netsys
Networking your world

National Enhance Technology
VDSL2/G.fast Solutions

Simply Delivering net connection...

What is VDSL2 ?

VDSL2

(Very-High-Bit-Rate Digital Subscriber Line 2), G.993.2, is standard of the most generally utilized xDSL broadband wire-line communications technology.

Designed to support the wide deployment of Triple Play services such as voice, video, data, high definition television (HDTV) and interactive gaming, VDSL2 enables operators and carriers to gradually, flexibly, and cost efficiently upgrade existing xDSL-infrastructure.

What is G.fast ?

G.fast

G.fast is digital subscriber line protocol standard which approved and published by ITU as G.9700/G.9701, it is the latest and most advanced xDSL broadband technology.

Designed with much higher bandwidth for coordination with the existing FTTx network, G.fast provide operators and carriers flexible and cost efficiently solution which is not only enable upgrade for current xDSL network but also a new choice for Fiber-copper hybrid infrastructure.
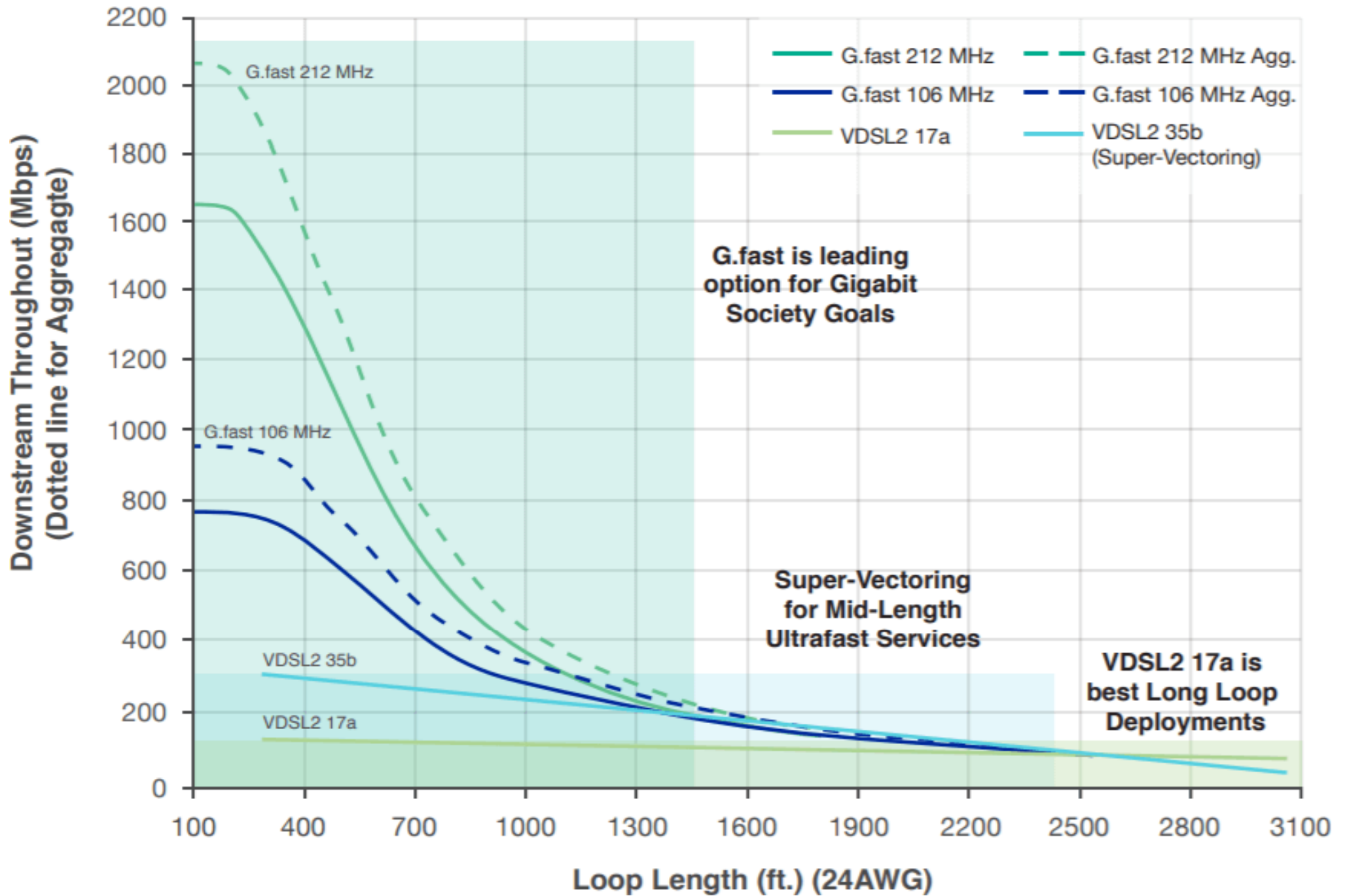
Table 1. G.fast theoretically speed rate.

Why we need VDSL2/G.fast ?

- xDSL infrastructure are still physically the most flexible access technologies between CO (Central Office) and subscriber.

- With dynamically increasing requirement for multi-media network, xDSL provide a well developed intermediate solution for Triple Play services, which operators and carriers can easily connect subscriber for their mobile, WiFi and multi-media service.

- VDSL2 provide long distance connection which allow operators and carriers extend their network coverage and provide internet service for subscriber at rural area, with adequate speed-rate.

- G.fast enable Gigabit speeds over existing infrastructure which can not only used for legacy equipment upgrade. Combine with Fiber-to-the-Building/distribution point (FTTB/FTTdp), this high utilizable solution offer high bandwidth that future technologies development would need and lower the subscriber connection costs.

VDSL2/G.fast Products Application Environment

- Retail POS (Department stores, Bars, Restaurants, Parking spaces, Retail spaces)

- Government (Naval ships, Housing, National Parks, Forestry, Research stations, Utilities, etc)

- Education (Outdoor camps, College campuses)

- Healthcare (Hospitals, Elder care, Outpatient facilities)

- Entertainment (Movie theaters, Home entertainment, Fairs , Outdoor venues)

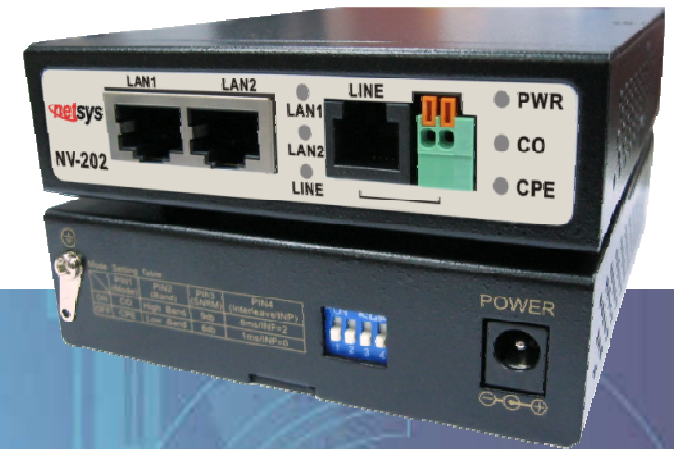**Building**   **Campus**   **Hospital**

VDSL2/G.fast business grade series

- **NV-202**：
  VDSL2 LAN extender with DIP Switch and 2 fast Ethernet

- **NV-202P**：
  VDSL2 LAN extender with 2 x Fast Ethernet plus 25W POE

- **NV-202M/S**：
  VDSL2 LAN extender with remote power + POE

- **NV-600A**：
  ADSL2+/VDSL2 Modem Router with 4 Giga Ethernet

- **NV-720**：
  Managed VDSL2 CPE Router with 11n/11ac Wi-Fi

- **NV-700L**：
  VDSL2 Single Master Modem

- **NV-802S**：
  8 Ports VDSL2 Managed IP DSLAM with 2 x Giga SFP Fiber & RJ45 Ethernet Combo

