Cisco 3660 Multiservice Platform for Large Branch-Office Multiservice Networking

THE CISCO 3660 LEVERAGES THE MULTISERVICE ARCHITECTURE OF THE CISCO 2600 AND 3600 SERIES PLATFORMS, EXTENDING THOSE CAPABILITIES FOR USE IN LARGER BRANCH-OFFICE APPLICATIONS OR FOR TELCO-MANAGED SERVICES AS CUSTOMER PREMISE EQUIPMENT (CPE). THE CISCO 3660 HAS THE VERSATILITY TO SUPPORT TODAY'S BRANCH AND ENTERPRISE REQUIREMENTS FOR DATA, VOICE, VIDEO, AND HYBRID DIAL ACCESS APPLICATIONS, AND THE HIGH-SPEED CONNECTIVITY NECESSARY TO SUPPORT THE INCREASED BANDWIDTH NEEDS FOR MULTISERVICE APPLICATIONS.

The uniquely modular chassis of the Cisco 3660 is designed with high availability and field service simplicity in mind, making it a robust yet highly cost-effective element in the network over which to deploy mission-critical applications. The Cisco 3660 provides unprecedented versatility with a broad range of available network modules and extensive flexibility with a variety of configurable options for customer-specific applications. The Cisco 3660 uses the same network modules that are available today on the Cisco 1600, 1700, 2600, and 3600 multiservice platforms, protecting customer investment, streamlining operations costs associated with sparing of parts, and for training.

Distinguishing features of the Cisco 3660 include integrated power redundancy and module hot-swap capabilities, which provide higher product availability for mission-critical applications. The integrated ports on the motherboard of the Cisco 3660 free up all six network module slots to enable higher densities of LAN/WAN or multiservice aggregation. The additional slots of the Cisco 3660 combined with the expanding capabilities of enhanced network modules enable new business applications, such as higher densities of packetized voice aggregation and branch-office Asynchronous Transfer Mode (ATM) access ranging from T1/E1 Inverse Multiplexing for ATM (IMA) to OC-3 speeds.

The Cisco 3660 can be ordered in several configurations. The base system consists of:
• Six expansion slots for network module support
• Two advanced integration module (AIM) slots for hardware acceleration and increased processing power
• Chassis support for redundant AC or DC power supplies
• One AUX port
• One console port
• Two personal computer memory card international association (PCMCIA) card slots for software and configuration backup

Figure 1   Cisco 3660 Multiservice Platform

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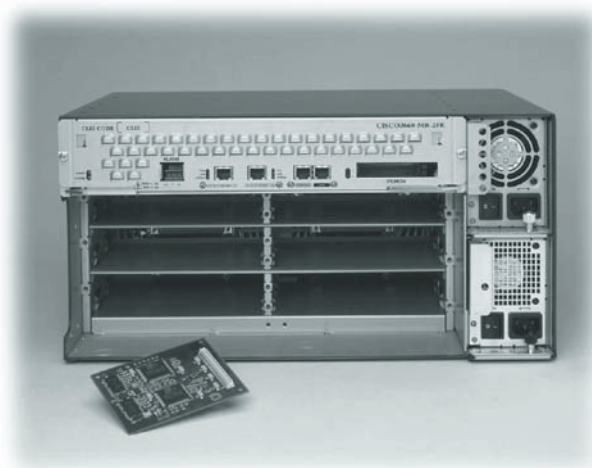
The Cisco 3660 can be ordered with either one or two Fast Ethernet ports and provides hot-swap capability of like-to-like network modules and for redundant power supplies, ensuring high availability. Rear-access cabling allows easy connectivity, and a modular design allows easier servicing of field-replaceable units (FRUs).

Robust network management capability for the Cisco 3660 is achieved using the CiscoWorks, CiscoView, and CiscoView Stack Management Interface applications. The same applications are used to manage a large number of Cisco products that have already been deployed in existing networks, presenting network support personnel a familiar look and feel.

One of the key benefits of the Cisco 3660 is that it runs Cisco IOS® software, the operating system deployed in most of the Internet backbone equipment around the world. The feature richness of Cisco IOS software becomes immediately available to customers who deploy the Cisco 3660, allowing them to enable a variety of applications to fulfill their growing business needs.

