PERFORMANCE

Processor

Processor Family
9th Generation Intel® Core™ i5 / i7 / i9 Processor or Intel Xeon® E Processor

<table>
<thead>
<tr>
<th>Processor Name</th>
<th>Cores</th>
<th>Threads</th>
<th>Base Frequency</th>
<th>Max Frequency</th>
<th>Cache</th>
<th>Memory Support</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core i5-9400H</td>
<td>4</td>
<td>8</td>
<td>2.5GHz</td>
<td>4.3GHz</td>
<td>8MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>Core i7-9750H</td>
<td>6</td>
<td>12</td>
<td>2.6GHz</td>
<td>4.5GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>Core i7-9850H</td>
<td>6</td>
<td>12</td>
<td>2.6GHz</td>
<td>4.6GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>Core i9-9880H</td>
<td>8</td>
<td>16</td>
<td>2.3GHz</td>
<td>4.8GHz</td>
<td>16MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>Xeon E-2276M</td>
<td>6</td>
<td>12</td>
<td>2.8GHz</td>
<td>4.7GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics P630</td>
</tr>
</tbody>
</table>

Operating System

Operating System
- Windows® 10 Home 64
- Windows 10 Pro 64
- Windows 10 Pro 64 for Workstations
- Fedora Linux
- Red Hat Enterprise Linux (certified only)
- Ubuntu Linux LTS
- No operating system

Graphics

<table>
<thead>
<tr>
<th>Graphics</th>
<th>Type</th>
<th>Memory</th>
<th>Key Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>NVIDIA® Quadro® RTX 3000</td>
<td>Discrete</td>
<td>6GB GDDR6</td>
<td>DirectX® 12</td>
</tr>
<tr>
<td>NVIDIA Quadro RTX 4000 Max-Q</td>
<td>Discrete</td>
<td>8GB GDDR6</td>
<td>DirectX 12</td>
</tr>
<tr>
<td>NVIDIA Quadro RTX 5000 Max-Q</td>
<td>Discrete</td>
<td>16GB GDDR5</td>
<td>DirectX 12</td>
</tr>
<tr>
<td>NVIDIA Quadro T1000</td>
<td>Discrete</td>
<td>4GB GDDR5</td>
<td>DirectX 12</td>
</tr>
<tr>
<td>NVIDIA Quadro T2000</td>
<td>Discrete</td>
<td>4GB GDDR5</td>
<td>DirectX 12</td>
</tr>
</tbody>
</table>

Monitor Support

Monitor Support
Supports up to 5 independent displays via native display and 4 external monitors; supports external monitors via HDMI®, USB-C (up to 4K@60Hz) or Thunderbolt™ (up to 5K@60Hz)

Chipset

Chipset
Intel CM246 chipset

Memory

Memory Type
- DDR4-2666 ECC (8GB / 16GB / 32GB available)
- DDR4-2666 non-ECC (8GB / 16GB / 32GB available)

Memory Slots
Four DDR4 SO-DIMM slots, dual-channel capable

Memory Protection
ECC on models with ECC DIMMs and Xeon processor

Max Memory
Up to 128GB
Notes:
1. The max memory is based on the test results with current Lenovo® memory offerings. The system may support more memory as the technology develops.

Storage

Storage Support
Up to three drives, 1x 2.5" HDD + 2x M.2 2280 SSD or 3x M.2 2280 SSD
• 2.5" HDD up to 2TB
• M.2 2280 SSD up to 2TB each

RAID
RAID 0/1/5 support

Storage Type

<table>
<thead>
<tr>
<th>Disk Type</th>
<th>Interface</th>
<th>RPM</th>
<th>Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5&quot; SATA HDD</td>
<td>SATA 6Gb/s</td>
<td>7.2K</td>
<td></td>
</tr>
<tr>
<td>2.5&quot; SATA HDD</td>
<td>SATA 6Gb/s</td>
<td>5.4K</td>
<td></td>
</tr>
<tr>
<td>M.2 2280 SSD</td>
<td>PCIe NVMe, PCIe 3.0 x4</td>
<td>-</td>
<td>Opal2</td>
</tr>
<tr>
<td>M.2 2280 SSD</td>
<td>PCIe NVMe, PCIe 3.0 x4</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Removable Storage