- **NV-450M/S**：
  Managed Single Master/Slave G.fast/VDSL2/V35B Bridge/Router Modem
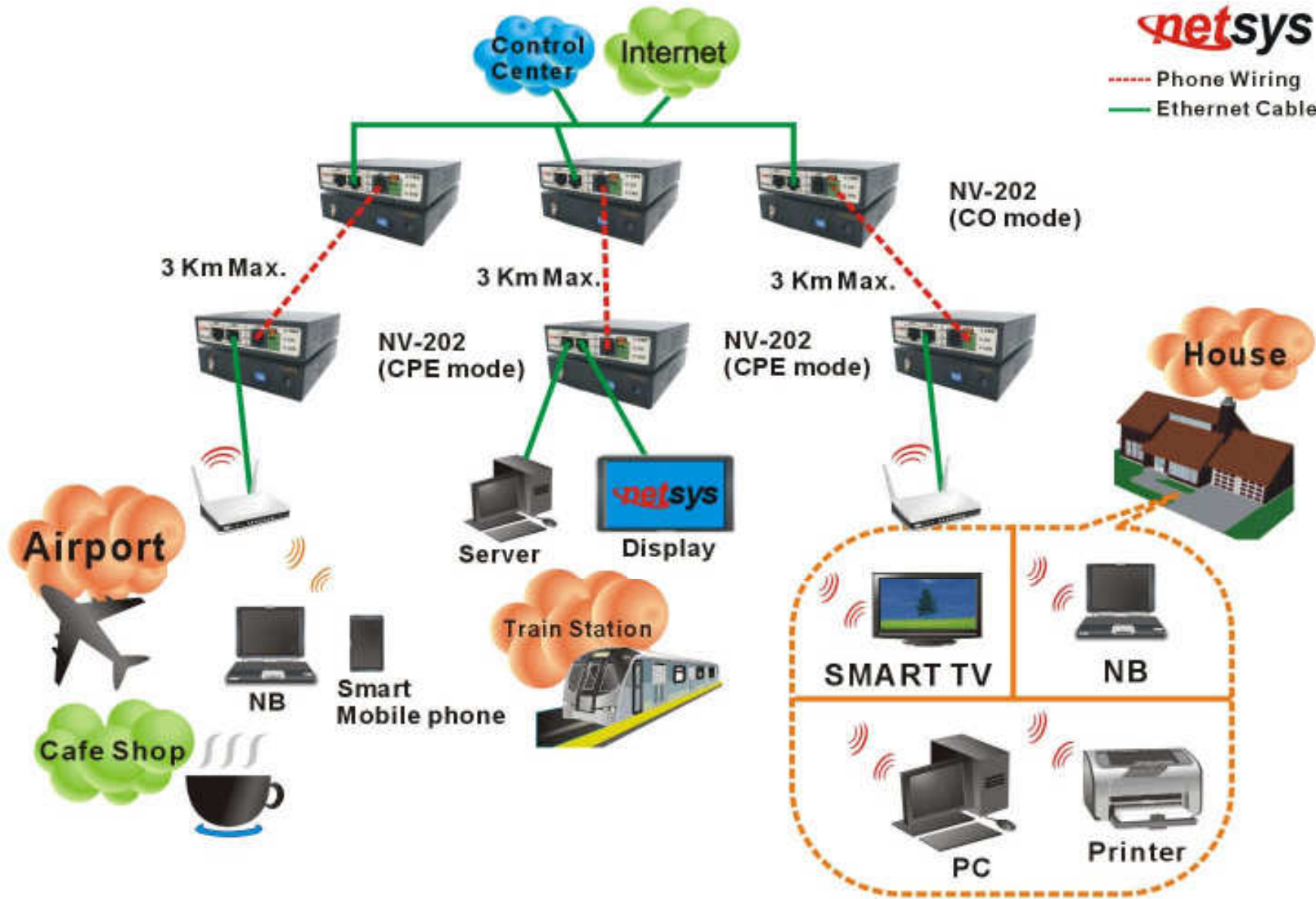
NV-202
VDSL2 LAN extender with DIP Switch

Benefits & Features:

- Supports RJ-11/Terminal Block combo for Line port.
- Supports high bandwidth up to 100Mbps symmetric over Line ports.
- Supports long reach mode up to 3 km with 24 gauge phone wire.
- Supports auto speed for Line port and Interleave mode selectable through CO side DIP switch.
- DIP switch with CO and CPE mode selectable.
- Supports interleave / INP & noise margin config by DIP Switch.
- Supports Surge protection.
- Compact size and metal case and Din-Rail (Optional) design.
- Supports point-to-point applications.

NV-202 Application Diagram

VDSL2 APPLICATION DIAGRAM

NV-202P
Long Reach LAN Extender with PoE

Benefits & Features:

- Provides 2 x 10/100 Mbps RJ-45 Ethernet ports with power injector.
- Supports Auto speed RJ-11/Terminal Block combo for Line port.
- Supports high bandwidth up to 100Mbps symmetric over Line ports.
- Supports long reach mode up to 3km with twisted pair phone wire.
- DIP switch with CO and CPE mode selectable.
- Supports high band / interleave / INP & noise margin config by DIP Switch.
- Supports Surge protection for line port.
- Auto-detect of PoE IEEE 802.3af/at (up to 25W) equipment providing protection from incorrect installation.
- Supports wall mounting and DIN-Rail mount installation (Optional).
- Supports mid-span PoE mode.
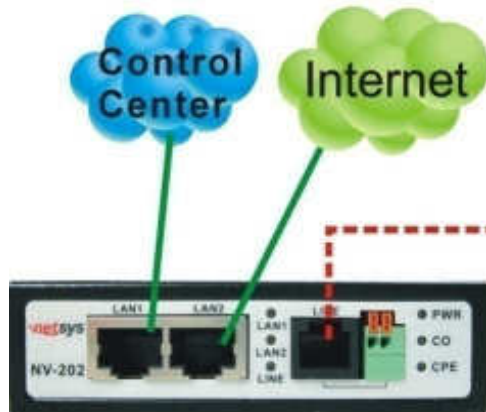- Supports point-to-point applications.

NV-202P Application Diagram

Phone Wiring
Ethernet Cable
Ethernet Cable with POE
Power Cable

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Control Center

Internet

Support 100 Mbps per port symmetrical bandwidth over phone wiring
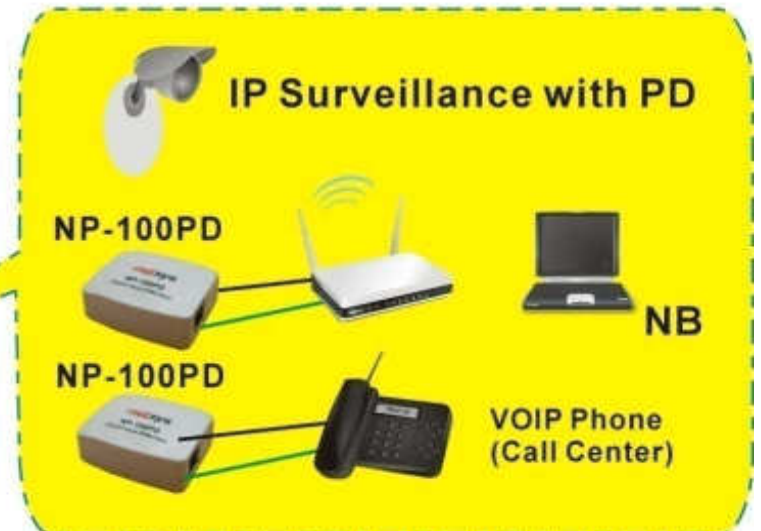
3 Km Max.

