Lenovo NeXtScale n1200 Enclosure

At a glance

Lenovo® NeXtScale System is comprised of compute nodes and chassis. The compute node is the nx360 M5 and the chassis is the n1200 Enclosure. The chassis can house up to 12 half-wide nx360 M4 and nx360 M5 nodes.

The Lenovo n1200 enclosure is a light chassis without integrated networking or switching. As a result, no chassis-level management is required. The nodes in the chassis with front access cabling would connect to top-of-rack switches installed in the same rack.

Features of the n1200 enclosure include:

- Ten 80mm high powered fans (hot swap).
- Up to six power supplies (non-redundant, N+1, or N+N). Choose from:
  - 900W power supply
  - 1300W power supply
- New -48V DC 900W power supply.
  - Available as an option and special bid model.
- n1200 Fan Power Control, Enhanced (FPC).
  - Required for support of -48V DC power supplies and any future chassis enhancements.
  - Included in new chassis models and available as an option.

Easy-to-order dual compute nx360 M5 standard models and CTO (build your own) models are now available in Standalone Solutions Configurator Tool (SSCT), Hardware Configurator (Blue Horizons), and Lenovo System x and Cluster Solutions configurator (x-config).

**Lenovo service options:** Three-year customer replaceable unit (CRU) and on-site limited warranty.

1 You may be asked certain diagnostic questions before a technician is sent.

Overview

Lenovo NeXtScale System is the next generation of dense computing. It is an open, flexible, and simple data center solution for users of technical computing, grid deployments, analytics workloads, and large-scale cloud and virtualization infrastructures.
Lenovo NeXtScale System is built with industry-standard components to create flexible configurations of servers, chassis, and networking switches that integrate easily in a standard 19-inch rack. It is a general purpose platform that provides flexibility to clients for creating unique and differentiated solutions leveraging off-the-shelf components such as standard networking switches and cables. Front-access cabling and Direct Dock Power enable you to quickly and easily make changes in networking, power connections, and storage.

Customized solutions for your applications can be configured to meet your specific business needs for optimum compute power, GPU acceleration, maximum compute power, GPU or coprocessor and storage with the right I/O and networking. Since the NeXtScale platform is optimized for standard racks, it allows the mixing of high-density NeXtScale server offerings and non NeXtScale components within the same cluster rack.

Clients can purchase a fully integrated NeXtScale solution from Lenovo, or order piece part, or procure through their preferred business partner.

If purchased through Intelligent Cluster, Lenovo manufacturing sites will fully integrate the components on site and test them as a complete solution before shipping the rack to your location. When you receive the rack, it is removed from the packaging, placed in its proper location, powered up, and connected to the network in minimal time. Lenovo personnel will confirm that the servers and network are functioning properly before acceptance.

In addition, the integrated NeXtScale solution will undergo Linpack testing on the nodes to simulate thermal conditions and stress memory and CPUs since these components have lower mean time before failures (MTBF). Customers who require Linpack benchmarking results can be provided HPL output data that was obtained during the test.

Lenovo NeXtScale System is scalable and extendable with multigeneration upgrades to protect and maximize IT investments.

**Key prerequisites**

- Supported operating system
- Device drivers, as required

**Planned availability date**

May 8, 2015

**Description**

The NeXtScale nx360 M5 system-board tray uses the following features and technologies:

- Two PCI Express® x16 adapter capabilities
  The system-board tray has two connectors for PCI Express adapters. These connectors accept standard x16 or x8 adapters.
- Dynamic System Analysis (DSA) programs
  The DSA programs collect and analyze system information to aid in diagnosing problems. The diagnostic programs collect a large amount of information, such as:
  - System configuration
  - Network interfaces and settings
- Installed hardware
- Service processor status and configuration
- Vital product data, firmware, and uEFI configuration
- RAID controller configuration and status
- Event logs for ServeRAID controllers and service processors
- Operating system configuration (Online DSA only)
- Installed device drivers (Online DSA only)
- System services (Online DSA only)

- Online DSA only

DSA comes in both online (runs under the operating system) and preboot (runs its own media) versions. Online DSA, which is a web download, collects additional software information and operating system vital product data. DSA Preboot runs additional diagnostics, such as the memory test which can help to detect faulty hardware. Both versions can transmit data back to Lenovo for analysis by service and support or can have the results analyzed locally.

- Integrated Management Module

The Integrated Management Module (IMM) combines the baseboard management controller (BMC) and video controller functions in a single chip that provides basic service-processor environmental monitoring functions. If an environmental condition exceeds a threshold or if a system component fails, LEDs are illuminated on the BMC to help you diagnose the problem and the error is recorded in the error log. The BMC also provides remote server management capabilities, using the Intelligent Platform Management Interface (IPMI) version 2.0 protocol.

