

#### **NVMe\* Compliance Test Resources**

David Woolf, University of New Hampshire InterOperability Laboratory Sarika Mehta, Validation Lead, Intel Corporation



#### IOL INTERACT tool

- David Woolf UNH-IOL
- NVMe Compliance Test Suite
  - Sarika Mehta Intel



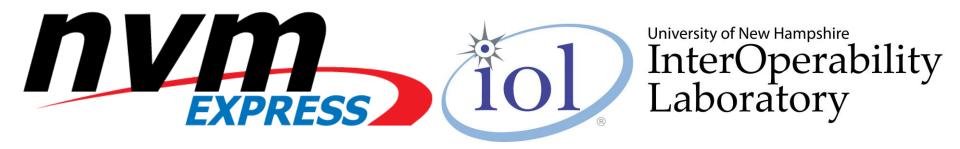


- 1. Overview of NVMe Test Program and IOL INTERACT Test Tool
- 2. Requirements for using IOL INTERACT
- 3. Installation and Use of IOL INTERACT





 Since 2012 NVMe Promoters Group collaborating with UNH-IOL to create a Test Program for NVMe.







#### Flash Memory 1. Overview of NVMe\* Test Program

#### Program has 4 Key Elements

- Test Services ------
- https://www.iol.unh.edu/services/testing/NVMe/
- Plugfests ------
- https://www.iol.unh.edu/services/testing/NVMe/plugfestfaq.php
- Test Tools -
- https://www.iol.unh.edu/services/testing/NVMe/tools.php
- Integrators List ------
- https://www.iol.unh.edu/services/testing/NVMe/integratorslist.php



1. Overview of NVMe\* Test Program

- NVMe Promoters Group
  - Provides guidance on services, tools, plugfests, Integrators List qualification requirements



- iol UNH-IOL
  - Executes test services and plugfests, administers Integrators List, and develops test tools





1. Overview of NVMe\* Test Program

- Key Test Tool Developed by UNH-IOL is IOL INTERACT
- Purpose of IOL INTERACT
  - Quickly and easily verify that an SSD meets the conformance requirements for the NVMe Integrators List
  - Not a rigorous performance test
- Sits on top of tNVMe compliance software





# 2. Requirements for using IOL INTERACT NVMe\* Test Software

- tNVMe
  - Installed automatically by IOL INTERACT installer
- PC with Intel Chipset, running Ubuntu 10.10 64 bit.
  - Support for more modern OS to be addressed through tNVMe updates





# 2. Requirements for using IOL INTERACT NVMe\* Test Software

- PCIe storage device
  - Any form factor that can connect to the Host System (CEM, SFF-8639 etc...)
- Membership in UNH-IOL NVMe Consortium
  - Grants license for IOL INTERACT, allows you to pre-check compliance for NVMe IL
  - UNH-IOL offers NVMe and PCIe conformance and interop testing
  - <u>https://www.iol.unh.edu/services/membership/form/</u>





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	From: Jeffrey Allen Masucci (jmasucci@iol.unh.edu> To: jmasucci@iol.unh.edu Subject: IOL-interact				
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	Hi Joff,				
	The IOL-Interact download is at this link <u>ftp://ftp.l</u> unh.edu/pub/NVMe/demo/				
	IOL-Interact currently works and is supported on Ubuntu 10.10 64 bit, based on Intel's tryme. You wouldn't be able to use the IOL- Interact without the license file that is attached to this email. After extracting the IOL- Interact, download the license file from this email and place it in the manage directory "iol-interactvl.Ol/manage". Then go back a directory and run ah install.sh, and change directories to manage directory and sh installnrunGUI.sh. If this doesn't work the full set-up is detailed in the text document.				
	The expiration date for the license is xx xx, xxxx, when the IOL- Interact is run it will display the days remaining. IOL- Interact will renew if you purchase membership with the IOL, in that case we will just email you with a new license file.				
	This is version v1.01 of the GUI and you will receive fixes and updates as we make them, if you need any support contact numelab@iol.unh.edu. Its our first version and we're expecting bugs. We want as much feedback as possible.				
	Thanks for your time and hope all goes well,				
	Jeffrey Masucci				
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#### Receive email with IOL INTERACT download link





