



1 / SMART EMBEDDED SYSTEM



2 / HIGHLIGHT FEATURES



3 / DEVICE MANAGEMENT PLATFORM



SMART SYSTEM



Self-developed Linux system, which has great extensibility.



High security performance, such as login authentication, multi-VPNs.



Clear and friendly GUI , easy for any engineer to use device.



Great
Extensibility



Rich
Functionality



Industrial
Application



User
Friendly



High
Security



NavigateWorx

FLEXIBLE LINKS

The screenshot shows the NavigateWorx web interface. At the top right, it displays 'Login: admin' and buttons for 'Reboot' and 'Logout'. On the left, there is a navigation menu with categories: Overview, Link Management (expanded to show Connection Manager, Cellular, Ethernet, and WiFi), Industrial Interface, and Network. The main content area is titled 'Status' and 'Connection' under 'General Settings'. It contains a table with the following data:

Priority	Enable	Connection Type	Description	
1	true	WWAN1		✎ ⊗
2	true	WWAN2		✎ ⊗
3	true	WAN		✎ ⊗
4	true	WLAN		✎ ⊗

Cellular:

Specify SIM1 carrier as WWAN1 link, SIM2 carrier as WWAN2.

WAN:

PPPoE, DHCP Client, Static IP

WiFi:

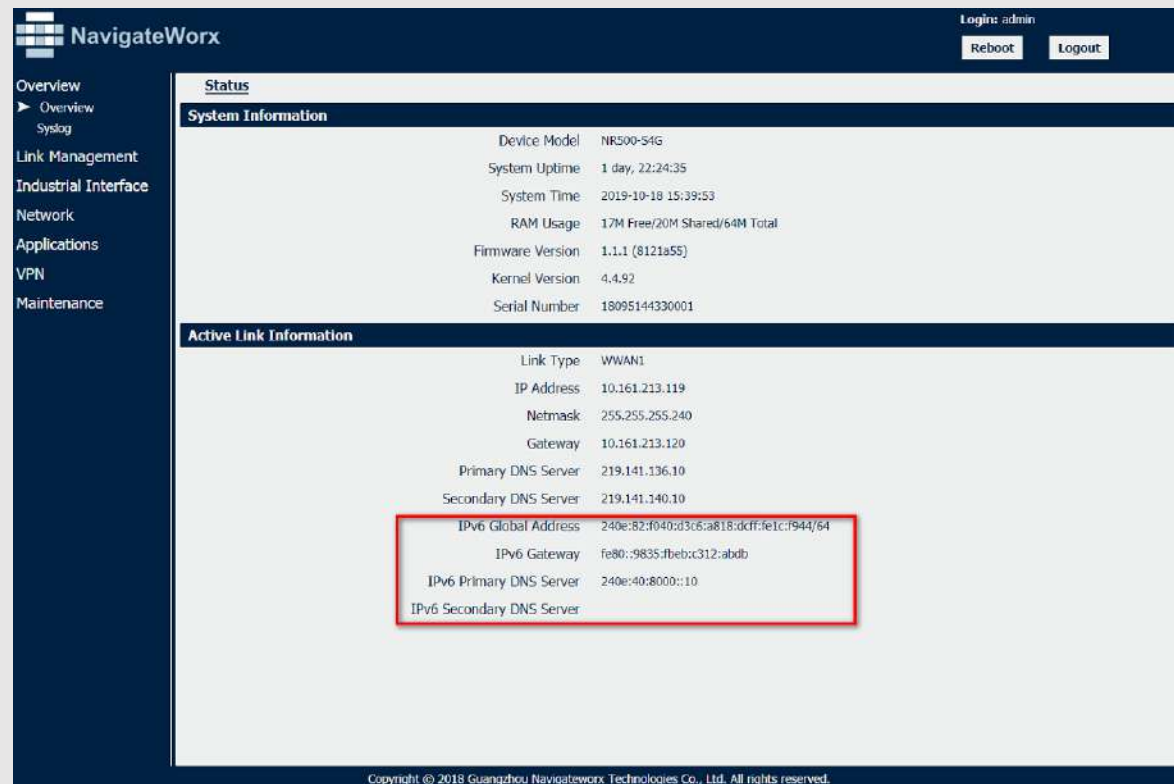
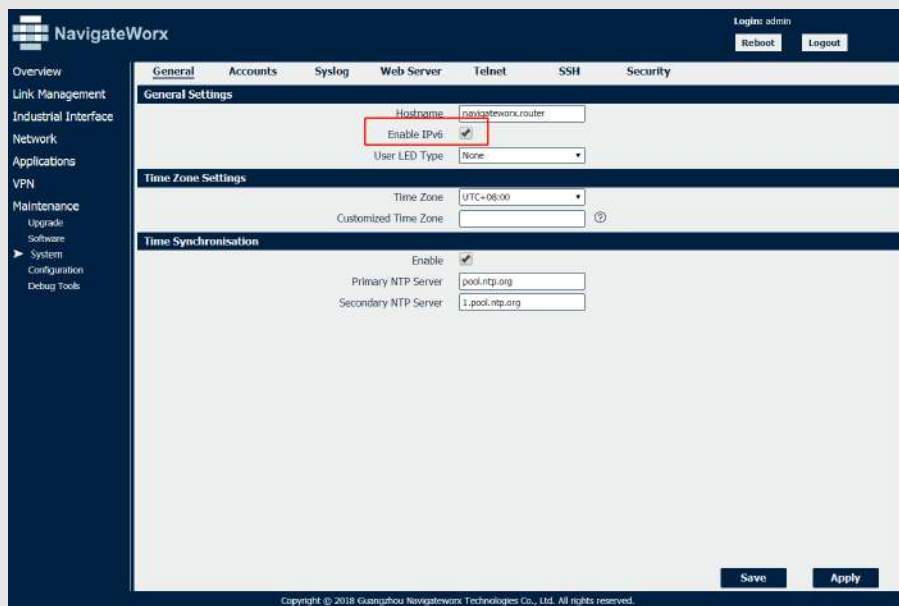
Supports WiFi AP and WiFi Client