Key Features and Benefits

The key features and benefits of the Cisco 3660 include:

- *Density and performance*—The Cisco 3660 multiservice platform with integrated ports, and six expansion slots, enables new business applications such as higher densities of packetized voice aggregation and branch-office ATM access ranging from T1/E1 IMA to OC-3.
- *High-availability design*—Redundant AC and DC power supply options on the Cisco 3660 deliver a robust platform for mission-critical applications. Furthermore, hot swap of like-to-like network modules (NMs) and power supplies facilitates greater uptime in a high-availability environment.
- *Data, voice, video, and hybrid dial access integration*—The Cisco 3660 allows customers to support the widest breadth of applications on a single platform, including data, voice, video, and hybrid dial access integration. Aggregation of applications on a single platform significantly streamlines operations and networking costs by simplifying support and manageability of branch-office networking requirements. Today there are more than 60 different network modules that can be used in these slots, providing unmatched versatility.

- *Investment protection*—The Cisco 3660 shares modular interfaces with the Cisco 1600, 1700, 2600, and 3600 series platforms, simplifying network support requirements, enabling economies of scale, minimizing training costs, and providing customer-specific options to fulfill today's and tomorrow's small, medium-sized, and large branch-office needs. Furthermore, the ability of the Cisco 3660 to support field-upgradable modular components enables customers to easily change network interfaces or other components without a "forklift upgrade" of the entire remote branch-office solution.
- *Lower cost of ownership*—Integrating the functions of built-in data service unit/channel service unit (CSU/DSUs), ISDN network termination (NTI) devices, and other equipment found in branch-office wiring closets provides a space-saving, cost-effective solution that can be managed remotely using network management applications such as CiscoWorks and CiscoView.

Additional Features and Benefits:

Versatility
- Modular architecture that offers a huge selection of LAN and WAN interfaces and provides easy customization for individual needs and the flexibility for network modules to be added on a "pay-as-you-grow" basis.
- A variety of interfaces with feeds and speeds ranging from 300-bps async up to ATM OC-3 provide connectivity to IP, ATM, Frame, and TDM networks and will support the needs of any large enterprise branch-office environment. A full description of these interfaces is provided in Table 2.
- Facilitates the consolidation of high-density digital voice interfaces with additional functionality, providing a very cost-effective solution. For example, a typical branch office could use the Cisco 3660 to consolidate the following:
  - Two T1s of digital voice connected to a private branch exchange (PBX) or to the public switched telephone network (PSTN)
  - An 8xT1/E1 ATM IMA trunk for connectivity to the regional office
  - 30 digital modems for dial-access services
  - Serial lines for connectivity to other devices

- WAN interface cards and network modules are shared with the Cisco 1600, 1700, 2600, and 3600 series multiservice platforms, reducing the cost of maintaining inventory of modular components and lowering training costs for support personnel.
- All parts are field upgradable, allowing quick, easy, and low-cost maintenance.

Performance
- A high-performance RISC architecture provides up to 120 Kpps of fast switching capability or up to 12 Kpps of process switching capabilities.
- Supports two AIM slots, which can be used to provide hardware acceleration and additional processing power for emerging applications as network needs evolve.
- Support for ATM T1/E1 IMA to OC-3 interfaces provides great flexibility and higher bandwidth for branch office to regional office connectivity, enabling support for emerging applications.

Reliability
- Redundant AC or DC power supply options provide continuous operation capability for high-availability environments.
- Allows for hot swap of like-to-like network modules without the disruption of traffic on other interfaces.
- Provides full diagnostics and error reporting on all major components of the chassis including power supply, main board, backplane, and fans.
- Dual-bank Flash memory allows a backup copy of Cisco IOS software to be stored in Flash memory for reduced downtime.
- LED status indicators provide at-a-glance indications for interface activity status, system status, and individual power-supply status.

Platform Manageability
- Support for CiscoWorks, CiscoWorks2000, and CiscoView allows simplified management of all integrated components on the Cisco 3660 and provides consistent network management along with other Cisco devices in the network.
- Enhanced setup feature, which provides context-sensitive questions, guiding the user through the configuration process and allowing faster deployment.