**Note:** In messages and documentation, the term "service processor" refers to the baseboard management controller.

- Integrated network support

The system-board tray comes with an integrated Intel® dual-port Gigabit Ethernet controller, which supports connection to a 10 Mbps, 100 Mbps, or 1000 Mbps network.

- Storage capacity

The system-board tray supports one 3.5-inch simple-swap SATA, or two 2.5-inch simple-swap SATA/SAS, or four 1.8-inch simple-swap solid-state HDDs. An optional SAS controller must be installed for specific configurations.

- Supported memory options

The nx360 M5 server system-board tray can address up to 128 GB of system memory. The memory controller supports up to 8 industry-standard, registered ECC double-data-rate 3 (DDR3) -1066 DIMMs, -1333 DIMMs, and -1600 DIMMs or unbuffered ECC double-data-rate 3 (DDR3) -800 DIMMs, -1066 DIMMs, -1333 DIMMs, -1600 DIMMs, and -1866 DIMMs.

- Memory mirroring

Memory mirroring stores data in two pairs of DIMMs simultaneously.

- Redundant connection

The addition of an optional network interface card (NIC) provides a failover capability to a redundant Ethernet connection. If a problem occurs with the primary Ethernet connection, all Ethernet traffic that is associated with the primary connection is automatically switched to the redundant NIC. If the applicable device drivers are installed, this switching can occur without data loss and without user intervention.

**Lenovo NeXtScale n1200 Enclosure 6U chassis (5456)**

- SAS, SATA, and SSD hard drive support
- Shared high-efficiency power supply (optional redundant supply)
– Shared low-power consuming fans
– Choice of SAS, Ethernet, or iSCSI host interface

**Power and cooling advantages**

Lenovo NeXtScale n1200 Enclosure servers help pack more processors into the same power and cooling envelope, better utilizing floor space, and "right size" data center design. With the Lenovo NeXtScale n1200 Enclosure solution, less power per processor means more processing capacity per kilowatt. The Lenovo NeXtScale n1200 Enclosure can run cooler to deliver greater reliability.

**Lenovo NeXtScale n1200 Enclosure Rear Door Heat eXchanger (43V6048)**

For dense data center environments, Lenovo offers smart rack-level heat management solutions such as the super-efficient Lenovo Rear Door Heat eXchanger. The water-cooled door is designed to dissipate heat generated from the back of the rack to reduce the overall room temperature. With this combination of benefits at the server and data center level, Lenovo systems deliver strong power and cooling benefits to Lenovo NeXtScale n1200 Enclosure clients.

The Lenovo NeXtScale n1200 Enclosure Rear Door Heat eXchanger for Lenovo NeXtScale n1200 Enclosure racks helps reduce the air temperature in your growing data center to approximately the same air temperature as that entering the rack, alleviating the need to add air conditioning units. This unobtrusive solution brings more cooling capacity to areas where the heat is greatest, around racks of servers with multiple, more powerful processors.

This cooling efficiency can help alleviate or possibly eliminate the need for additional air conditioning power and the associated construction cost.

**Lab services**

**Lenovo NeXtScale n1200 Enclosure installation planning**

Features:

• Assess the client's air conditioning and air distribution in support of NeXtScale systems
• Evaluate the need for any Rear Door Heat eXchanger installations and offer necessary guidance
• Review the NeXtScale power specifications based on the client's hardware configurations and offer necessary guidance

Typical benefits:

• Offers accurate environmental information as required for supporting NeXtScale systems most reliably
• Identifies the most efficient approach to the NeXtScale system cooling and ventilation needs
• Reduces potential installation shortfalls with open and ongoing communication with the client surrounding their specific NeXtScale system requirements

**NeXtScale systems management**

The NeXtScale product family offers systems management support through standards-based, scriptable interfaces. This support starts with the embedded Intelligent Platform Management Interface (IPMI) baseboard management controller (BMC).

For rapid diagnosis of problems, NeXtScale supports Lenovo Dynamic System Analysis (DSA) preboot diagnostics and online data collection for problem determination in supported Microsoft™ Windows™ and Linux™ environments. Refer
to the Dynamic System Analysis product documentation for additional detail on DSA features.

NeXtScale compute nodes support Lenovo Systems Director with limited function. Refer to Lenovo Systems Director product documentation for specific details on supported functions on NeXtScale hardware.