Link Failover:

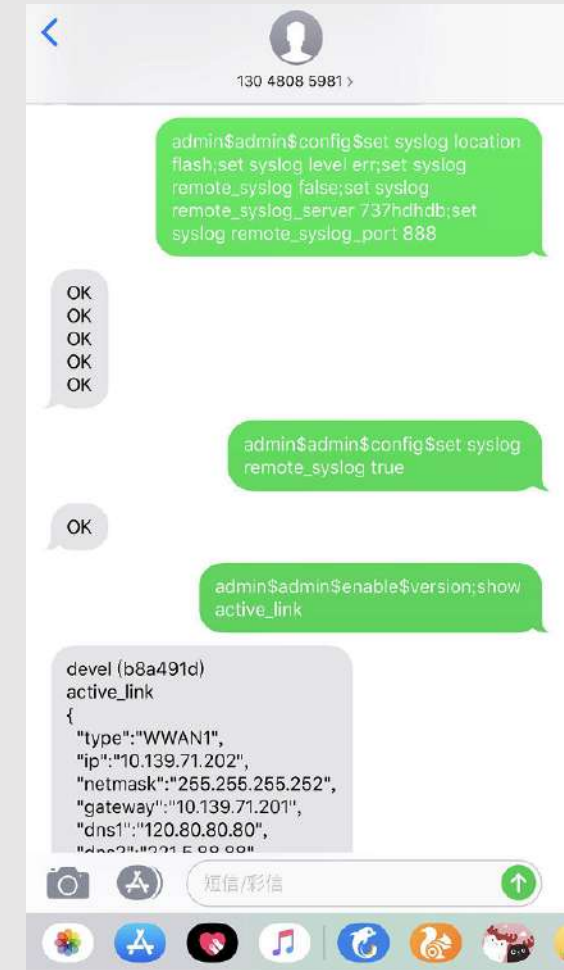
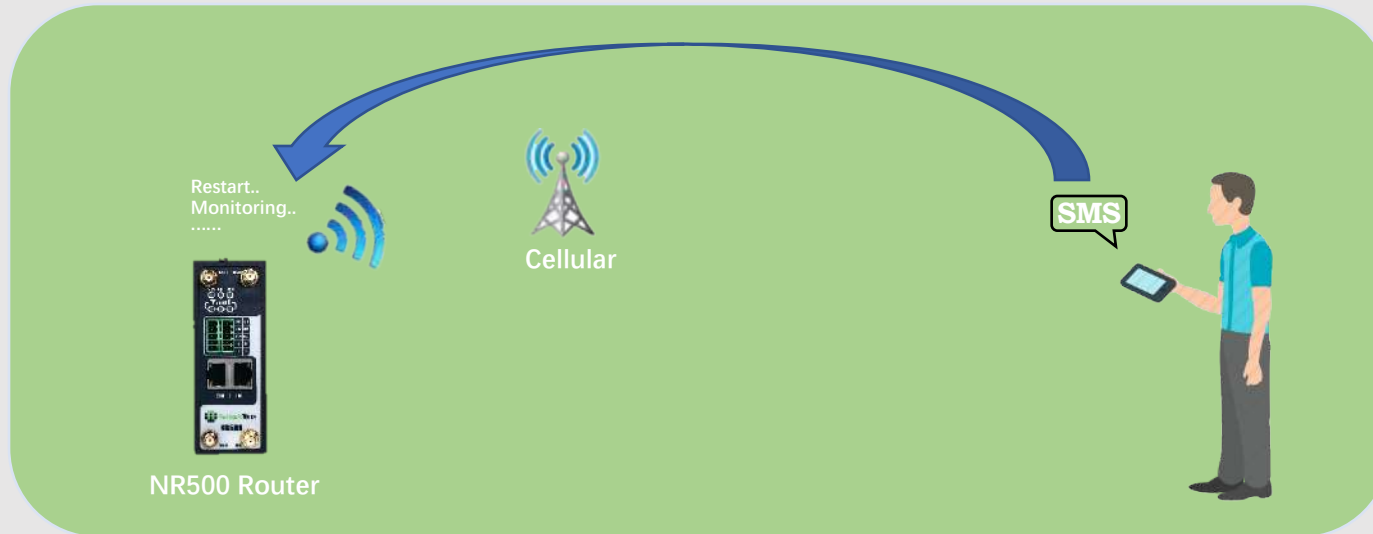
Supports Ethernet WAN, Cellular WAN and WiFi failover

IPv6 Supported

- With the development of the IOT, IPv4 is not enough for the things. IPv6 will be the trend in the future.
- Navigatex router support well with both IPv4 and IPv6.
- Configuration via WebGUI



SMS CONTROL



SMS Control

NR500 router dial up successfully with a SIM card. Engineer send SMS to the router with Special SMS Command to control NR500 router restart, configure NR500 router or get the running status of NR500 router.