- Auto install configures remote units automatically across a WAN connection to save the cost of sending technical staff to remote sites.
- Support for the Cisco Discovery Protocol (CDP), which enables a CiscoWorks network management station to automatically discover the Cisco 3660 in a network topology.

Ergonomic design
- All network interfaces are located on the rear of the unit for simplified installation and cable management.
- Uniquely modular and easy-to-open chassis design allows fast and easy access for installing upgrading, or field replacement and service of a variety of system components (field-replaceable component design).

Cisco IOS Software
Full support for Cisco IOS software allows customers to deploy many features across a variety of applications. These include:
- *WAN optimization*—Support for dial-on-demand routing (DDR) and dial backup, as well as protocol spoofing and snapshot routing, help reduce unnecessary WAN traffic. Furthermore, data compression over ATM, Frame Relay, dedicated leased-line networks, and dial networks further reduce WAN costs and increase effective bandwidth.
- *Quality of service (QoS)*—Features such as the resource reservation protocol (RSVP), protocol independent multicast (PIM), generic traffic shaping, committed access rate (CAR), custom and priority queuing, and weighted fair queuing (WFQ) ensure a consistent QoS for new applications such as teleconferencing over the WAN.
- *Dial access*—Support for the most complete set of access protocols of any access server in the industry, including, point-to-point protocol (PPP), multilink PPP (MP), integrated analog and digital modems, 56 Kbps/V.90, dial-out and fax-out, and modem over basic rate interface (BRI), R2, and channel associated signaling (CAS) signaling.
- *Security*—Cisco IOS software firewall feature set, data encryption standard (DES), and 3DES data encryption, tunneling, extended access lists, violation logging, Remote Access Dial-In User Service (RADIUS), Kerberos V, and TACACS+ with authentication, authorization, and accounting (AAA) are supported.

- *Voice signaling*—Cisco IOS software offers a robust set of signaling features for packet telephony applications foreign exchange station (FXS), foreign exchange office (FXO) with Wink, Immediate and Delay start, (E&M) with Ground or Loop start, and Basic Rate Interface (BRI) signaling are some of the variants offered today, with ISDN Primary Rate Interface (PRI) and other common channel signaling variants planned for the future.

Support

Cisco support solutions are designed for one purpose to put customers quickly in touch with the appropriate resources. The Cisco support network consists of technical assistance center (TAC) engineers, development engineers, field engineers, parts warehouses, delivery services, and service providers. By including Cisco support with Cisco equipment purchases customers immediately gain access to a wealth of support resources.

Summary

As new world networking capabilities change the landscape of the enterprise network, the Cisco 3660 provides a platform that helps customers future-proof their investment by providing higher densities, greater performance, and more expansion capabilities to meet their network requirements. Designed for higher-availability environments with power redundancy and network module hot-swap capability, the Cisco 3660 offers a single platform for integration of all large branch-office networking requirements. Sharing existing interface cards the Cisco 1600, 1700, 2600, and 3600 series multiservice platforms allows customers to further leverage their existing investments hardware and training, lowering their overall costs.

Technical Specifications

Table 1 System Specifications

Cisco 3660 Series	
Processor Type	225-MHz RISC QED RM5271
Flash Memory	8-MB, upgradable to 64-MB
System Memory	32-MB DRAM, upgradable to 64-, 128- or 256-MB SDRAM
Network Module Slots	6 slots
Advanced Integration Module Slots	2 slots
Onboard LAN Ports	Up to two 10/100-Mbps
Power	250W power supplies with dual DC, dual AC, or single DC, single AC configuration
Dimensions	8.7 x 17.5 x 11.8 in. (22.1 x 44.5 x 30 cm)
Performance	120-Kpps fast switching and 12 Kpps process switching
Console and Auxiliary Ports (up to115.2 kbps)	Yes
Rack-Mounting	Yes, 19-in. widths, center mount
Dual Type II PCMCIA Card Slots	Yes

