Research Notes

# Red Hat Enterprise – IBM Summit

|  |  |  |
| --- | --- | --- |
| **Topic** | **Research** | **References** |
| ***Application Software*** | * Our AI software, like Distributed Deep Learning (PowerAI DDL), can teach computers to identify objects in images, understand the contents of documents, forecast demand or assess risk. As an example, we showed that using supercomputing technology, we could train a model to identify things at higher than human accuracy. Image recognition software has potential applications in a wide variety of fields – from identification of cancer in medical scans to assessing damage after a hurricane. * The computing power of a bleeding-edge machine like Summit can help train AI much faster than traditional computers. We know that having much shorter time to solution means that ultimately people have higher quality AI, can apply AI to more data types and create more solutions — because it becomes more feasible to run lots of studies.  Our research team is working not only on Summit-scale AI, but also on systems for AI in the enterprise – taking mini versions of Summit technology (the AC922 Power9 system and PowerAI software) into clients’ data centers to help them create AI on their own data. * It will provide at least 5-10X more performance on DOE (Department of Energy) applications compared to its predecessor * DOE can manage power transmission to other countries from American electricity | <https://www.omgubuntu.co.uk/2018/06/summit-supercomputer-red-hat-linux>  <https://www.ibm.com/blogs/research/2018/06/summit/> |
| ***Hardware*** | * Specs for the IBM Summit   + Application Performance 200 PF   + Number of Nodes 4,608   + Node performance 42 TF   + Memory per Node 512 GB   + DDR4 + 96 GB HBM2   + NV memory per Node 1600 GB   + Total System Memory>10 PB DDR4 + HBM2 + Non-volatile   + Processors2 IBM POWER9™ 9,216 CPUs   + 6 NVIDIA Volta™ 27,648 GPUs   + File System250 PB, 2.5 TB/s, GPFS™   + Power Consumption13 MW   + Interconnect Mellanox EDR 100G InfiniBand   + Operating System Red Hat Enterprise Linux (RHEL) version 7.4 * Interesting Facts   + A **200-petaflop** machine, Summit can perform 200 quadrillion (peta-) floating point operations per second (-flops). If every person on Earth completed one calculation per second, it would take the world population **305 days** to do what Summit can do in **1 second**.   + At over 340 tons, Summit’s cabinets, file system, and overhead infrastructure weigh more than a large commercial aircraft.   + More than 4,000 gallons of water pump through Summit's cooling system every minute, carrying away about 13 megawatts of heat.   + Occupying 5,600 sq. ft. of floor space, Summit could fill two tennis courts.   + Summit is connected by 185 miles of fiber optic cables—or the distance from Knoxville to Nashville.   + Summit’s file system can store 250 petabytes of data, or 74 years of high-definition video.   + For some AI applications, researchers can use less precise calculations than flops, potentially quadrupling Summit’s performance to exascale levels, or more than a billion billion calculations per second.   + 200 quadrillion calculations per second | <https://www.olcf.ornl.gov/summit/>  <https://www.ibm.com/it-infrastructure/power/supercomputing> |
| ***User Interface*** | * GNOME   + The default desktop environment for Red Hat Enterprise Linux based on the GTK+ 2 graphical toolkits.   + Supreme access to productivity applications, web browsers, and KDE applications   + Supported by the Metacity window manager   + The Motif Window Manager is a stand alone manager, in order to run, you must have the openmotif package installed * KDE   + An alternative desktop environment based on the Qt 3 graphical toolkit.   + KWIN windows manager is the default window manager for KDE   + The Motif Window Manager is a stand alone manager, in order to run, you must have the openmotif package installed, it has the same usage for the KDE environment * Rebooting/Shutting Down   + The shutdown systems in the RedHat Linux machines creates a sense of recording in the shutdown log and communicates to users to the reasons why   + The reboot option shows your intent to other users and gives more control and is more efficient for the admin | <https://access.redhat.com/documentation/en-us/red_hat_enterprise_linux/5/html/deployment_guide/s1-x-clients>  https://serverfault.com/  questions/787144/  reboot-or-shutdown-r-now-what-restart-command-is-safer |
| ***Device Management*** | * Kernel   + Live patching for the kernel, kpatch, is now available, which enables you to consume Critical and Important CVEs fixes without the need to reboot your system   + The IMA/EVM feature for verifying file system integrity is now supported on all architectures * Image Builder   + The Image Builder is now fully supported. Cloud images can be built for Amazon Web Services, VMware vSphere, and OpenStack | https://access.redhat.com/  documentation/en-us/  red\_hat\_enterprise\_linux/  7/html/ |
| ***Security*** |  |  |
| ***Network Connectivity*** |  |  |