Note:

Special SMS Command means the router CLI Command. The engineer will send the SMS with CLI Command to control or monitoring the router.

SMS GATEWAY



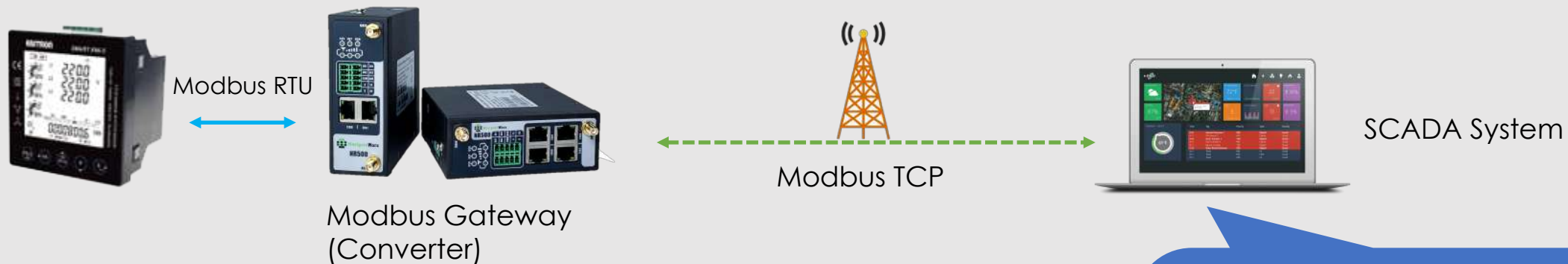
Solution1:

- NR500 Router go to Internet with SIM card inserted. A Serial Device connect to NR500 router via Serial port and send the SPECIAL characters to NR500 router.
- NR500 Router send out the SMS with related content to specific phone number.

