architecture and technical overview for the components of the Pure Power System 8374-01M. Figure 1-2 shows the Pure Power system.

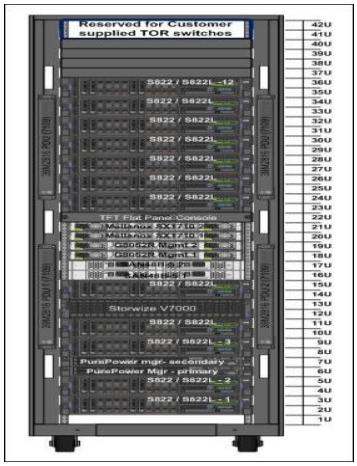


Figure 2: PurePower System

solution consists of the following components:

- IBM Compute Nodes 8284-22A or 8247-22L
- IBM Storwize V7000 Gen2 storage enclosure 2076-524 IBM System Storage® SAN48B-5 switch 2498-F48
- Mellanox SX1710 Data Network switch 8831-NF2
- Systems Management IBM 7120 Model G8052 RackSwitch 7120-48E
- Pure Power System Management Node designed to provide the virtualization capabilities for the IBM Pure Power 8374-01M
- IBM Service console 7316-TF4 IBM Enterprise Rack 7014-B42

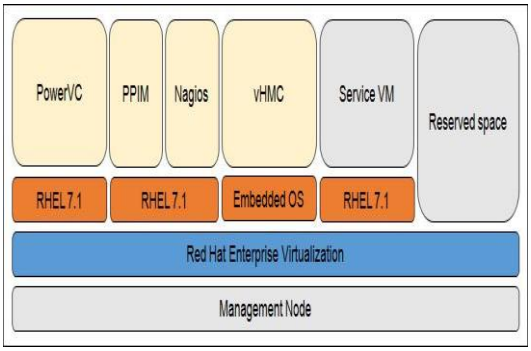
Customer supplied TOR switches may be used.

IBM Pure Power System includes an integrated, preinstalled software stack, orchestrating to provide the user with the most advanced virtualization capabilities through an intuitive interface, in order to keep the promise of quick time to value [6]. Many of them based on open source tools, the software components take care of the monitoring, provisioning and overall management of the cloud infrastructure; like the hardware stack, and they are intelligently preconfigured and preintegrated, so that their arrangement is transparent to the user [20,21].

[22] The capabilities of Hardware Resource Management, Virtualization Management and System Monitoring are combined across the multiple pieces of software provided with IBM PurePower, as shown in Table 1.

Table 1: PurePower Capabilities

Capability	Software	Description
Virtualization Management	PowerVC 1.2.3 Standard Edition	The software allowing users to capture, store and redeploy LPARs across the physical servers
System Monitoring	Nagios Core 4.0.8	The open source software used for the monitoring of systems, networks and infrastructure; additional capabilities include alerts and automation.



IV. PROPOSED SYSTEM

The POWER8 processor is manufactured by using the IBM 22 nm Silicon-On-Insulator (SOI) technology. Each chip is 649 mm2 and contains 4.2 billion transistors. As shown in Figure 1-3, the chip contains 12 cores, two memory controllers, PCIe Gen3 I/O controllers, and an interconnection system that connects all components within the chip. Each core has 512 KB of L2 cache, and all cores share 96 MB of L3 embedded DRAM (eDRAM). The interconnect also extends through module and system board technology to other POWER8 processors in addition to DDR3 memory and various I/O devices.

POWER8 systems use memory buffer chips to interface between the POWER8 processor and DDR3 or DDR4 memory.1 Each buffer chip also includes an L4 cache to reduce the latency of local memory accesses.

The POWER8 processor is designed for system offerings from single-socket servers to multi socket Enterprise servers. It incorporates a triple-scope broadcast coherence proto- col over local and global SMP links to provide superior scaling attributes. Multiple-scope coherence protocols reduce the amount of SMP link bandwidth that is required by at- tempting operations on a limited scope (single chip or multi-chip group) when possible. If the operation cannot complete coherently, the operation is reissued by using a larger scope to complete the operation.