Optical
None

Card Reader
4-in-1 card reader (SD, SDHC, SDXC, MMC)

Multi-Media

Audio Chip
High Definition (HD) Audio, Synaptic® CX11880 codec

Speakers
Stereo speakers, 2W x2, Dolby® Atmos*

Microphone
• Dual array microphone, far-field
• No microphone

Camera
• 720p, with ThinkShutter, fixed focus
• IR & 720p, with ThinkShutter, fixed focus
• No camera

Battery

Battery
Integrated Li-Polymer 90Wh battery, supports Rapid Charge (charge up to 80% in 1hr)

Max Battery Life®
MobileMark® 2014: 8 hr (discrete mode) or 13 hr (hybrid mode)

Notes:
1. All battery life claims are approximate maximum and based on results using the MobileMark 2014, MobileMark 2018, and/or JEITA 2.0 battery-life benchmark tests. Actual battery life will vary and depends on many factors such as product configuration and usage, software use, wireless functionality, power management settings, and screen brightness. The maximum capacity of the battery will decrease with time and use.

Power Adapter

Power Adapter
• 170W slim tip AC adapter
• 230W slim tip AC adapter

DESIGN
### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Touch</th>
<th>Type</th>
<th>Brightness</th>
<th>Surface</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
<th>Key Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6”</td>
<td>FHD (1920x1080)</td>
<td>None</td>
<td>IPS</td>
<td>500 nits</td>
<td>Anti-glare</td>
<td>16:9</td>
<td>1200:1</td>
<td>72%</td>
<td>160°</td>
<td>Dolby Vision™, HDR</td>
</tr>
<tr>
<td>15.6”</td>
<td>FHD (1920x1080)</td>
<td>None</td>
<td>IPS</td>
<td>300 nits</td>
<td>Anti-glare</td>
<td>16:9</td>
<td>700:1</td>
<td>72%</td>
<td>160°</td>
<td></td>
</tr>
<tr>
<td>15.6”</td>
<td>UHD (3840x2160)</td>
<td>None</td>
<td>IPS</td>
<td>500 nits</td>
<td>Anti-glare</td>
<td>16:9</td>
<td>1200:1</td>
<td>100%</td>
<td>170°</td>
<td>Dolby Vision, HDR</td>
</tr>
<tr>
<td>15.6”</td>
<td>UHD (3840x2160)</td>
<td>Multi-</td>
<td>OLED</td>
<td>SDR 400nit, HDR 500nit (peak)</td>
<td>Anti-reflection Anti-smudge</td>
<td>16:9</td>
<td>100000:1</td>
<td>100% DCI-P3</td>
<td>170°</td>
<td>Dolby Vision, HDR</td>
</tr>
</tbody>
</table>

**Color Calibration**
- X-Rite Pantone factory color calibration (UHD display)
- No color calibration

**Touchscreen**
- On-cell touch, supports 10-point touch
- Non-touch

**Notes:**
1. California Electronic Waste Recycling Fee
   - In California, per state law, Lenovo charges an electronic waste recycling fee on this covered device at the time of sale of the product.
   - For more information, go to [https://www.caRecycle.ca.gov/Electronics/Consumer](https://www.caRecycle.ca.gov/Electronics/Consumer)
2. For non-OLED display, HDR is only supported under hybrid mode

### Input Device

**Pen**
- Lenovo Pen Pro
- None

**Keyboard**
- 6-row, spill-resistant, multimedia Fn keys, numeric keypad

**Keyboard Backlight**
- LED backlight

**UltraNav™**
- 3-button TrackPoint® pointing device and 3-button Mylar® surface multi-touch touchpad

### Mechanical

#### Dimensions (WxDxH)

<table>
<thead>
<tr>
<th>Models</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-touch models</td>
<td>377.4 x 252.3 x 24.5-29.4 mm (14.86 x 9.93 x 0.96-1.16 inches)</td>
</tr>
<tr>
<td>Touch models</td>
<td>377.4 x 252.3 x 25.8-30.7 mm (14.86 x 9.93 x 1.02-1.21 inches)</td>
</tr>
</tbody>
</table>