Solution2:

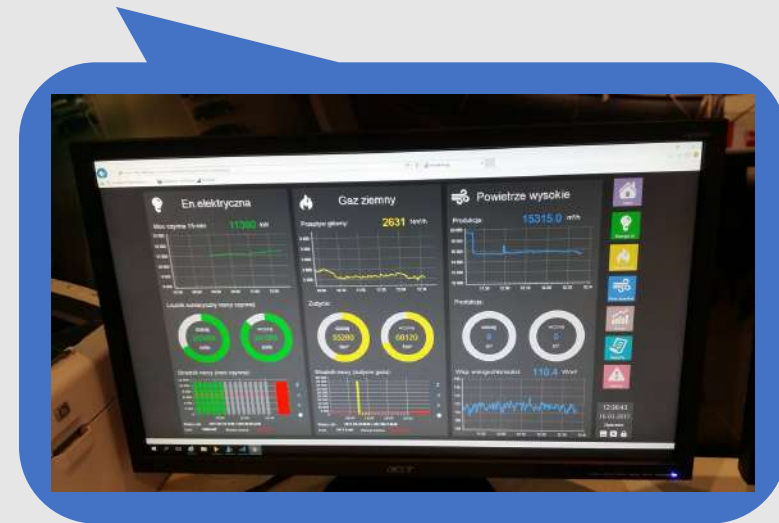
- NR500 Router go to Internet with SIM card inserted. A PLC connect to NR500 router via Ethernet port and send a HTTP request to the router with the special URL .
- NR500 Router send out the SMS with related content to specific phone number.

MODBUS GATEWAY

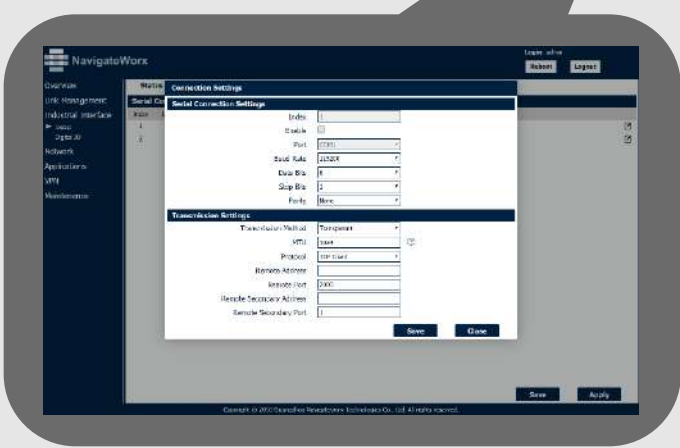
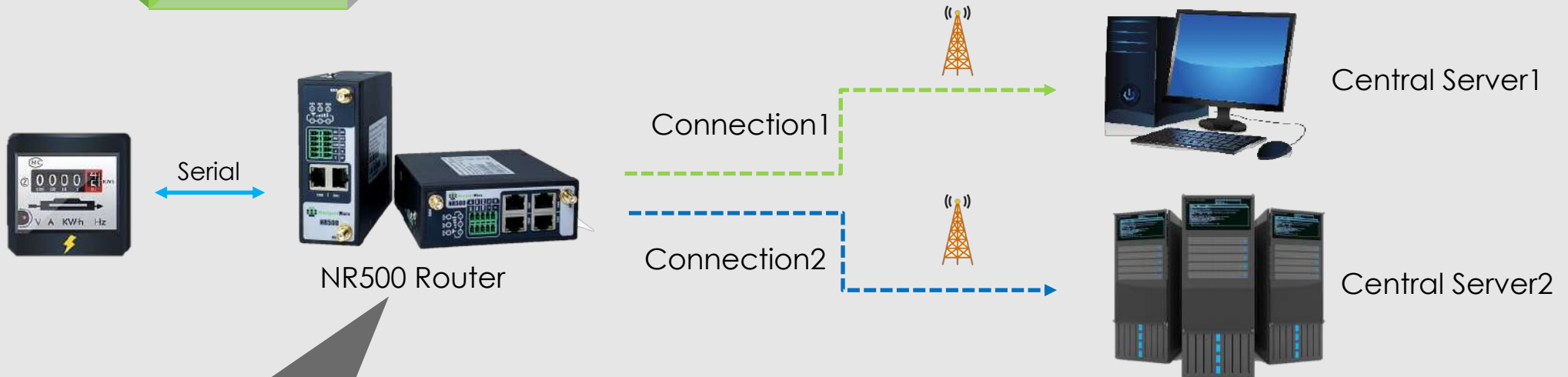