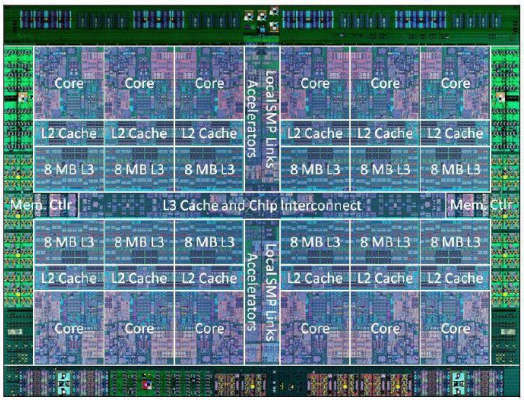


Figure 3- POWER8 chip

The accompanying extra highlights can enlarge the presentation of the POWER8 processor:

- Support for DDR3 and DDR4 memory through memory cradle chips that offload the memory support from the POWER8 memory controller.
- L4 store inside the memory cradle chip that decreases the memory inertness for neighborhood access to memory behind the support chip; the activity of the L4 reserve is straightforward to applications running on the POWER8 processor. Up to 128 MB of L4 reserve can be accessible for each POWER8 processor.
- Hardware value-based memory.

- On-chip quickening agents, remembering for chip encryption, pressure, and irregular number age quickening agents.
- Coherent Accelerator Processor Interface (CAPI), which permit quickening agents connected to a PCIe opening to get to the processor transport utilizing a low dormancy, rapid convention interface.
- Adaptive force the board.

There are two renditions of the POWER8 processor chip. The two chips utilize a similar structure squares. The scale-out frameworks utilize a 6-center variant of POWER8. The 6-center chip is introduced two by two out of a double chip module (DCM) that plugs into an attachment in the framework leading body of the frameworks. Practically, it functions as a solitary chip.

Table 2: Technology characteristics of the POWER8 processor

Technology	POWER8 processor
Die size	649 mm^2
Fabrication technology	▸ 22 nm lithography ▸ Copper interconnect ▸ SOI ▸ eDRAM
Maximum processor cores	6 or 12
Maximum execution threads core/chip	8/96
Maximum L2 cache core/chip	512 KB/6 MB
Maximum On-chip L3 cache core/chip	8 MB/96 MB
Maximum L4 cache per chip	128 MB
Maximum memory controllers	2
SMP design-point	16 sockets with IBM POWER8 processors
Compatibility	With prior generation of POWER processor

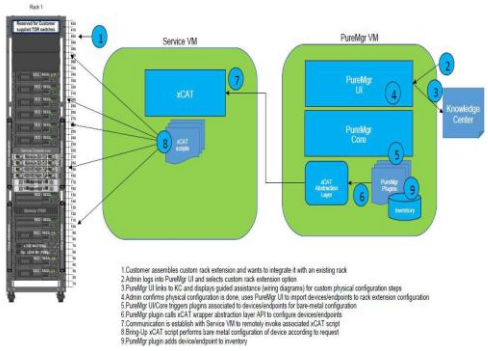


Figure 4 Custom rack Scalability

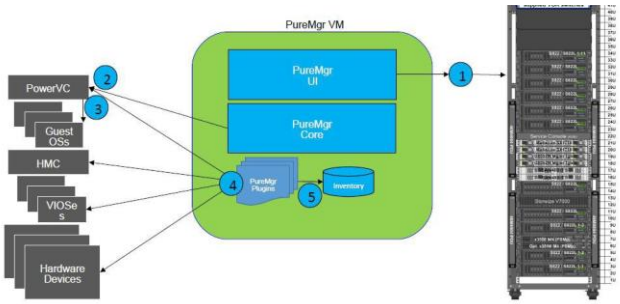


Figure 5- Architecture

V. RESULT AND DISCUSSION

The Electronic Service Agent is no-extra charge programming that dwells on your server. It screens occasions and transmits framework stock data to IBM on an intermittent, customer characterized timetable. The Electronic Service Agent naturally reports equipment issues to IBM. Early information about potential issues empowers IBM to convey proactive assistance that may bring about higher framework accessibility and execution. Moreover, data gathered through the Service Agent is made accessible to IBM administration bolster delegates when they help answer your inquiries or analyze issues. Establishment and utilization of IBM Electronic Service Agent for issue announcing empowers IBM to offer better help and administration for your IBM server.

VI. CONCLUSION AND FUTURE WORK

PurePower Integrated Manager has been an exceptional piece of software that manages the PurePower rack. The different modules explained in this paper have been designed, developed and tested. The code for the modules were found to satisfy the specifications and passed all the tests it was subjected to during testing. This code has made it to the April 2016 release. PurePower Integrated Manager integration with the different types of devices using the power systems rack was tested and the method of PPIM managing the overloads at industry level standards using the V7000 Storewize switches, achieving virtualization using PowerVC and managing the hardware using HMC. The effective usage of racks using multirack support was added later as a much needed value add.

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