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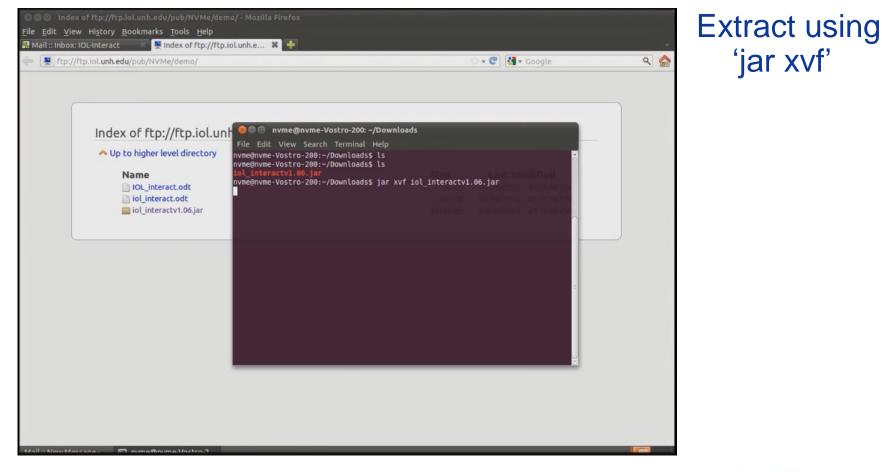


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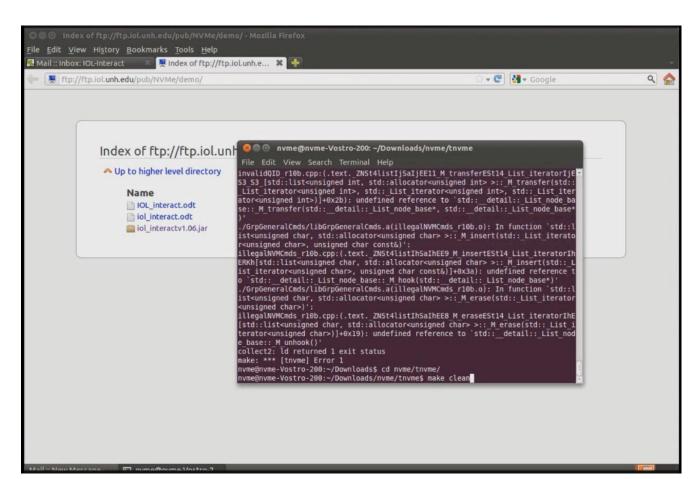


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	nyme@nyme-Vostro-200:~/Downloads\$ sh install.sh [sudo] password for nyme:
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	Building dependency tree Reading state information Done
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	linux-headers-2.6.35-22-generic Use 'apt-get autoremove' to remove them.
	0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded. Reading package lists Done
	Building dependency tree Reading state information Done
	libboost1.42-all-dev is already the newest version.

'sh install.sh'



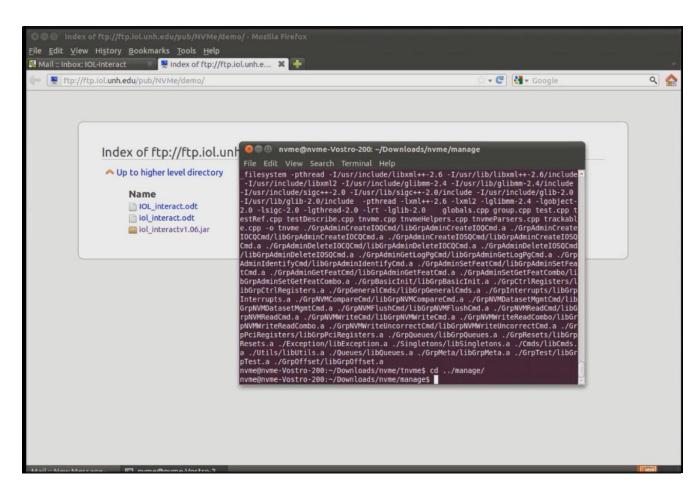




If a make error occurs for tnvme, run 'make clean' followed by 'make'. This will take a minute or so