DC Source

AC to 48V/1.875A DC Power Adapter for Source Input
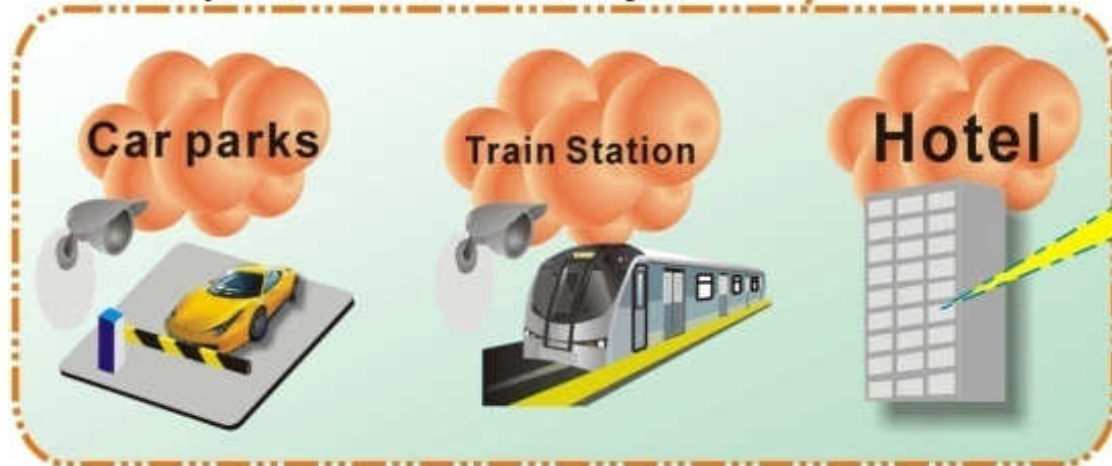
NV-202(CO mode)
(DC 12V power input)

NV-202P(CPE mode)
(DC 48V power input)

100Mbps Max. With Power Injector

IP Surveillance with PD

Car parks

Train Station

Hotel

NP-100PD

NP-100PD

NB

VOIP Phone (Call Center)

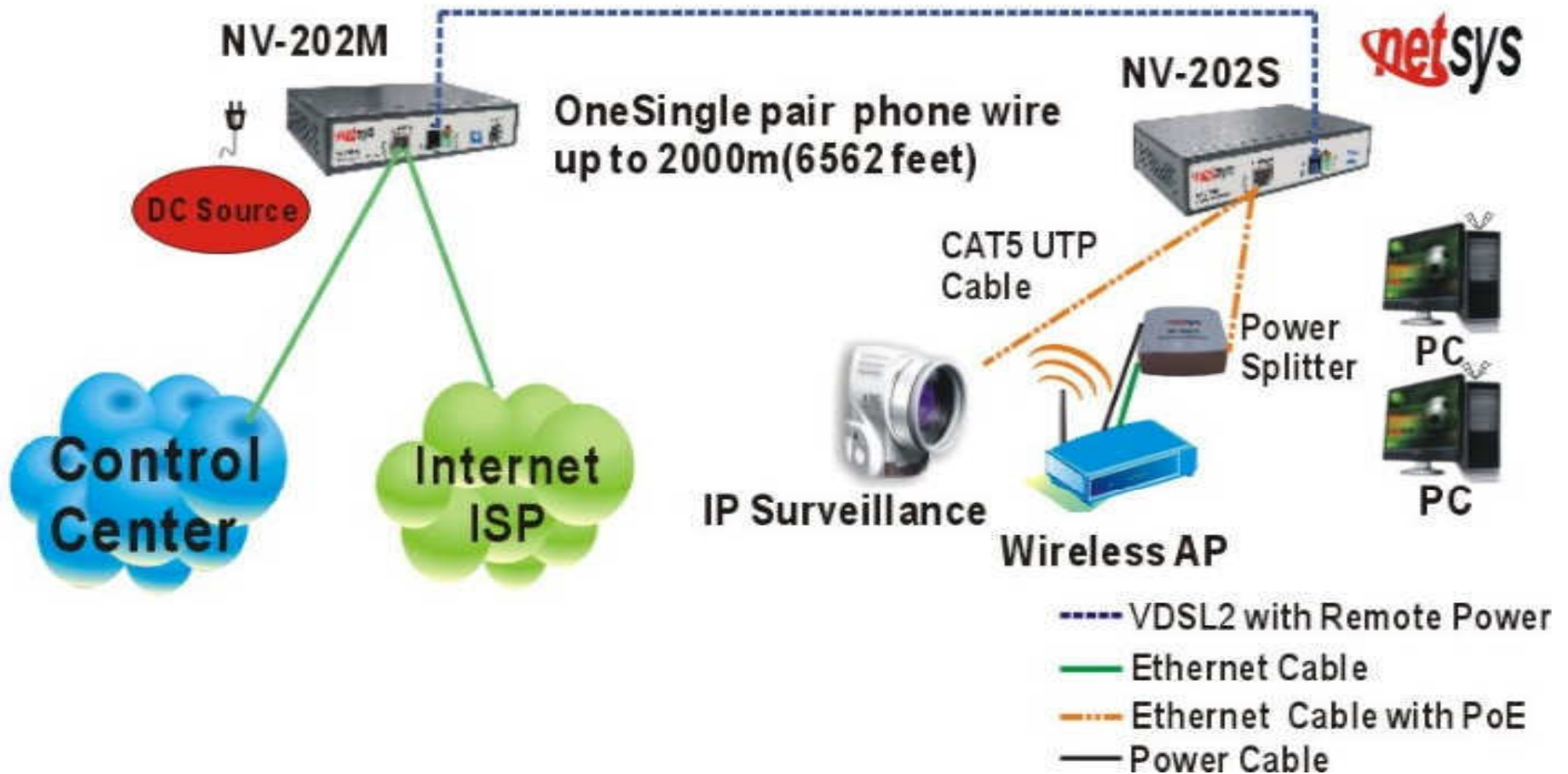# NV-202M/S
Long Reach LAN Extender with Remote Power + POE

Benefits & Features:

- Compliant with ETSI, ITU and ANSI VDSL2 standards.
- Support Auto speed RJ-11/Terminal Block combo for Line port.
- Support high bandwidth up to 100Mbps symmetric over Line ports.
- Support Power feeding up to 2 km / 7W output budget with single pair twist phone wire.
- Support OVP / OCP / OTP power protection and revise polarity auto cross over.
- Support high band / Interleave mode selectable through CO side DIP switch.
- Support interleave / INP & noise margin config by DIP Switch.
- Support Surge protection for line port.
- Auto-detect of PoE IEEE 802.3af/at equipment providing protection from incorrect installation.
- Support wall mounting and DIN-Rail mount installation (Optional).
- Support mid-span power injector.
- Support point-to-point applications.

NV-202M/S Application

VDSL2 with Remote Power Application

NV-202M

DC Source

OneSingle pair phone wire up to 2000m(6562 feet)

NV-202S

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Control Center

Internet ISP

IP Surveillance

CAT5 UTP Cable

Wireless AP

Power Splitter

PC

PC

----- VDSL2 with Remote Power
—— Ethernet Cable
----- Ethernet Cable with PoE
—— Power Cable

NV-600A
ADSL2+/VDSL2 Modem Router

Benefits & Features:

- Compliants with IEEE 802.3/802.3u, ETSI, ITU, ANSI VDSL standards.
- POTS / ISDN Splitter port 1 x RJ-11 (Splitter on board).
- POTS / ISDN pass filter Spectrum: 0 ~ 120KHz.
- Supports 997,998 band plan.
- Supports 8a, 8b, 8c, 8d, 12a, 12b, 17a, 17b, 30a band profile.
- Supports Bandwidth up to 100 Mbps over RJ-11 ports.
- Supports IPV4/IPV6 and SSL.
- Supports Web Management (HTTP/HTTPS).
- Supports Route & Switch mode, PPPoE/NAT/DHCP/DMZ/uPnP/Firewall.
- Supports SNR indicator for check phone wiring quality.
- Provides surge protection for VDSL2 port.