Table 2 Cisco 3660 Network Modules, Product Numbers, and Descriptions

Network Modules	Description	Supported Date
Serial Network Modules		
NM-16A	16-port high-density async network module	August 1999
NM-32A	32-port high-density async network module	August 1999
NM-4T	4-port serial network module	August 1999
NM-4A/S	4-port async/sync serial network module	August 1999
NM-8A/S	8-port async/sync serial network module	August 1999
LAN Network Modules and Mixed-Media LAN and WAN Network Modules		
NM-1FE-TX	1-port Fast Ethernet network module (10/100BaseTX only)	August 1999
NM-1FE-FX	1-port Fast Ethernet network module (10/100Base Fiber only)	August 1999
NM-4E	4-port Ethernet network module	August 1999
NM-1E	1-port Ethernet network module	August 1999
NM-1E2W	1-port Ethernet, two-WAN-card-slot network module	August 1999
NM-2E2W	2-port Ethernet, two-WAN-card-slot network module	August 1999
NM-1E1R2W	1-port Ethernet, one-port Token Ring, two-WAN-card-slot network module	August 1999
Digital Voice and Fax Packet Voice Trunk Network Modules		
NM-HDV-1T1-24(=)	Single-port, 24-channel T1 voice/fax Network Module (supports 24 channels of medium complexity VoCoders: G.729a/b, G.726, G.711 and fax or 12 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711 and fax)	August 1999
NM-HDV-1T1-24E(=)	Single-port, enhanced 24-channel T1 voice/fax Network Module (supports 24 channels of high and medium complexity VoCoders: G.729a/b, G.726, G.729, G.728, G.723.1, G.711 and fax)	August 1999
NM-HDV-2T1-48(=)	Dual-port, 48-channel T1 voice/fax Network Module (supports 48 channels of medium complexity VoCoders: G.729a/b, G.726,G.711and fax or 24 channels of G726, G729, G723.1, G.728, G729a/b, G711 and fax) Supports add/drop multiplexing (drop and insert)	August 1999
NM-HDV=	High-density voice/fax Network Module spare	August 1999
PVDM-12=	12-channel packet voice DSP module upgrade spare	August 1999
Digital Voice Interface Cards		
VWIC-1MFT-T1(=)	1-port RJ-48 MultiFlex Trunk - T1	August 1999
VWIC-2MFT-T1(=)	2-port RJ-48 MultiFlex Trunk - T1	August 1999
VWIC-2MFT-T1-DI(=)	2-port RJ-48 MultiFlex Trunk with drop and insert - T1	August 1999
Analog Voice and Fax Packet Voice Trunk Network Modules		
NM-1V	1-slot voice and fax network module	August 1999
NM-2V	2-slot voice and fax network module	August 1999
NM-HDV	High-density voice network module	August 1999
NM-HDV-1T1-24	Single-port, 24-channel T1 high-density voice network module	August 1999

Table 2 Cisco 3660 Network Modules, Product Numbers, and Descriptions (Continued)

Network Modules	Description	Supported Date
NM-HDV-1T1-24E	Single-port, enhanced-24-channel T1 high-density voice network module	August 1999
NM-HDV-2T1-48	Dual-port, 48-Channel high-density voice network module	August 1999
Analog Voice Interface Cards		
VIC-2FXS	2-port voice interface card—FXS	August 1999
VIC-2FXO	2-port voice interface card—FXO	August 1999
VIC-2E/M	2-port voice interface card—E&M	August 1999
VIC-2FXO-M3	2-port voice interface card—FXO (for Australia)	August 1999
VIC-2FXO-EU	2-port voice interface card—FXO (for Europe)	August 1999
VIC-2BRI-S/T-TE	2-port voice interface card—BRI (terminal)	August 1999
Voice interface cards are available as daughter cards to the one-and two-port voice/fax network modules. Up to two voice interface cards can be installed on a single voice/fax network module. The voice interface cards are not included in the price of the mixed-media network modules.		
ATM Network Modules		
NM-1ATM-25	1-port 25-Mbps ATM network module	Q1 CY 2000
NM-1A-OC3MM	1-port 155-Mbps OC-3 ATM multimode network modules	August 1999
NM-1A-OC3SMI	1-port 155-Mbps OC-3 ATM single-mode, intermediate-reach network modules	August 1999
NM-1A-OC3SML	1-port 155-Mbps OC-3 ATM single-mode, long-reach network modules	August 1999
NM-4T1-IMA (=)	4-port T1 ATM network module with Inverse Multiplexing over ATM (IMA)	August 1999
NM-4E1-IMA (=)	4-port E1 ATM network module with IMA	August 1999
NM-8T1-IMA (=)	8-port T1 ATM network module with IMA	August 1999
NM-8E1-IMA (=)	8-port E1 ATM network module with IMA	August 1999
Serial WAN Interface Cards		
WIC-1DSU-T1	1-port T1/fractional T1 with CSU/DSU	August 1999
WIC-1T	1-port high-speed serial	August 1999
WIC-1DSU-56K4	1-port, four-wire 56/64-Kbps with CSU/DSU	August 1999
ISDN WAN Interface Cards		
WIC-1B-S/T	1-port ISDN BRI	August 1999
WIC-1B-U	1-port ISDN BRI with NT1	August 1999
WAN interface cards are available as daughter cards to the mixed-media LAN/WAN network modules. Up to two WAN interface cards can be installed on a single, mixed-media LAN/WAN network module. The WAN interface cards are not included in the price of the mixed-media network modules		
ISDN and Channelized Serial Network Modules		
NM-1CT1	1-port channelized T1/ISDN PRI network module	Q1 CY 2000
NM-1CT1-CSU	1-port channelized T1/ISDN PRI with CSU network module	Q1 CY 2000

