



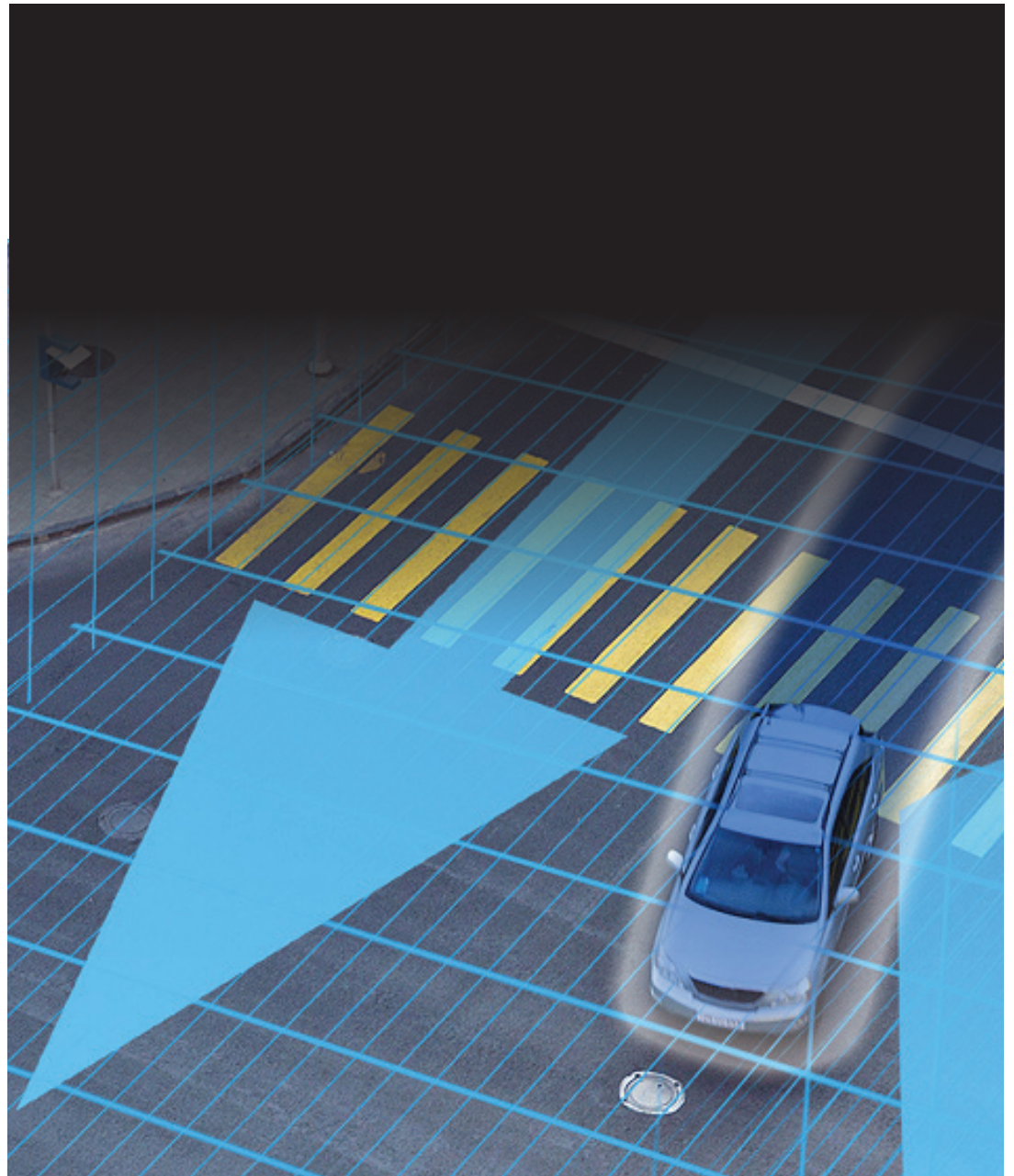
TECHNICAL WHITE PAPER

CONTENTS & NAVIGATION

2-3

Machine Learning at the edge

HP ML Developers Portal
<https://hp.io/ML>



THE HP ML DEVELOPERS PORTAL

Machine Learning (ML) is rapidly gaining acceptance as the best way to analyze large amounts of data in areas as diverse as image recognition and oil and gas exploration. Advanced machine learning algorithms in combination with modern GPUs and CPUs allow researchers and developers to move past the realm of super computers to use desktop workstations for algorithm development.



TECHNICAL WHITE PAPER

CONTENTS & NAVIGATION

2-3

Machine Learning at the edge

HP ML Developers Portal
<https://hp.io/ML>

MACHINE LEARNING AT THE EDGE

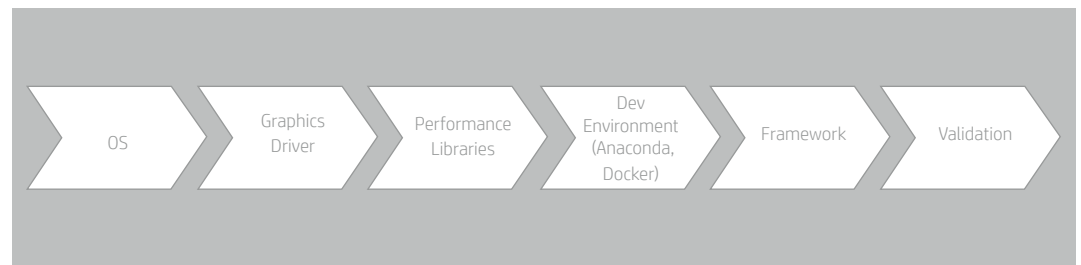
Much has been written about machine learning in the cloud, and many people believe that the cloud is the best or only place to develop and train a machine learning model. HP believes there is a compelling case for developing and training machine learning models on a workstation, at the edge of the network. To help data scientists and engineers hit the ground running in their quest to develop machine learning models, we have created the [HP ML Developers Portal](https://hp.io/ML) that will provide the tools and documentation to enable you to install a high-performance, validated machine learning environment onto your HP Z Workstation. Check <https://hp.io/ML> often for the latest tools and information.

