PANDA, PLATFORM ACCESSIBILITY & DEVELOPMENT ACCELERATION

PANDA, WHAT IS IT?

- Platform Accessibility and Development Acceleration, or PANDA for short, is a platform designed to provide full IT services (Full Security and Enterprise Services) to open source developers, researchers, non-profits, and small & medium sized businesses on the worlds first FEDRAMP HISEC certified open source datacenter designed to allow for maximum collaborative efforts between Federal Governments & Agencies, open source developers, researchers, non-profits, and small & medium sized businesses.

- For the overwhelming majority of individuals, PANDA is a service provided completely for free. Researchers, Open Source Developers, and Non-Profits enjoy full service IT Enteprise and IT Security services, as well as substantial DevOps support so they can focus on their missions.

PANDA is an MSP, MSSP, IaaS, PaaS, DevOPsaaS Platform that allows customers to effortlessly conduct Software Development without the hassles or concerns that traditional Software Development and Engineering Organizations encounter when working with Federal Organizations, Non-Profit Industries, Universities, and Research Institutions.

PANDA provides a full Infrastructure & fully compliant environment with a variety of collaborative services and capabilities, file services, a full security suite complete with 24/7/365 security & network monitoring, and 24/7 support.

PANDA IS FREE FOR OPEN SOURCE DEVELOPERS, NON-PROFITS, AND RESEARCHERS!*

PANDA, ADDITIONAL INFORMATION

Key Features

- Infrastructure as a Service
- Platform as a Service
- DevOps as a Service
- Fully Customizable Environments
- Web GUI Interaction
- On-Demand Development Environments
- FEDRAMP HISEC (On-Going)
- ATO Certifiable
- DISA STIG Compliant
- 8570.X Compliant
- HIPPA/PCI Compliant Compatible

- Global Accessibility
- Domain Services
- Collaboration Services
- File Services & Data Storage
- Email
- Website & Hosting
- 24/7/365 Security & Systems Monitoring
- Unlimited Bandwidth
- Conference Rooms
- Showers

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Future Key Features

- VoIP Services
- Web & Email Filtering
- DDoS Protection
- Automated Incident Response Reporting
- Dynamic & Static Malware Assessment Reporting
- 3 Open Access Super Computers
- Native GitHub Support
- Native Slack Support
- Hosted E-Learning Platforms
- Fully Redundant Load Balancing
- 24/7/365 Support Center
- Global Datacenter Locations

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Target Customer Base, PANDA

Target audience base is primarily focused towards Open Source Developers, Researchers, and Non-Profits, but also supports small & medium sized businesses, Federal Contractors, and Government Agencies to offset costs.

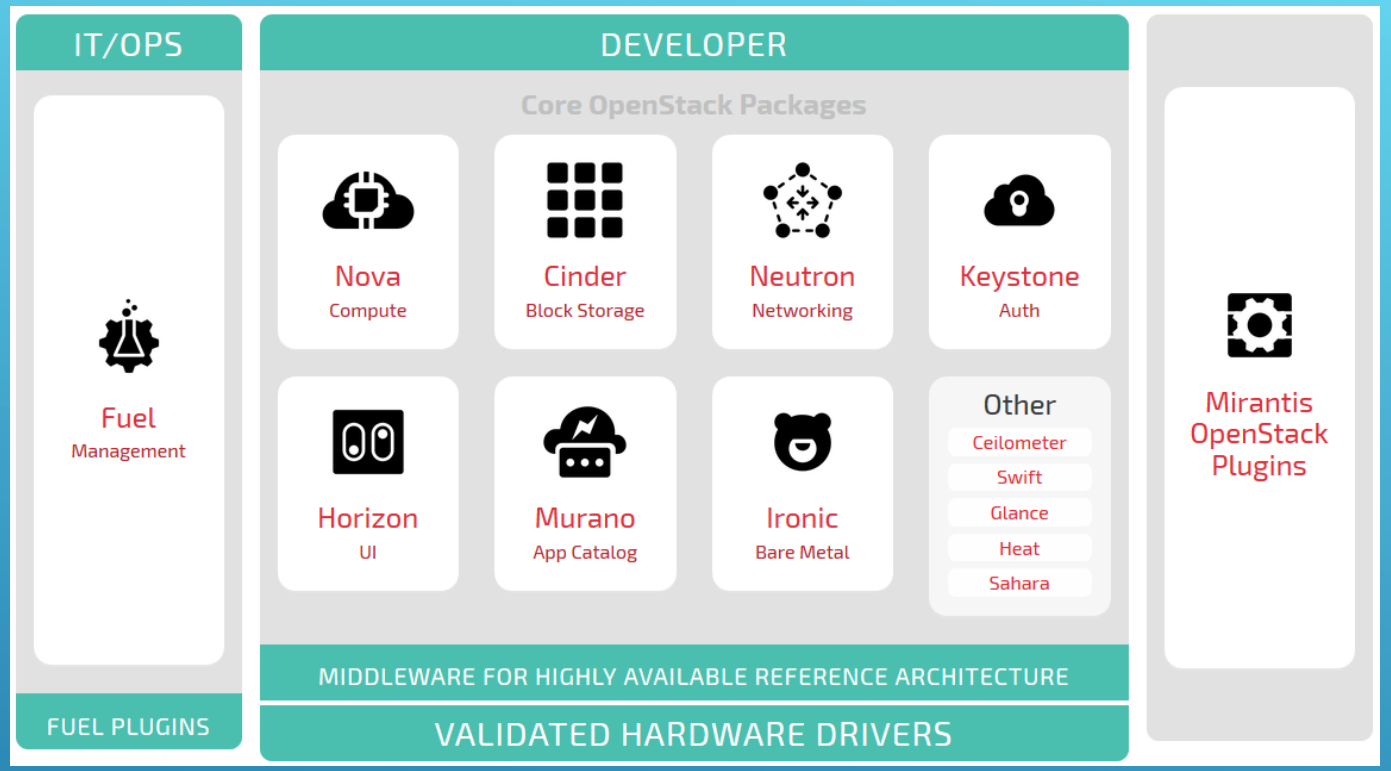
- Open Source Developers
- Non-Profits
- Research Institutes
- Universities
- Researchers
- Defense Contractors
- Growing Small Businesses
- Mid Cap Companies
- GitHub