Cellular

- NR500 Router runs as Modbus Gateway (Based on TCP Client) and connect to Internet with SIM card.
- A serial device support Modbus RTU protocol and send the data to NR500 router, NR500 will convert Modbus RTU to Modbus TCP.
- Remote side is a SCADA server and assume it can get the Public Static IP address. SCADA server can receive the data format base on Modbus TCP protocol and display on its screen.



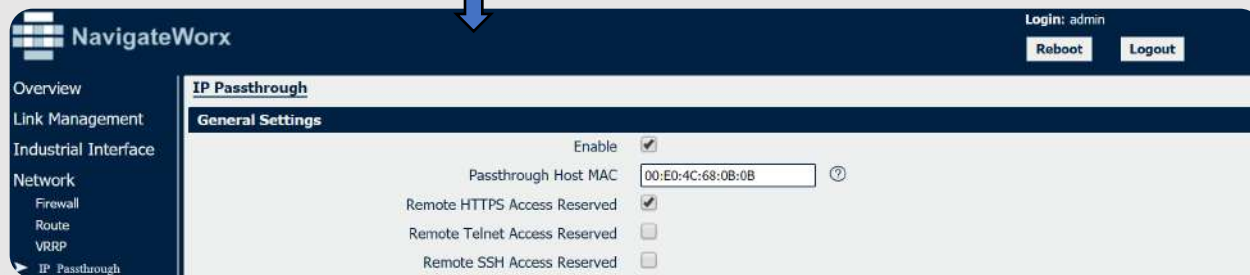
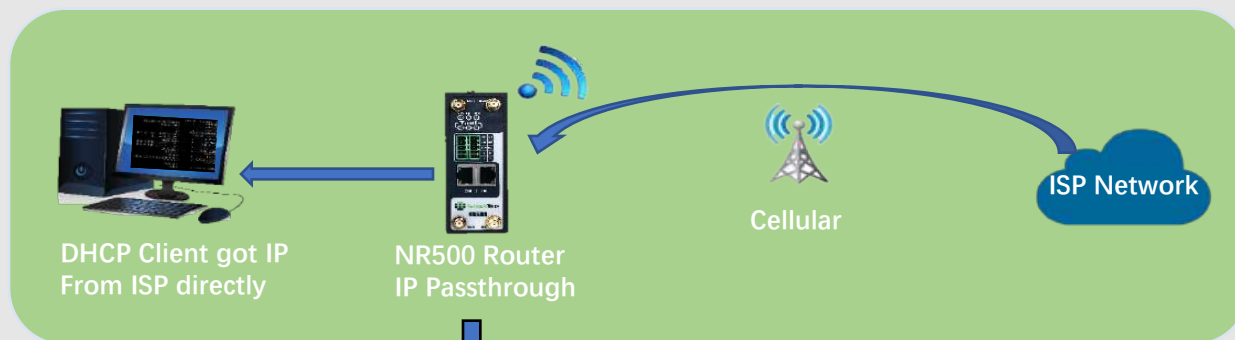
MULTI-CONNECTIONS



Solution

- NR500 Router runs as transparent mode (Based on TCP Client) and connect to Internet with SIM card.
- NR500 Routers enable dual TCP connections and connect to dual central servers on remote side.
- A serial device connect to NR500 router via serial port and send the data to NR500 router.
- NR500 will send the data to the remote servers simultaneously for redundancy.