NV-720

ADSL2+/VDSL2 Wi-Fi Modem Router

Benefits & Features:

- Adopts ARM Cortex A9 dual-core processor.
- Built-in 2T2R(867Mbps) 802.11ac Wi-Fi AP.
- Supports high bandwidth up to 100Mbps symmetric over line ports.
- Supports 8a, 8b, 8c, 8d, 12a, 12b, 17a, 17b, and 30a band profile.
- Supports uPnP/PPPoE/PPPoATM/IPv4/IPv6.
- Supports Firewall functions contains Packet filtering, DMZ, Mac Address based filtering, Parental Control, Application based filtering.
- Supports DHCP Server/DHCP Relay/DHCP Client/DHCPv6 Client/DHCPv6 Server/DNS/DNS Proxy or Relay/DNSv6 Proxy or Relay/NTP Client/HTTP1.1 server.
- Supports Multicast IP table/IGMP v3 Proxy and Snooping.
- Supports SSL/SSH Security.
- Supports QoS, Prioritize voice over data.
- Supports TR-069.
- Supports G.998.4 G.INP.
- Provides surge protection.

NV-600A/NV-720
Application Diagram

Netsys' NV-600A/NV-720 is a CPE Router leverages the extraordinary bandwidth promise of VDSL2 (max 100Mbps Symmetric) technology

Control Center

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---- Phone Cable
—— Ethernet Cable

IP Gate Way

NV-802S
Managed IP DSLAM

MRT & Train Station

Building

100Mbps Symmetric

Splitter

100Mbps Symmetric

NV-720D

NV-600A

Airport

NV-720S

Phone

Phone

Smart phone

Tablet

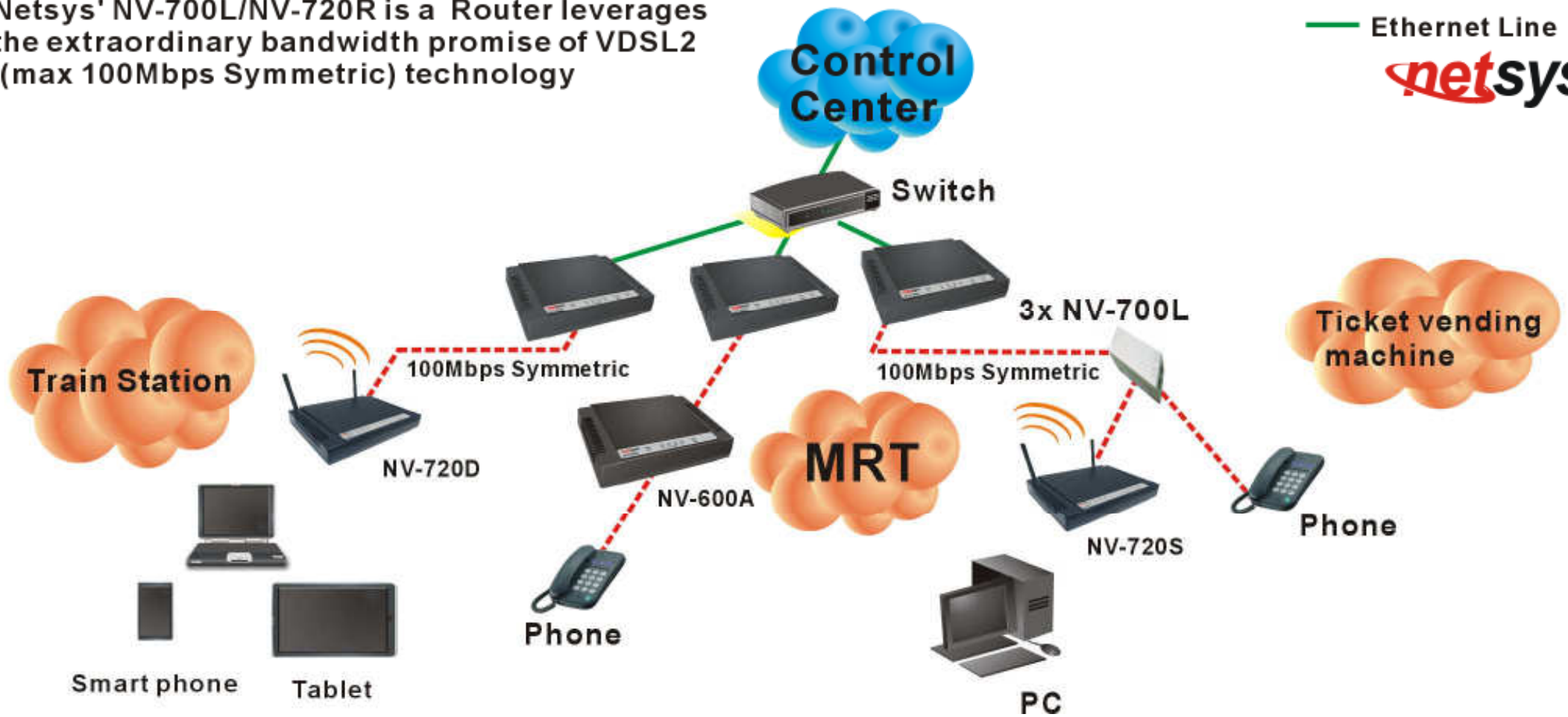Smart phone

Tablet

NV-700L
VDSL2 Single Master Modem

Benefits & Features:

- Adopts ARM Cortex A9 dual-core processor.
- Support http/https web management.
- Support CO side bridge mode.
- Support 8 band selectable.
- Support IPv4/IPv6 address.
- Support 8queue MFC/DSCP both type.
- Supports SSL/SSH Security.
- Supports configuration backup and restore.
- Supports Dual Firmware Image Backup.
- Supports TR-069.
- Supports G.998.4 G.INP.
- Provides surge protection.
- Mac Address based filtering.

NV-700L Application Diagram

Netsys' NV-700L/NV-720R is a Router leverages the extraordinary bandwidth promise of VDSL2 (max 100Mbps Symmetric) technology