The compute nodes have been tested with the Extreme Cluster Administration Toolkit (xCAT), an open source community-based cluster administration tool set tailored to scale-out compute environments. You can download xCAT from SourceForge at

http://sourceforge.net/projects/xcat/

For additional information on xCAT, contact your Lenovo Sales and Support Team, or visit

http://www.xcat.org/

**Accessibility by people with disabilities**

A US Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be requested at


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**Product positioning**

Lenovo delivers innovations that meet your specific needs. The right choice depends on your business requirements, target applications, and operating environment. NeXtScale focuses on:

- Compute performance in gigaflops per dollar and performance per watt
- Rapid scaling and large scale-out deployments
- Maximum useable compute density in the data center
- Software-resilient workloads such as HPC, grid, and cloud computing
- Optional redundant power supply for nongrid workloads

The NeXtScale hardware platform is positioned for large-scale enterprise deployments that rely on recovery-oriented architecture that primarily enables redundancy through the software layer instead of redundant hardware.

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**Product number**

The following are features already announced for the 3331 and 5456 machine types:

<table>
<thead>
<tr>
<th>Description</th>
<th>MT</th>
<th>Model</th>
<th>Feature</th>
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</thead>
<tbody>
<tr>
<td>n1200 Enclosure Chassis Label GBM - 900W -48VDC</td>
<td>5456</td>
<td>HC1</td>
<td>ASGF</td>
</tr>
<tr>
<td>CFF -48V DC 900w Power Supply</td>
<td>3331</td>
<td>HC1</td>
<td>ASGJ</td>
</tr>
<tr>
<td>CFF -48V DC 900w Power Supply</td>
<td>5456</td>
<td>HC1</td>
<td>ASGJ</td>
</tr>
<tr>
<td>n1200 Fan Power Control, Enhanced</td>
<td>3331</td>
<td>HC1</td>
<td>ASTA</td>
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<tr>
<td>n1200 Fan Power Control Enhanced</td>
<td>5456</td>
<td>HC1</td>
<td>ASUM</td>
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<tr>
<td>Lenovo x3850 ITL Kit</td>
<td>3331</td>
<td>HC1</td>
<td>ASW4</td>
</tr>
<tr>
<td>Lenovo x3950 ITL Kit</td>
<td>3331</td>
<td>HC1</td>
<td>ASW5</td>
</tr>
<tr>
<td>32GB TruDDR4 Memory (2Rx4, 1.2V) PC4-17000 CL15</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2133MHz LP DDR4M</td>
<td>3331</td>
<td>HC1</td>
<td>ASUJ</td>
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Description

Lenovo NeXtScale n1200 Enclosure

Options

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<thead>
<tr>
<th>Description</th>
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<th>Model</th>
<th>Feature Code</th>
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<th>Part number</th>
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<td>HC1</td>
<td>ASTA</td>
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<td>ASW4</td>
<td>00KH367 00KH367</td>
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<tr>
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<td>HC1</td>
<td>ASW5</td>
<td>00KH368 00KH368</td>
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<tr>
<td>CFF -48V DC 900W Power Supply</td>
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<td>HC1</td>
<td>ASGJ</td>
<td>00KG685 00KG685</td>
<td></td>
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<tr>
<td>32GB TruDDR4 Memory (2Rx4, 1.2V) PC4-17000</td>
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<td>HC1</td>
<td>A5UJ</td>
<td>95Y4808 95Y4808</td>
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</tr>
</tbody>
</table>

Pseudo parts

**Note:** The following pseudo part numbers cannot be ordered as stand-alone parts and can only be ordered as part of a configuration created in x-config.

<table>
<thead>
<tr>
<th>Pseudo part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>95Y4809</td>
<td>32GB 2Rx4 8Gbit 1.2V PC4-17000 2133MHz DDR4 RDIMM</td>
</tr>
<tr>
<td>00MU737</td>
<td>n1200 Fan Power Control Enhanced</td>
</tr>
</tbody>
</table>

Publications

Lenovo Systems Information Center provides you with a single information center where you can access product documentation for Lenovo systems hardware, operating systems, and server software. Through a consistent framework, you can efficiently find information and personalize your access. The Lenovo Systems Information Center is at

http://www-03.ibm.com/systems/x/support/index.html

The languages that are available are:

- English
- French
- German
- Italian
- Japanese
- Brazilian Portuguese
- Simplified Chinese
- Traditional Chinese

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Lenovo services include business consulting, outsourcing, hosting services, applications, and other technology management.
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http://www.ibm.com/services/continuity