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Change permissions for runtnvme.sh with 'chmod 777 runtnvme.sh'





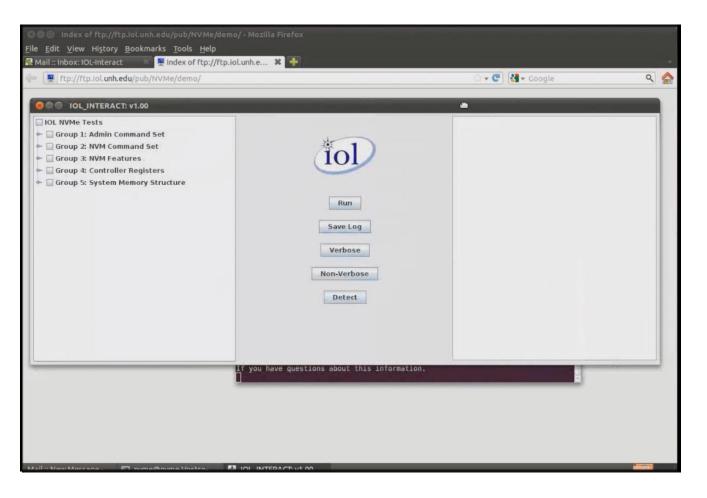
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Start IOL INTERACT with 'sh installnrunG UI.sh'

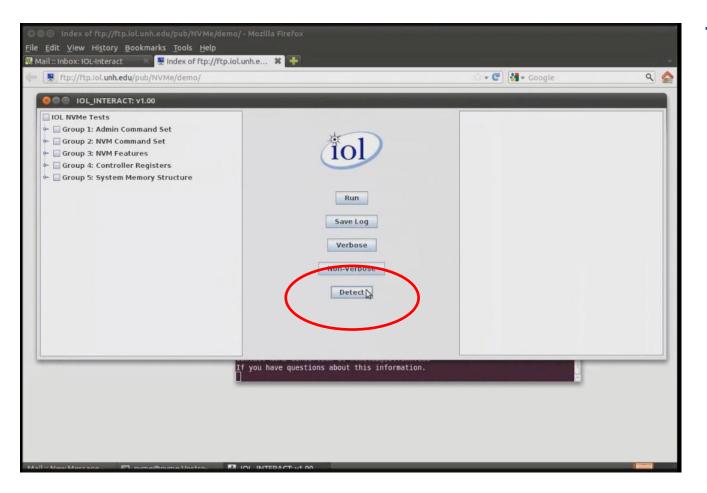
You will see a license message and a UNH-IOL contact email











The software will open. Use the 'detect' button to detect any attached NVMe devices.

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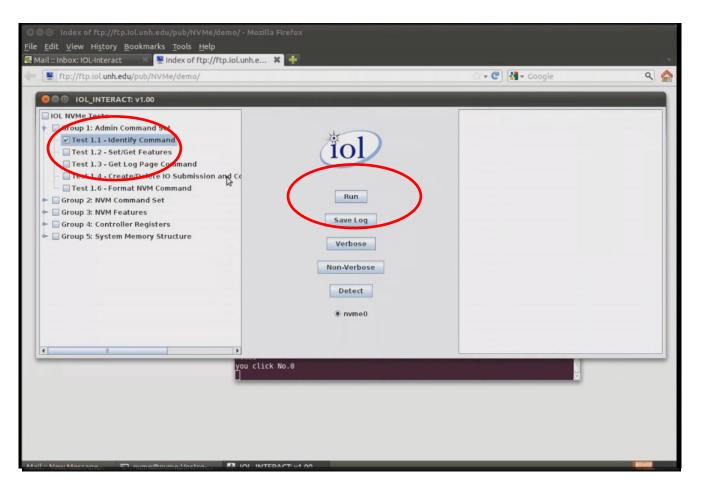


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Select the radio button for NVMe device to test. The device must appear in /mnt/nvme

Tol





Select tests to run on the left, then click Run.