- Bandwidth – Multiple 10Gbps Connects
- Storage – ~60TB 7.2K RPM, ~5TB 15K RPM, ~4TB SSD Cache
- Cores – 116
- CPUs – AMD, Intel
- Servers – Dell, SuperMicro, Custom
- Platform – OpenStack, Azure
- OS – Ubuntu 16.04 LTS, Windows 2k16, FreeNAS
- Routing & Switching – Ubiquity, OpenContrails, OpenVSwitch, VyattaOS

PANDA, CURRENT PERFORMANCE

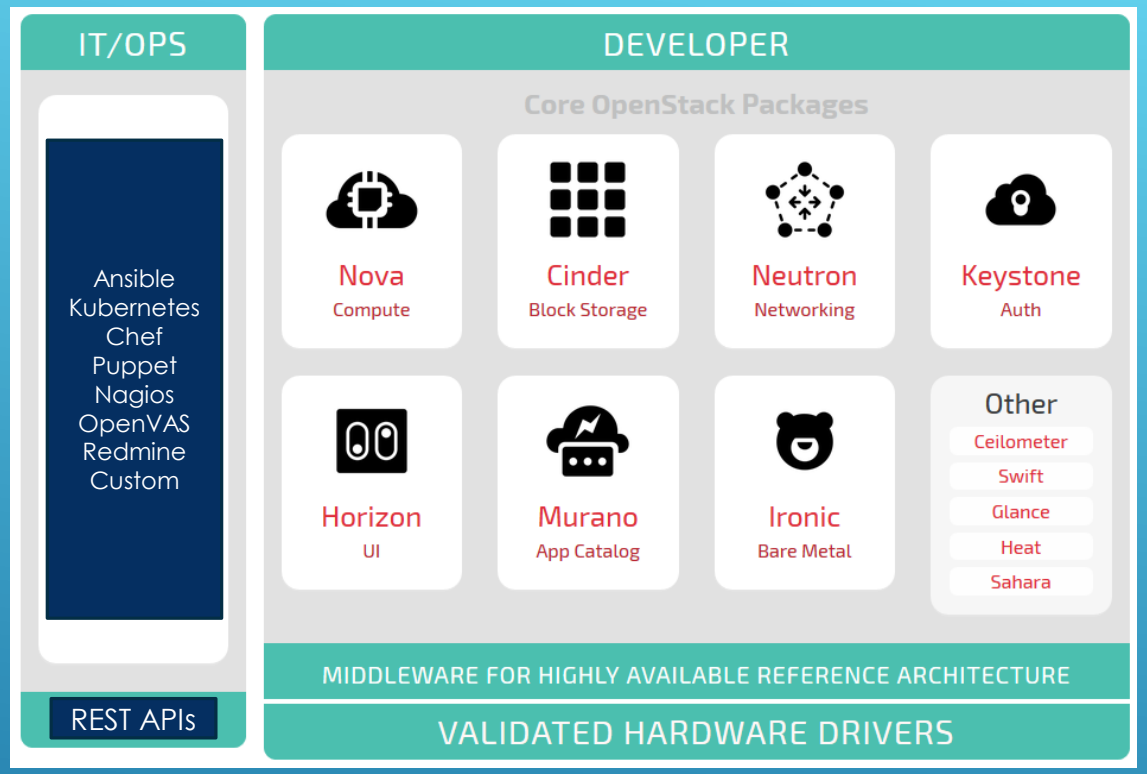
- Bandwidth – Multiple 10Gbps Connects, 4 100Gbps Connects
- Storage – ~500TB 7.2K RPM, ~100TB 15K RPM, ~10TB SSD Cache, ~2.5TB Ramdisk
- Cores – Over 10,000
- CPUs – AMD, Intel
- Servers – Dell, SuperMicro, Custom
- Platform – OpenStack, Azure
- OS – Ubuntu 16.04 LTS, Windows 2k16, FreeNAS, FreeBSD
- Routing & Switching – Ubiquity, Brocade, OpenVSwitch, BSD Router