---- Phone Line
—— Ethernet Line

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Control Center

Switch

3x NV-700L

Train Station

100Mbps Symmetric

100Mbps Symmetric

Ticket vending machine

NV-720D

NV-600A

MRT

NV-720S

Phone

Smart phone   Tablet

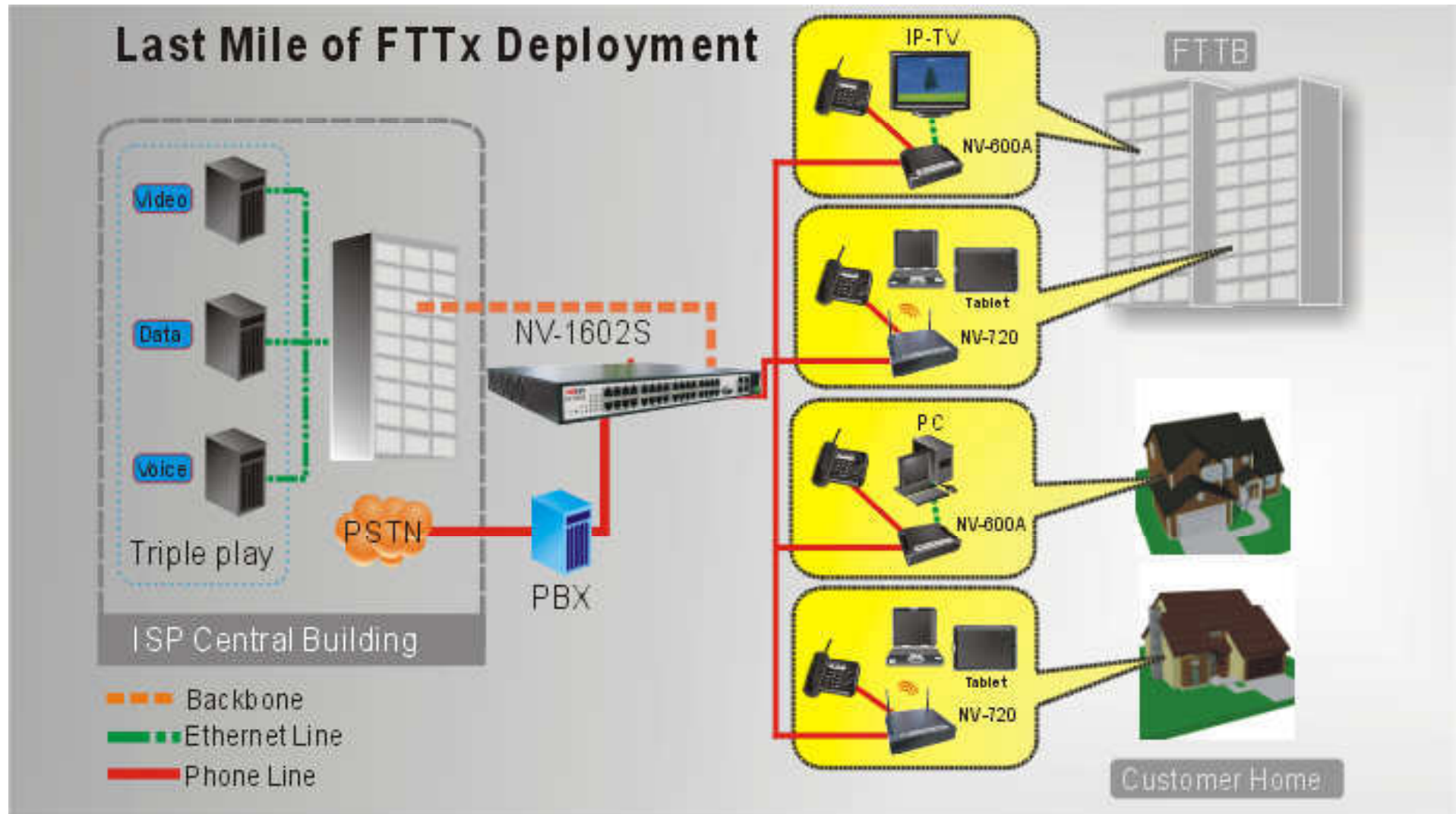Phone

PC

Phone

NV-802S

8 Ports VDSL2 Managed IP DSLAM with 2 Giga Ethernet

Benefits & Features:

- 8 x RJ45 connector for POTS / ISDN connection (Splitter on board)
- 8 x RJ45 connector for VDSL2 connection & 2x Gigabit TP/SFP combo port
- Compliant with IEEE 802.3/802.3u/802.3ab/802.3z Standards
- Compliant with ITU-T G993.2/G993.1/G994.1/G997.1 Standards
- Supports 997,998 band plan
- Supports 997,998 band plan
- Supports 8a, 8b, 8c, 8d, 12a, 12b, 17a, 17b, 30a band profile
- Supports high bandwidth up to 100Mbps within 0.3km for VDSL2 ports
- Supports UPBO, DPBO, Trellis coding and INP.
- Supports Echo cancellation and Victual Noise
- Supports Web Management (HTTP/HTTPS), TFTP, Console
- Supports interleave delay for noise resistant and data loss
- Supports IEEE802.1q tagging VLAN with Q-in-Q
- Provides surge protection for VDSL2 port
- Supports SNMP v1/v2/v3 and RFC1394 / RFC1643 / RFC1213 MIB
- Supports port security with MAC address filtering
- Supports L2/L3/L4 access control list (ACL)
- Supports DHCP client and Relay & Option 82
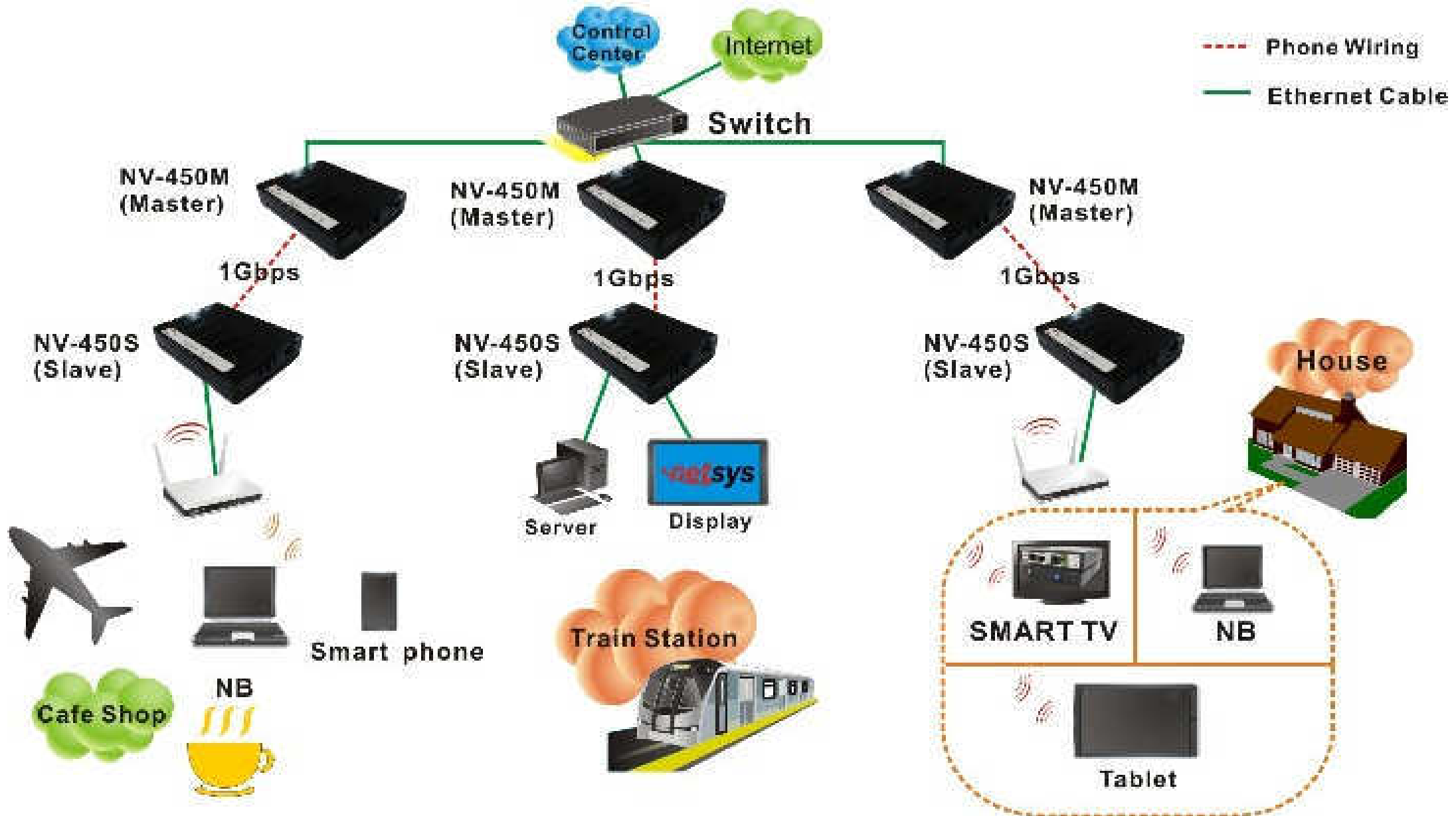
NV-802S Application Diagram

NV-450M/S

G.fast Master Modem + G.fast / VDSL2 / V35b   Slave Modem

Benefits & Features:

- Compliant with IEEE 802.3 / 802.3u / 802.3ab Ethernet Standard
- Compliant with ITU-T G993.2 VDSL2 standard (NV-450S only)
- Compliant with ITU-T G998.4 G.INP standard (NV-450S only)
- Compliant with ITU-T G.9700/G.9701 G.fast standard
- Backward compatible VDSL2/V35b (NV-450S only)
- Support 106a/b & 210a/b dual G.fast band profile
- Support super Vectoring for V35b / G.fast(NV-450S only)
- Support Vectoring for VDSL2(NV-450S only)
- Support High Bandwidth up to 1Gbps
- Support USB 3.0 for connecting USB Dongle
- Support static routing for IPv4 and IPv6 forwarding(NV-450S only)
- Mac Address based filtering • Support 8 queue MFC/DSCP both type QoS
- Support HTTP/HTTPS web management • Support SSL security
- Support remote management and monitor
- Support configuration backup and restore
- On board surge protection for Line port
- Support bridge(switch) / Router mode(NV-450M bridge mode only)
- Support Dual Firmware Image Backup • Support RJ-11 / Terminal block combo line port
- Support NTP Time Server. • Support TR-0693.
- On board POTS/ISDN splitter • Support Jumbo frame(MTU) up to 1600 bytes

NV-450M/S Application Diagram

Industrial grade VDSL2 series

Industrial grade VDSL2 product:

Industrial grade equipment posses same feature with business grade but have higher environment reliability, which allow operators and carriers further extend their service coverage as equipment can be installed in harsh environment.
And with more WiFi & mobile technologies like 4G LTE, LTE-M, LPWAN, LoRa and NB-IoT etc. getting general in the market, our Industrial VDSL2 equipment provide system integrator or carriers some simple solutions if they need to establish connection between system and system, system and server, or connect their WiFi/mobile access point to their network with a pair of twisted copper wire.

Industrial VDSL2 series

- **NV-500**：
Industrial Grade VDSL2 LAN extender with DIP Switch

- **NV-600AI**：
Industrial Grade ADSL2+/VDSL2 Router

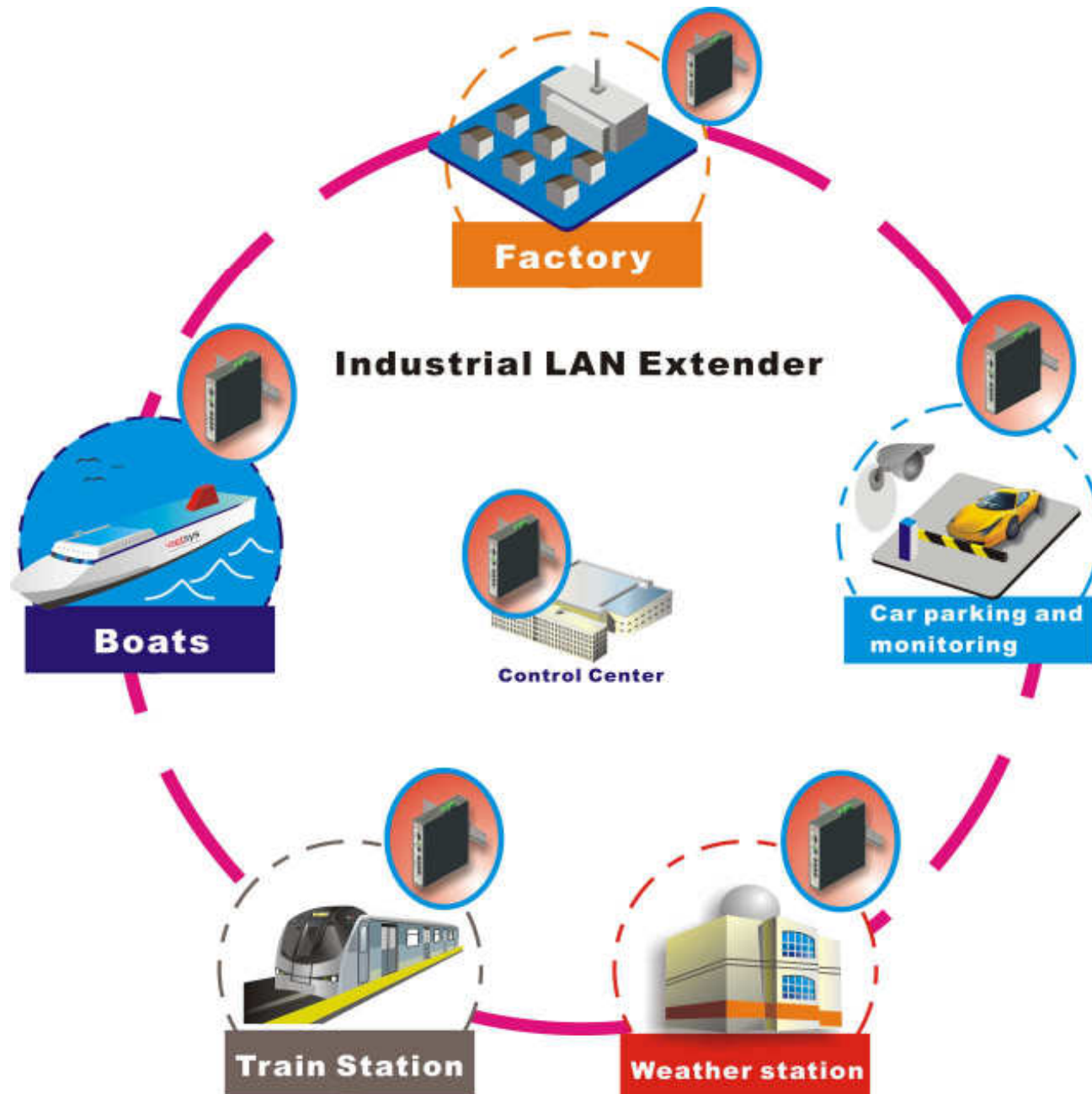- **NV-700I**：
Industrial Grade managed CO/CPE VDSL2 extender