OOO NVME Test Tool		
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- IOL INTERACT software sits on top of NVMe compliance test suite software.
- NVMe compliance test suite to be discussed next.





#### IOL INTERACT\* tool

- David Woolf UNH-IOL\*
- NVMe Compliance Test Suite
  - Sarika Mehta Intel





#### Overview

- High-level Introduction
- Usage
- Community Participation





#### **NVMe\* Compliance Test Suite**

Introduction

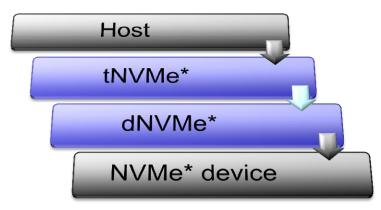
- Open source
- 64-bit Linux\* based, user space software test infrastructure
- Helps validate device compliance with the NVMe\* specification
- Currently supports NVMe\* spec revision 1.0





#### **Test Suite Components**

- tNVMe\* Compliance test suite application
  - User level interface
  - Weaves functionality provided by kernel into tests
- dNVMe\* Linux driver for the compliance test suite
  - Exposes an interface to kernel functionality





28



#### Hardware for Test Execution

- Real physical hardware
- Simulated hardware

#### Test execution with ease of debug

- Zero Dependency
  - Standalone tests
- Configuration Dependency
  - Test depending on prior configuration
- Sequence Dependency
  - Multiple tests depending on prior tests



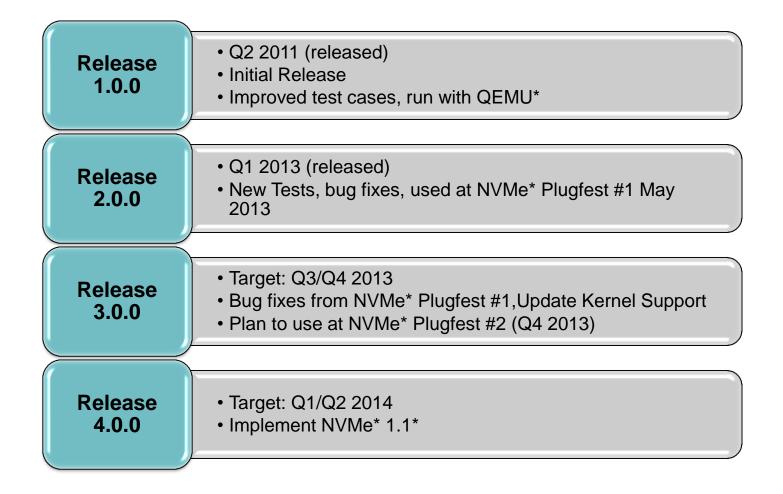


- Use tNVMe\* as is with quick scripting
- Custom debug/validation framework wrapper





NVMe Compliance Test Suite Planned Roadmap



Flash Memory



#### Call to Action - Participate

- UNH-IOL\* administers code contributions via Github\*
- Software release: <u>https://github.com/nvmecompliance</u>
- Architecture, compiling, executing, and contribution details: <u>https://github.com/nvmecompliance/tnvme/wiki</u>
- NVMe\* device simulation: <u>https://github.com/nvmeqemu</u>
- Contact: <a href="mailto:compliance@nvmexpress.org">compliance@nvmexpress.org</a>





#### Links and Resources

- 1. tNVMe\* wiki: https://github.com/nvmecompliance/tnvme/wiki
- 2. Software release: <u>https://github.com/nvmecompliance</u>
- 3. Test plan and test cases: <u>https://github.com/nvmecompliance/tnvme/blob/master/Doc/testPlan.ods</u>.
- 4. Designing test dependencies: <u>https://github.com/nvmecompliance/tnvme/blob/master/Doc/testDependencyPreso.pdf</u>
- 5. Code sample for wrapper: <u>https://github.com/nvmecompliance/manage/blob/master/regression.sh</u>
- 6. Support: <a href="mailto:compliance@nvmexpress.org">compliance@nvmexpress.org</a>



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