PANDA, FUTURE PERFORMANCE



PANDA, CURRENT, OPENSTACK (MIRANTIS)

SOURCE: HTTPS://WWW.MIRANTIS.COM/SOFTWARE/OPENSTACK/



PANDA, FUTURE, OPENSTACK (OCATA)

SOURCE: HTTPS://DOCS.OPENSTACK.ORG/DEVELOPER/NEUTRON/DEVREF/LAYER3.HTML

HTTPS://WIKI.OPENSTACK.ORG/WIKI/NEUTRON/ML2

PANDA, OPENSTACK, WHY?

- OpenVSwitch vs ML2
  - OpenVSwitch supports L3 switching, whereas ML2 does not, limiting the number of total customers we can support with PANDA.
  - OpenVSwitch also allows us to provide QoS, whereas ML2 does not.
  - Additional Benefits is the use of individualized SNMP monitoring with Nagios with OpenVSwitch. Again, ML2 does not allow us to do this.
  - Other noted benefits is with OpenVSwitch, customers can utilize customized VLAN solutions on their deployments, whereas with ML2 each customer is locked into their dictated VLAN from us.
- Mirantis > OCATA
  - Mirantis is currently not set to End of Life until September 2019, while Ocata was recently released in February of 2017, within the 6 month vetting window. As such, it is still considered to be unstable, and unreliable until further aging and industry vetting.
  - Ocata currently natively supports Neutron ML2. We will have to build our solution away from ML2 towards OpenVSwitch

- Firewall – PFSense
- Web Load Balancing – HA Proxy, Nginx
- DynamicDNS – Various Vendors
- BDR – BSD Router
- Core Routers – VyattaOS
- Core Switching – OpenVSwitch
- Distribution Routing & Switching – Ubiquity
- User Routing – VyattaOS
- User Switching L3 – OpenVSwitch
- User Switching L2 - Neutron

PANDA, TRAFFIC FLOW

- OpenVSwitch provides superior network controls on both sides, with us on overall network configuration, as well as our users with second set of OpenVSwitch boxes, allowing the end customer to support sophisticated networks that are otherwise unavailable with standard Neutron/ML2
- Core Routing with BSD Router allows for greater than normal commercial vendor performance for a fraction of price, allowing for massive scalability for minimal cost on a price per performance basis
- Core Switching with OpenVSwitch allows us to purchase 100Gbps PCI x16 cards, which allows for Channel bonded 400Gbps backplanes internally, which is simply unachievable from standard commercial vendor solutions
- Distribution layer with Ubiquity allows for the lowest Tenant Based per port cost while allowing all tenants to enjoy 10Gbps cross connects to any other segment of the datacenter, as well as 40Gbps Rack to Storage throughput speeds for maximum performance. This would be unachievable with standard commercial solutions financially.
- User Layer decisions were again made due to Layer 3 capabilities, specifically for access to QoS Features required for customer system performance, and for VLAN tagging in case the customers need to segregate their services from themselves due to Malware, testing operations, etc.
- Nginx was selected for bulk global loadbalancing due to how it manages traffic on a multi processor based methodology, combined with how well it performs on AMD based processors, and their price per core vs Intel Chips.
- HAProxy was selected to be a more sophisticated secondary layer between Nginx global traffic shaping and location based web servers due to its more sophisticated capabilities vs. generic Nginx, and the lower cost of smaller Xeon processers and their performance vs smaller AMD Chips. (6 & 8 Intel vs 12 & 16 AMD). Proxygen was not selected because I do not know C, and the availability of C Developers makes position placement difficult
- DynamicDNS is being utilized to drastically increase global network flexibility by leveraging tiered caching for customers based on site hits via subdomains. This is intended to rank SSD Caching from Tier 0 through Tier 4, with most visisted customer data going to Tier 0, and least visited to Teir 4

PANDA, TRAFFIC FLOW, WHY?

PANDA, CURRENT COSTS

PANDA, COSTS BREAKOUT

- Power - ~3.91 per KWh
- Rent – 312K, Triple Net
- Certifications – 2.89M
- Bandwidth – 2.59M (projected)
- Equipment – Increases daily ☹
- Payroll – ~3-15% of 59 FTEs, depending on department

PANDA, GETTING INVOLVED!

- Interested In Helping? Have a project? Have constructive input? REACH OUT!
- Give us your old gear, we'll take it ALL!
- Grants! Grants! Grants!

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QUESTIONS?