Table 2 Cisco 3660 Network Modules, Product Numbers, and Descriptions (Continued)

Network Modules	Description	Supported Date
NM-2CT1	2-port channelized T1/ISDN PRI network module	Q1 CY 2000
NM-2CT1-CSU	2-port channelized T1/ISDN PRI with CSU network module	Q1 CY 2000
NM-1CE1B	1-port channelized E1/ISDN PRI balanced network module	Q1 CY 2000
NM-1CE1U	1-port channelized E1/ISDN PRI unbalanced network module	Q1 CY 2000
NM-2CE1B	2-port channelized E1/ISDN PRI balanced network module	Q1 CY 2000
NM-2CE1U	2-port channelized E1/ISDN PRI unbalanced network module	Q1 CY 2000
NM-1FE1CT1	1-port Fast Ethernet and 1-port channelized T1/ISDN-PRI network module	Q1 CY 2000
NM-1FE1CT1-CSU	1-port Fast Ethernet and 1-port channelized T1/ISDN-PRI network module with integrated CSU	Q1 CY 2000
NM-1FE2CT1	1-port Fast Ethernet and 2-port channelized T1/ISDN-PRI network module	Q1 CY 2000
NM-1FE2CT1-CSU	1-port Fast Ethernet and 2-port channelized T1/ISDN-PRI network module with integrated CSUs	Q1 CY 2000
NM-1FE1CE1U	1-port Fast Ethernet and 1-port channelized E1/ISDN-PRI unbalanced network module	Q1 CY 2000
NM-1FE1CE1B	1-port Fast Ethernet and 1-port channelized E1/ISDN-PRI unbalanced network module	Q1 CY 2000
NM-1FE2CE1U	1-port Fast Ethernet and 2-port channelized E1/ISDN-PRI unbalanced network module	Q1 CY 2000
NM-1FE2CE1B	1-port Fast Ethernet and 2-port channelized E1/ISDN-PRI balanced network module	Q1 CY 2000
NM-4B-S/T	4-port ISDN BRI network module	Q1 CY 2000
NM-4B-U	4-port ISDN BRI with NT1 network module	Q1 CY 2000
NM-8B-S/T	8-port ISDN BRI network module (S/T interface)	Q1 CY 2000
NM-8B-U	8-port ISDN BRI with NT1 network module (U interface)	Q1 CY 2000
Modem Modules		
NM-8AM	8-port analog modem network module	Q1 CY 2000
NM-8AM-J	8-port analog modem network module for Japan	Q1 CY 2000
NM-16AM	16-port analog modem network module	Q1 CY 2000
NM-16AM-J	16-port analog modem network module for Japan	Q1 CY 2000
NM-6DM	6-port digital modem network module	Q1 CY 2000
NM-12DM	12-port digital modem network module	Q1 CY 2000
NM-18DM	18-port digital modem network module	Q1 CY 2000
NM-24DM	24-port digital modem network module	Q1 CY 2000
NM-30DM	30-port digital modem network module	Q1 CY 2000
MICA-6MOD=	6-port digital modem upgrade card	Q1 CY 2000