For details on education offerings related to specific products, visit


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**Technical information**

**Specified operating environment**

**Physical specifications**

**Lenovo NeXtScale n1200 Enclosure**

**Dimensions**
- Height: 262.2 mm (10.3 in)
- Depth: 914.5 mm (36.0 in) (back side of mounting flange to rear of chassis)
- Width: 447 mm (17.6 in)

**Electrical**
- 100 - 127 (nominal) V ac; 50 Hz or 60 Hz; 6.8 A
- 200 - 240 (nominal) V ac; 50 Hz or 60 Hz; 5.0 A
- Input kilovolt-amperes (kVA) (approximately):
  - Minimum configuration: 0.100 kVA
  - Maximum configuration: 6.000 kVA
- Btu output:
  - Ship configuration: 341.18 Btu/hr (100 watts)
  - Full configuration: 20,470.84 Btu/hr (6,000 watts)

Power requirements (per rack) maximum configuration

**900-watt PSU electrical power specifications:**
- 100 - 127 V ac or 200 - 240 V ac auto-ranging operation
- Built-in overload and surge protection
- 100 - 127 (nominal) V ac; 50 or 60 Hz; 6.8 A (maximum)
- 200 - 240 (nominal) V ac; 50 or 60 Hz; 5.0 A (maximum)

**Standards**

**Equipment approvals and safety**
- Russia, Belorussia and Kazakhstan, TR CU 020/2011 and TR CU 004/2011
- IEC 60950-1 (CB Certificate and CB Test Report)
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, EN61000-3-3)
- CISPR 22, Class A
- TUV-GS (EN60950-1/IEC 60950-1, EK1-ITB2000)

**Operating environment**

The Lenovo NeXtScale nx360 M5 products are designed to operate in a general business environment, such as a Class A or A1, temperature and humidity-controlled room.

**Power on (note 1):**
- Temperature: 5°C - 40°C (40°F - 104°F) up to 950 m (3,117 ft). Above 950 m, de-rated maximum air temperature 1°C / 175 m (note 2)
- Humidity, noncondensing: -12°C dew point (10.4°F) and 8% - 85% relative humidity (note 3 & 4)
- Maximum dew point: 24°C (75°F)
- Maximum altitude: 3050 m (10,000 ft) & 5°C - 28°C (41°F - 82°F)
- Maximum rate of temperature change: 5°C/hr (41°F/hr) for tape drive, 20°C/hr (68°F/hr) for HDDs (note 5)
- Declared noise level: 7.0 bels (idling)

**Power off (note 6):**
- Temperature: 5°C to 45°C (41°F - 113°F)
- Relative humidity: 8% - 85%
- Maximum dew point: 27°C (80.6°F)

**Storage (nonoperating):**
- Temperature: 1°C to 60°C (33.8°F - 140°F)
- Altitude: 3050 m (10,000 ft)
- Relative humidity: 5% - 80%
- Maximum dew point: 29°C (84.2°F)

**Shipment (nonoperating) (note 7):**
- Temperature: -40°C to 60°C (-40°F - 140°F)
- Altitude: 10,700 m (35,105 ft)
- Relative humidity: 5% - 100%
- Maximum dew point: 29°C (84.2°F) (note 8)

**Particulate contamination**

**Attention:**

Design to ASHRAE Class A3, ambient of 40°C, with relaxed support:

- The system supports cloud-like workload with no performance degradation acceptable (Turbo-Off).
- Under no circumstance, can any combination of worst-case workload and configuration result in system shutdown or design exposure at 40°C.

**Specific processors supported environment:**

- Processor E5-2667:
  - Temperature: 5°C - 30°C (41°F - 86°F)
  - Altitude : 0 - 950 m (3,117 ft)
• Processor E5-2680:
  – Temperature: 5°C - 30°C (41°F - 86°F)
  – Altitude : 0 - 950 m (3,117 ft)
• Processor E5-2690 v2:
  – Temperature: 5°C - 35°C (41°F - 95°F)
  – Altitude : 0 - 950 m (3,117 ft)
• Processor E5-2697 v2:
  – Temperature: 5°C - 35°C (41°F - 95°F)
  – Altitude : 0 - 950 m (3,117 ft)

Notes

Note 1: Chassis is powered on.

Note 2: Derate maximum allowable temperature 1°C / 175 m above 950 m.

Note 3: The minimum humidity level for class A3 is the higher (more moisture) of the -12°C dew point and the 8% relative humidity. These intersect at approximately 25°C. Below this intersection (25°C) the dew point (-12°C) represents the minimum moisture level, while above its relative humidity (8%) is the minimum.

