Choose the Best Accelerated Technology

Intel® AI Analytics Toolkit

Kevin Ta
AI Software Solutions Engineer, Intel
Agenda

- Overview
- Data Analytics & Classical Machine Learning
  - Intel® Distribution of Modin
  - Intel® Extension for Scikit-Learn
  - Intel® Distribution of XGBoost
- Deep Learning
  - Intel® Optimization for TensorFlow*
  - Intel® Optimization for PyTorch*
  - Intel® Neural Compressor
# Intel® oneAPI Toolkits

<table>
<thead>
<tr>
<th>Intel® oneAPI Base Toolkit</th>
</tr>
</thead>
<tbody>
<tr>
<td>A core set of high-performance libraries and tools for building C++, SYCL, C/OpenMP, and Python applications</td>
</tr>
</tbody>
</table>

## Add-on Domain-specific Toolkits

<table>
<thead>
<tr>
<th>For HPC developers</th>
<th>For visual creators, scientists &amp; engineers</th>
<th>For edge &amp; IoT developers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel® oneAPI Tools for HPC</td>
<td>Intel® oneAPI Rendering Toolkit</td>
<td>Intel® oneAPI Tools for IoT</td>
</tr>
<tr>
<td>Deliver fast Fortran, OpenMP &amp; MPI applications that scale</td>
<td>Accelerate visual compute, deliver high-performance, high-fidelity visualization applications.</td>
<td>Build efficient, reliable solutions that run at network’s edge</td>
</tr>
</tbody>
</table>

## Toolkits powered by oneAPI

<table>
<thead>
<tr>
<th>For AI developers &amp; data scientists</th>
<th>For deep learning inference developers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel® AI Analytics Toolkit</td>
<td>Intel® OpenVINO™ toolkit</td>
</tr>
<tr>
<td>Accelerate machine learning &amp; data science pipelines end-to-end with optimized DL &amp; ML frameworks &amp; high-performing Python libraries</td>
<td>Deploy high performance inference &amp; applications from edge to cloud</td>
</tr>
</tbody>
</table>

Download at [intel.com/oneAPI](https://intel.com/oneAPI)  
Or visit Intel® DevCloud for oneAPI
Intel’s AI Software Objective

Simplify our AI developers’ lives regardless of how they consume the software

Open source, common software programming model
End-to-end tools and kits to help accelerate time-to-solution
Meet developers where and how they use software
Intel Has the Developer Tools Companies Use to Scale AI Everywhere

**Upstream**
Integrated acceleration to popular open source software
- Modin, XGBoost, TF, PT, PDPD, MxNet, more...

**Intel Extension**
Easily pluggable extensions to open source software
- Scikit-Learn Extension, Optimized Analytics Package, IPEX, more...

**Intel Distro**
Intel Optimized Distributions of open source software
- Modin, Intel TF, IDP

**Intel Tools**
Tools / Kits which improve productivity and perf on Intel HW
- AIKIT, OpenVINO™, BigDL, oneContainer Portal, CnvrG.io, Intel Neural Compressor, SigOpt,

Across major software channels (PyPI, Anaconda, Intel, Apt, Yum, Docker)
<table>
<thead>
<tr>
<th>Engineer Data</th>
<th>Create Machine Learning &amp; Deep Learning Models</th>
<th>Deploy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container Repository</td>
<td>MLOps, Cnvr.io</td>
<td>Developer Sandbox, DevCloud</td>
</tr>
<tr>
<td>oneContainer</td>
<td></td>
<td>Annotation/Training/Optimization Platform, Sonoma Creek</td>
</tr>
</tbody>
</table>

- **Connect AI to Big Data**
  - Spark
  - BigDL (previously "Analytics Zoo")

- **Accelerate End-to-End Data Science and AI**
  - Data Analytics Scale
  - Optimized Frameworks and Middleware
  - Optimize Models

- **Engineer Data**
  - oneDAL
  - oneDNN
  - oneCCL
  - oneMKL

- **Create Machine Learning & Deep Learning Models**
  - oneDAL
  - oneDNN
  - oneCCL
  - oneMKL

- **Deploy**
  - Annotation/Training/Optimization Platform, Sonoma Creek

- **GP Compute**
  - #Cores, #Frequency
  - AVX2, AVX-512, VNNI
  - AMX
  - Cache, DDR5, HBM, Optane, Frequency

*Other names and brands may be claimed as the property of others.*
Intel® AI Analytics Toolkit

Accelerate end-to-end AI and data analytics pipelines with libraries optimized for Intel® architectures

Who needs this product?
Data scientists, AI researchers, ML and DL developers, AI application developers

Top Features/Benefits
- Deep learning performance for training and inference with Intel optimized DL frameworks and tools
- Drop-in acceleration for data analytics and machine learning workflows with compute-intensive Python packages

Get the Toolkit [HERE](#) or via these locations

- Intel Installer
- Docker
- Apt, Yum
- Conda
- Intel® DevCloud

Hardware support varies by individual tool. Architecture support will be expanded over time.

Back to Domain-specific Toolkits for Specialized Workloads
Combine the AI Kit optimizations across the data science pipeline!

*Performance improvements shown here are based off hardware running on Intel Cascade Lake processors. This chart will be updated once data from Ice Lake is available. See backup for workloads and configurations. Results may vary.*