#### Weight

<table>
<thead>
<tr>
<th>Models</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-touch models</td>
<td>2.5 kg (5.51 lbs)</td>
</tr>
<tr>
<td>Multi-touch models</td>
<td>2.9 kg (6.4 lbs)</td>
</tr>
</tbody>
</table>

**Case Color**
- Black

**Case Material**
- GFRP (top), Magnesium-aluminum (bottom)
CONNECTIVITY

Network
Onboard Ethernet
- Gigabit Ethernet, Intel Ethernet Connection I219-V (non-vPro models)
- Gigabit Ethernet, Intel Ethernet Connection I219-LM (vPro models)

WLAN + Bluetooth™
- Intel Wi-Fi 6 AX200, 802.11ax 2x2 Wi-Fi + Bluetooth 5.1, M.2 card
- No WLAN and Bluetooth

WWAN
- Wireless WAN upgradable
- Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
- Not Support

SIM Card
- Nano-SIM Card, Verizon LTE (US)
- No SIM card

NFC
- Near Field Communication
- Not support

Ports

Standard Ports
- 1x USB-C 3.1 Gen 1 (support data transfer, Power Delivery and DisplayPort™)
- 2x USB 3.1 Gen 1 (one Always On)
- 1x Security keyhole
- 2x USB-C 3.1 Gen 2 / Thunderbolt 3 (support data transfer, Power Delivery and DisplayPort)
- 1x HDMI 2.0
- 1x SD card reader
- 1x Ethernet (RJ-45)
- 1x headphone / microphone combo jack (3.5mm)

Optional Ports
- 1x Smart card reader
- 1x Nano-SIM card slot (WWAN models)

Notes:
1. The transfer speed of following ports will vary and, depending on many factors, such as the processing speed of the host device, file attributes and other factors related to system configuration and your operating environment, will be slower than theoretical speed.
   - USB 2.0: 480 Mbit/s;
   - USB 3.2 Gen 1 (SuperSpeed USB 5Gbps, formerly USB 3.0 / USB 3.1 Gen 1): 5 Gbit/s;
   - USB 3.2 Gen 2 (SuperSpeed USB 10Gbps, formerly USB 3.1 Gen 2): 10 Gbit/s;
   - USB 3.2 Gen 2x2 (SuperSpeed USB 20Gbps): 20 Gbit/s;
   - Thunderbolt 3: 40 Gbit/s;
   - FireWire 400: 400 Mbit/s;
   - FireWire 800: 800 Mbit/s
2. Depending on many factors, actual data transfer speed may be lower than theoretical speed
3. Power Delivery only supports power-out for charging peripherals
- USB-C Dock is not supported in right-side USB-C port

Monitor Cable

Monitor Cable
- Lenovo HDMI to VGA Monitor Adapter
- Lenovo USB-C to DisplayPort Adapter
- Lenovo USB-C to VGA Adapter
- No monitor cable

SECURITY & PRIVACY

Security
Security Chip
Discrete TPM 2.0, TCG certified

Physical Locks
Kensington® Security Slot

Smart Card Reader
• Smart card reader
• No smart card reader

Fingerprint Reader
Touch style fingerprint reader on palm rest, match-on-chip

BIOS Security
• Power-on password
• Supervisor password
• Hard disk password
• Self-healing BIOS

Other Security
• (Optional) ThinkShutter camera cover
• (Optional) IR camera for Windows Hello

MANAGEABILITY

System Management
System Management
• Intel vPro Technology, DASH
• None

SERVICE

Warranty
Base Warranty
• 1-year depot service
• 1-year depot with 2-year system board service
• 3-year (1-yr battery) depot service
• 3-year (1-yr battery) limited onsite service
• No base warranty

ACCESSORIES

Bundled Accessories
Bundled Accessories
None

CERTIFICATIONS

Green Certifications
Green Certifications
• EPEAT™ Gold
• ENERGY STAR® 8.0
• RoHS compliant

Other Certifications
MIL-Spec Test
MIL-STD-810G military test passed

ISV Certifications
ISV Certifications
Please visit www.thinkworkstations.com/isv-certifications/