HP ML DEVELOPERS PORTAL: WE DO THE HARD WORK FOR YOU

The machine learning landscape is currently dominated by open-source frameworks while some of the high-performance math libraries that underpin them, such as NVIDIA® CUDA®, are proprietary. The open source nature of these frameworks are a blessing and a curse. They deliver the hard work and innovation of the world's best minds to anyone that wants to pursue a machine learning idea. However, many contributors means there will be constant changes to the frameworks. Finding the right composition of framework, tools, OS, libraries, and hardware can be a maddening time sink. The HP ML Developers Portal will allow you to skip the maddening part of the process and devote more time to creating, training, and deploying your models.

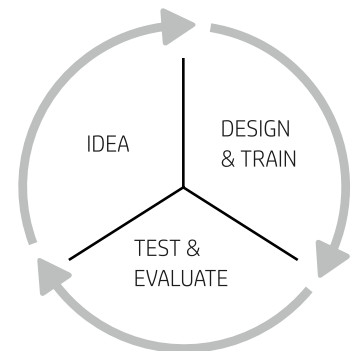
The initial focus of the portal will be on a subset of machine learning known as deep learning. It will provide recipes and automation to install Berkeley Vision and Learning Center's Caffe Deep Learning framework and the TensorFlow Deep Learning framework initially developed by Google. While it is possible to use these frameworks in a native environment, we highly recommend using a containerized environment such as Anaconda or Docker. To provide you with maximum flexibility, we will provide recipes for both Anaconda and Docker environments. Our recipes and automation tools are tested on all our supported configurations.

MACHINE LEARNING INSTALLATION PROCESS



PERFORMANCE FROM THE START

Developing a state of the art machine learning model is an iterative process, and the faster you can iterate, the more quickly you can deliver your model to the market. With this in mind, all of our recipes and automation are focused on GPU accelerated software stacks matched with HP Z Workstations configured to maximize the workflow.



MACHINE LEARNING DEVELOPMENT



TECHNICAL WHITE PAPER

CONTENTS & NAVIGATION

2-3

Machine Learning at the edge

HP ML Developers Portal
<https://hp.io/ML>

HP RECOMMENDED CONFIGURATIONS FOR MACHINE LEARNING *

	Edge Deployments	Smaller Development Loads	Largest Development Loads
Workstation	HP Z4 G4	HP Z4 G4	HP Z8 G4
Operating System ^{1,2}	Microsoft Windows 10	Linux® Ubuntu 16.04 update 3	Linux® Ubuntu 16.04 update 3
Processor ³	Intel® Xeon® W-2133 3.6 GHz 6 core or similar	Intel® Xeon® W-2155 3.3 GHz 10 core or similar	2x Intel® Xeon® 6136 3.0 GHz 12 core each, 24 core total or similar
Memory	16 GB DDR4-2666 ECC SDRAM or greater	64 GB DDR4-2666 ECC SDRAM or greater	192 GB DDR4-2666 ECC SDRAM or greater
Storage ⁴	OS Drive: 256 GB SATA 6 GB/s SSD	OS Drive: 256 GB SATA 6 GB/s SSD	OS Drive: 256 GB SATA 6 GB/s SSD
	Data Drive: 256 GB PCIe SSD	Data Drive 1: 256 GB PCIe SSD Data Drive 2: 2 TB 7200 rpm HDD	Data Drive 1: HP Z Turbo Drive M.2 512 GB SSD Data Drive 2: HP Z Turbo Drive M.2 512 GB 2nd SSD Data Drive 3: 4 TB 7200 rpm HDD
GPU	NVIDIA® Quadro® P400	NVIDIA® Quadro® P5000	Up to 3x NVIDIA® Quadro® GV100

CURATED SOFTWARE STACKS *

	TensorFlow	Caffe
Operating System	Ubuntu 16.04 update 3	Ubuntu 16.04 update 3
Graphics Driver	Latest driver Softpaq	Latest driver Softpaq
Performance Libraries	CUDA® CuDNN NCCL	CUDA® CuDNN NCCL
Docker	Docker CE/Docker EE	Docker CE/Docker EE
Anaconda	v5.1	v5.1
Framework Version	v1.6	Current

* Check the HP ML Developers Portal, <https://hp.io/ML> for the very latest recommended configurations and support matrix

Sign up for updates
hp.com/go/getupdated



Share with colleagues

LET US HELP YOU CREATE AMAZING BUSINESS
SOLUTIONS TODAY

LEARN MORE

Sources and legal disclaimers

¹ Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.windows.com>

² Linux® Ubuntu is not supplied by HP.

³ Multicore is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel®'s numbering, branding and/or naming is not a measurement of higher performance.

⁴ For hard drives and solid state drives, 1 GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB of system disk is reserved for system recovery software.

© Copyright 2018 HP Development Company, L.P. The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

Microsoft and Windows are U.S. registered trademarks of the Microsoft group of companies. Intel, Core, Xeon, vPro, and Thunderbolt are trademarks of Intel Corporation in the U.S. and other countries. NVIDIA, Quadro, and Optimus are registered trademarks of NVIDIA Corporation. Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries.

4AA7-2445ENW, March 2018.