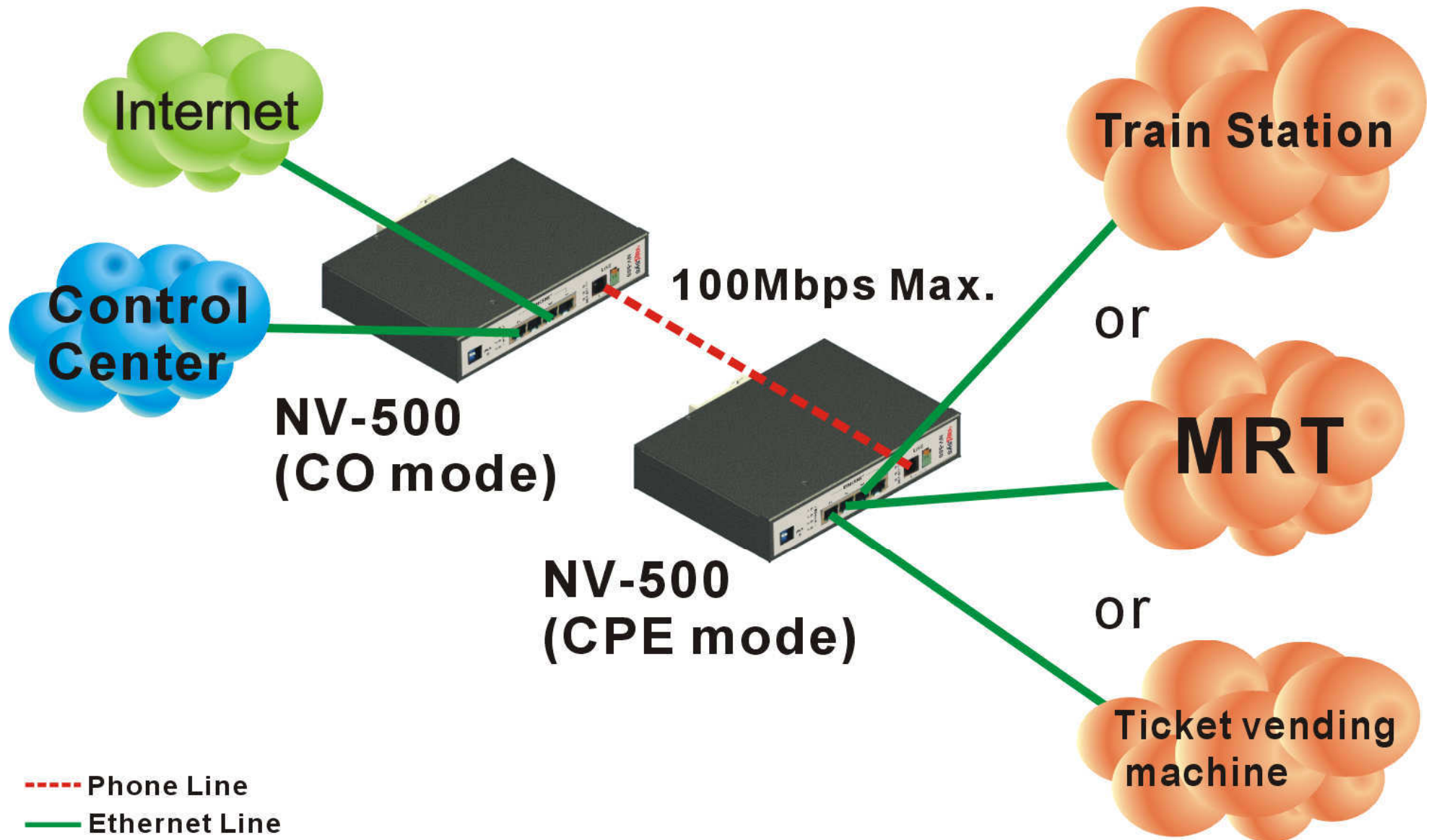-20℃　　　　　～　　　　　70℃

Industrial-Grade Application

NV-500
Industrial Grade VDSL2 LAN extender

Benefits & Features:

- Supports high bandwidth up to 100Mbps symmetric over Line ports.
- Supports long reach mode up to 3 km with 24 gauge phone wire.
- Supports auto speed for Line port and Interleave mode selectable through CO side DIP switch.
- DIP switch with CO and CPE mode selectable.
- Supports interleave / INP & noise margin config by DIP Switch.
- Supports Surge protection.
- Supports power redundant and wide range dual power input (DC12V ~ 48V).
- Supports Overload Current Protection / Reverse Polarity Protection.
- Supports wide range operating temperature (-20 degree C ~ 70 degree C).
- Supports alarm contact (relay output - 1 A @ 24 VDC).
- Supports DIN-Rail mount installation.
- Metal case design and compliants with IP30 standard.

NV-500 Application Diagram

Internet

Control Center

NV-500 (CO mode)

100Mbps Max.

NV-500 (CPE mode)

Train Station

or

MRT

or

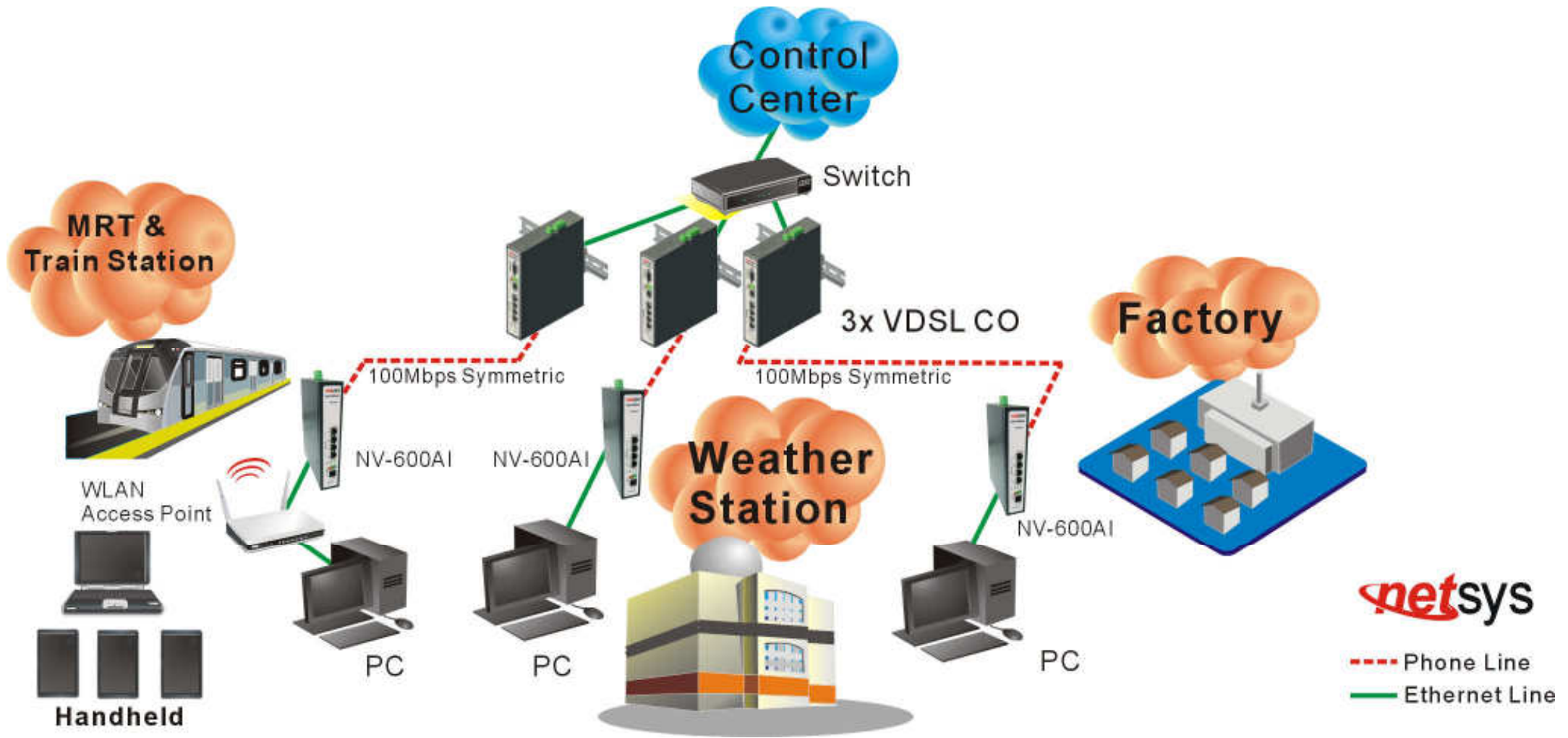Ticket vending machine

----- Phone Line
——— Ethernet Line

NV-600AI
Managed Industrial Grade ADSL2+/VDSL2 Router

Benefits & Features:

- Supports auto speed for Line port.
- Supports high bandwidth up to 100Mbps symmetric over Line ports.
- Supports Web management (HTTP/HTTPS).
- Supports uPnP/PPPoE/NAT/DHCP/DMZ/Firewall.
- Supports Router & Switch (Bridge) mode.
- Supports SNMP v1/v2/v3.
- Supports SNR indicator for checking phone wiring quality.
- Supports Interleave Delay to prevent against noise and data errors.
- Supports 8a, 8b, 8c, 8d, 12a, 12b, 17a, 17b, and 30a band profile.
- Supports 997, 998 band plan.
- Supports Surge protection.
- Supports power redundant and wide range dual power input(DC12V ~ 48V).
- Supports Overload Current Protection / Reverse Polarity Protection.
- Supports wide range operating temperature(-20 degree C ~ 70 degree C).
- Supports alarm contact (relay output - 1 A @ 24 VDC).
- Supports DIN-Rail mount installation.
- Metal case design and compliants with IP30 standard.
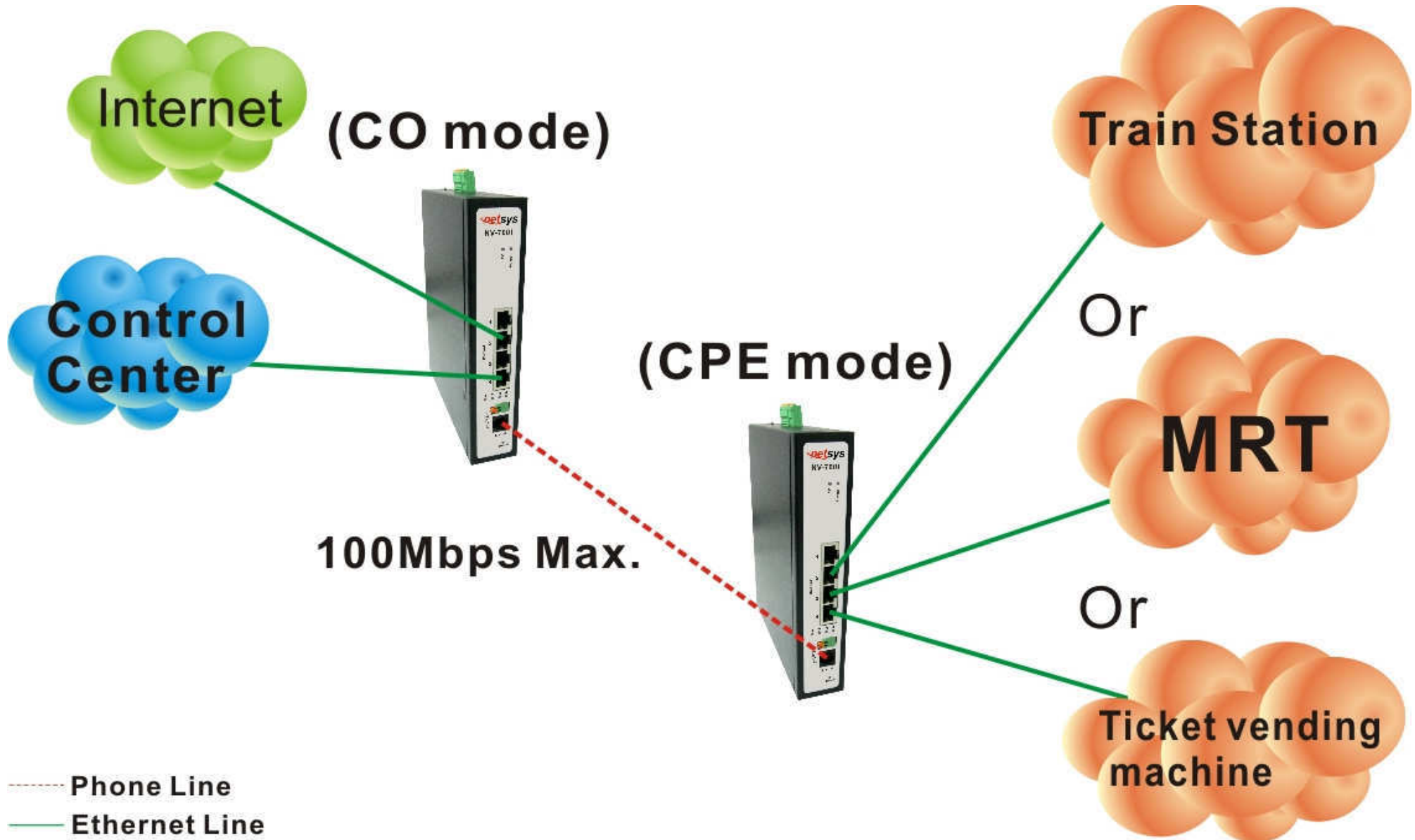
NV-600AI Application Diagram

NV-700I
Managed Industrial Grade VDSL2 CO/CPE Extender

Benefits & Features:

• Supports wide range 12~48vdc dual power input for power redundant
• Supports wide operating temperature -20 ~70 ℃
• Adopts ARM Cortex A9 dual-core processor
• Supports IP30 level metal housing and DIN rail
• Supports RJ11 & Terminal Block combo port
• Supports backup / restore for config setting
• Supports dual firmware for saving firmware upgrading failure
• Supports http/https server for remote web management
• Supports CO(Master)/ Slave(CPE) Mode selectable by Web config
• Supports Jumbo frame up to 2k(MTU)
• Supports 17a/30a profile config
• Supports G.998.4 G.INP
• Supports IPV4/ IPV6 address • Supports Dual Firmware Image Backup • On board surge protector for Ethernet and line port • Supports IGMP snooping V2/ V3 • Supports SSL/ SSH/ TR-069 security • Supports SPDT relay for connecting alert device • Supports SNMP VI/V2

NV-700I Application Diagram

Internet

(CO mode)

Train Station

Control Center

(CPE mode)

Or

MRT

100Mbps Max.

Or

Ticket vending machine

- - - - - Phone Line
——— Ethernet Line

Reference Site - 1

- Dutch Telekom network

- Motel One Frankfurt Airport, Frankfurt am Main

- Best Western Premier Hotel Steglitz International, Berlin

- Globana Airport Hotel, Leipzig/Halle, Germany

- Express by Holiday Inn, Leinfelden-Echterdingen

- Hilton Garden Inn, Stuttgart

- Hotel Ambassador

- Hotel an der Oper, Berlin

- Nippon Hotel Hamburg, Hamburg

- Banyan Tree Resorts

- Taoyuan International Airport Parking system

- Germany ICE Stations

- University of Cologne

- BAE System – Submarine Solution, England

- Orbe Telecommunications, Spain

Banyan Tree Resort

Train station

University of Cologne

Reference Site - 2

- Italy Telecom

- Army / Campus / Hospital – French

- Weather station - Germany

- Merchant Ship – Germany

- UK Power Networks (UKPN)

- Jail – USA

- Oil Refinery – USA

- Farm – USA

- Car License identify system – Germany / Taiwan

- Military Training System – Theissen / Meggitt

- Amusement park – USA / Germany

- IP surveillance system – Many countries

- Call Center – Africa

- Camping Sites – Many countries

Range training Field

Amusement Park

Oil Refinery

Best Western Hotel in USA

Banyan tree Hotel in Seychelles

Submarine

Farm

Metro & Train Station

Military Training System

2020 Product Roadmap

netsys
Networking your world

Q1 — NV-450M/S
G.fast VDSL2 / V35b Master / Slave Modem

Q2 — NV-320FX
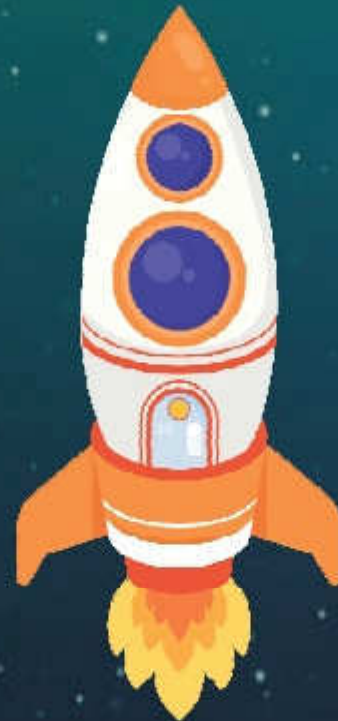Externet Extender with 2 Giga LAN ports & SFP

Q3 — NV-450I
Managed Industrial G.fast VDSL2 / V35b Master / Slave LAN Extender

Q4 — NV-1000I
Industrial G.fast / VDSL2 Master / Slave LAN Extender

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Thank you!