Table 3 Cables for Network Modules

Network Modular Type	Electrical Interface	Product Number	Length	Connector Gender
NM-4A/S NM-8A/S (Up to 115.2 Async or 128 Kbps Async) NM-4T WIC-IT	V.35 DTE	CAB-V35MT	10 ft	Male
	V.35 DCE	CAB-V35FC	10 ft	Female
	RS-232 DTE	CAB-232MT	10 ft	Male
	RS-232 DCE	CAB-232FC	10 ft	Female
	RS-449 DTE	CAB-449MT	10 ft	Male
	RS-449 DCE	CAB-449FC	10 ft	Female
	X.21 DTE	CAB-X21MT	10 ft	Male
	X.21 DCE	CAB-X21FC	10 ft	Female
	RS-530	DTE CAB-530MT	10 ft	Male
CT1/CE1 PRI	MIP-CT1 DSX1 to DB15 cable	CAB-7KCT1DB15	—	—
CT1/PRI	RJ-45-RJ-45	CAB-T1-RJ-45	10 ft	Male
CE1/PRI	E1-ISDN PRI	CAB-E1-PRI	10 ft	—
	E1 twinax 120-ohm balanced	CAB-E1-TWINAX	3 m	—
	E1 DB15 120-ohm balanced	CAB-E1-DB15	5 m	—
	FSIP and MIP-CE1 BNC 75-ohm unbalanced	CAB-E1-BNC	5m	—
16/32 Async	8-port with RJ-45 ends	CAB-OCTAL-ASYNC	10 ft	Male RJ-45
	8-port with 25 pin ends	CAB-OCTAL-MODEM	10 ft	Male RS-232
	8-port RJ-45 + eight xMMOD	CAB-OCTAL-KIT	10 ft	Male RS-232
CAB-OCTAL-ASYNC	Adapter cable	CAB-25AS-MMOD	—	RJ-45 –RS-232M
	Adapter cable	CAB-25AS-FDTE	—	Female RJ-45 -RS-232F

Table 4 Technical Specifications

Description	Specification
Dimensions	8.7 x 17.5 x 11.8 in. (22.1 x 44.5 x 30 cm)
Weight	• 32 lb (14.55 kg) (min.) • 43 lb (19.55 kg) (max.)
Power Requirements	
Output	250W max. per power supply
AC Input Voltage	100 to 240
Frequency	50 to 60 Hz
AC Input Current	4A at 100V or 2A at 200V
DC Input Voltage	-38V to -75V
DC Input Current	8A at -48V
Environmental Specifications	
Operating Temperature	32˚ to 104 F (0˚ to 40 C)
Nonoperating Temperature	-13˚ to 158 F (-25˚ to 70 C)
Relative Humidity	5 to 95%
Noise Level (Maximum)	48 dbA
Regulatory Compliance	The Cisco 3660 conforms to a number of different safety, EMI, immunity and network homologation standards. Details of the regulatory specifications can be found at http://www.cisco.com/public/Support_root.shtml.

CISCO SYSTEMS

Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
        800 553-NETS (6387)
Fax: 408 526-4100

European Headquarters
Cisco Systems Europe s.a.r.l.
Parc Evolic, Batiment L1/L2
16 Avenue du Quebec
Villebon, BP 706
91961 Courtaboeuf Cedex
France
http://www-europe.cisco.com
Tel: 33 1 69 18 61 00
Fax: 33 1 69 28 83 26

Americas
Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-7660
Fax: 408 527-0883

Asia Headquarters
Nihon Cisco Systems K.K.
Fuji Building, 9th Floor
3-2-3 Marunouchi
Chiyoda-ku, Tokyo 100
Japan
http://www.cisco.com
Tel: 81 3 5219 6250
Fax: 81 3 5219 6001

Cisco Systems has more than 200 offices in the following countries. Addresses, phone numbers, and fax numbers are listed on the
Cisco Connection Online Web site at http://www.cisco.com/offices.

Argentina • Australia • Austria • Belgium • Brazil • Canada • Chile • China • Colombia • Costa Rica • Croatia • Czech Republic • Denmark • Dubai, UAE
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