Note 4: Moisture levels lower than 0.5°C DP, but not lower -10°C DP or 8% relative humidity, can be accepted if appropriate control measures are implemented to limit the generation of static electricity on personnel and equipment in the data center. All personnel and mobile furnishings and equipment must be connected to ground via an appropriate static control system. The following items are considered the minimum requirements:

  • Conductive materials (conductive flooring, conductive footwear on all personnel that go into the data center) will be used, and all mobile furnishings and equipment will be made of conductive or static dissipative materials).
  • During maintenance on any hardware, a properly functioning wrist strap must be used by any personnel who contacts IT equipment.

Note 5: 5°C/hr for data centers employing tape drives and 20°C/hr for data centers employing disk drives.

Note 6: Chassis is removed from original shipping container and is installed but not in use, for example, during repair, maintenance, or upgrade.

Note 7: The equipment acclimation period is 1 hour per 20°C of temperature change from the shipping environment to the operating environment.

Note 8: Condensation is acceptable, but not rain.

Energy value tables - NeXtScale nx360 M5

• Category 2005/2007/2011 = C/b/F
• Input voltage = 100 V ac
• Frequency = 60 Hz

Hardware requirements

For service, the Lenovo NeXtScale n1200 Enclosure requires a compatible:

  • Monitor
  • Combination USB keyboard and pointing device, such as part number 40K5372
  • USB CD-RW/DVD drive, such as the Lenovo part number 73P4515 or 73P4516

Note: Rack must have 784.86 mm (30.9 in) minimum clearance on the front and back sides of the rack to allow service.
**Compatibility**
All components of the Lenovo NeXtScale n1200 Enclosure are compatible when purchased as a supported Lenovo NeXtScale n1200 Enclosure solution.

**Planning information**

**Customer responsibilities**
Installation of hardware components is provided by Lenovo on the Lenovo NeXtScale n1200 Enclosure.

Clients are responsible for preparing their site for installation.

You are expected to review the *Installation Planning Guide* before the delivery of your Lenovo NeXtScale n1200 Enclosure. Clients' responsibilities must be verified as complete before scheduling an Lenovo installer to come on site. Visit

http://www-03.ibm.com/systems/x/?lnk=mprSY-sysx-usen

To service your Lenovo NeXtScale n1200 Enclosure or obtain Lenovo service, the Lenovo NeXtScale n1200 Enclosure requires a compatible:

- Monitor
- Combination USB keyboard and pointing device, such as part number 40K5372
- USB CD-RW/DVD drive, such as the Lenovo part number 73P4515 or 73P4516

**Note:** Rack must have 784.86 mm (30.9 in) minimum clearance on the front and back sides of the rack to allow service.

**Cable orders**
All cables are supplied with the Lenovo NeXtScale n1200 Enclosure. Depending on the applications, the cables may be fully installed, partially installed (plugged at one end and packaged for shipping), or included as part of a shipment group.

**Installability**
Installation of hardware components is provided by Lenovo with the exception of plumbing connections to the optional Rear Door Heat eXchanger.

**Packaging**
Lenovo NeXtScale n1200 Enclosure shipping contents

NeXtScale CD, which contains the following documentation as portable document format (PDF) files:

- Safety Information (multilingual)
- Rack Safety Information (multilingual)
- Environmental Notices and User Guide (multilingual)
- NeXtScale n1200 Enclosure (MT5456) Installation and User's Guide
- Rear Door Heat eXchanger for the NeXtScale Rack Installation and Maintenance Guide
- Licenses and Attributions Documents
- DPI C13 PDU+, DPI C13 3-phase PDU+, DPI C19 PDU+, and DPI C19 3-phase PDU+ Installation and Maintenance Guide
- Lenovo License Agreement for Machine Code
- UEFI Disclaimer Notices File
Important Notices multilingual document that contains all of the legal, safety, emissions, and environmental statements in printed format.

**Security, auditability, and control**

This offering uses the security and auditability features from standard Lenovo offerings and supported Linux distributions.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

**Global Technology Services**

Contact your Lenovo representative for the list of selected services available in your country, either as standard or customized offerings, for the efficient installation, implementation, and/or integration of this product.

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**Terms and conditions**

**Warranty service upgrades**

**Hourly service rate classification**

Two

**General terms and conditions**

**Field-installable features**

Yes

**Model conversions**

No

**Machine installation**

Customer setup. Customers are responsible for installation according to the instructions Lenovo provides with the machine.

**Machine Code License Acceptance Requirement**

Acceptance-By-Use Machine: Yes, acceptance of the Machine Code license terms is conveyed through the user's initial use of the machine.

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**Prices**

For all local charges, contact your Lenovo representative.

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**Announcement countries**

All European, Middle Eastern, and African countries.

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