IP PASSTHROUGH



IP passthrough on a router from an ISP means the router will bridge the traffic through to whatever is on the other side (whatever device is connected to the routers LAN port). This is useful if you have a Ethernet Device connected to the router and you want the global IP address from your ISP on the Ethernet Device instead of the router. This setup makes port forwarding much easier for example.

```
Administrator: Command Prompt
Description . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #2
Physical Address. . . . . : 32-59-B7-16-3F-67
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . . : Yes

Ethernet adapter Ethernet:

Connection-specific DNS Suffix . . . . . :
Description . . . . . : Realtek USB GbE Family Controller
Physical Address. . . . . : 00-E0-4C-68-0B-0B
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::7927:f2f6:fb9:976e%10(Preferred)
IPv4 Address. . . . . : 10.245.208.195(Preferred)
Subnet Mask . . . . . : 255.255.255.248
Lease Obtained. . . . . : Tuesday, February 12, 2019 11:14:30 AM
Lease Expires . . . . . : Tuesday, February 12, 2019 11:16:30 AM
Default Gateway . . . . . : 10.245.208.196
DHCP Server . . . . . : 192.168.5.1
DHCPv6 IAID . . . . . : 654368844
DHCPv6 Client DUID. . . . . : 00-01-00-01-22-54-49-AA-30-59-B7-16-3B-66
DNS Servers . . . . . : 120.80.80.80
                        221.5.88.88
NetBIOS over Topip. . . . . : Enabled

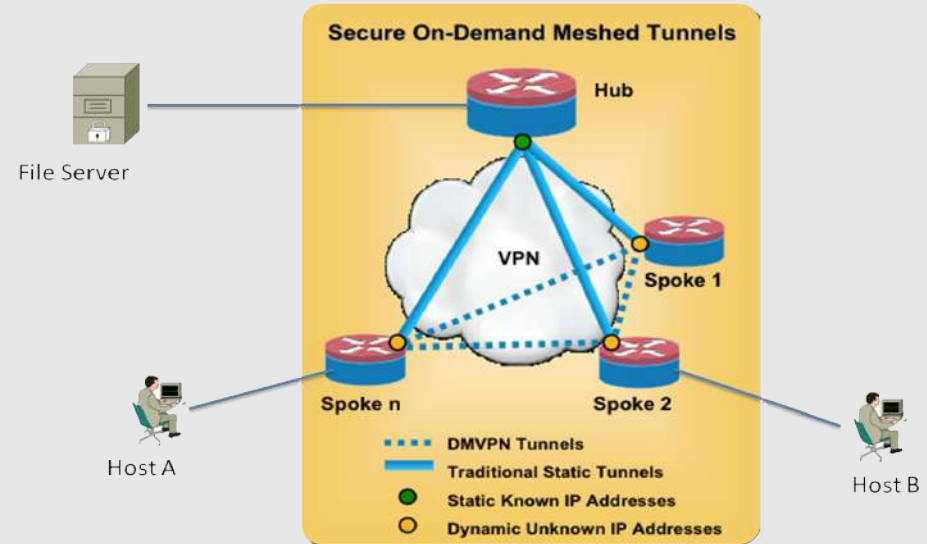
Ethernet adapter VMware Network Adapter VMnet1:

Connection-specific DNS Suffix . . . . . :
Description . . . . . : VMware Virtual Ethernet Adapter for VMnet1
Physical Address. . . . . : 00-50-56-C0-00-01
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::449:d3ed:872d:ba06%19(Preferred)
IPv4 Address. . . . . : 192.168.179.1(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Lease Obtained. . . . . : Tuesday, February 12, 2019 11:14:34 AM
Lease Expires . . . . . : Tuesday, February 12, 2019 11:44:33 AM
Default Gateway . . . . . :
DHCP Server . . . . . : 192.168.179.254
DHCPv6 IAID . . . . . : 738218070
DHCPv6 Client DUID. . . . . : 00-01-00-01-22-54-49-AA-30-59-B7-16-3B-66
DNS Servers . . . . . : fec0:0:0:ffff::1%1
                        fec0:0:0:ffff::2%1
```

DMVPN

DMVPN (Dynamic Multipoint Virtual Private Network)

- Easy to extend the Spoke Point;
- No need to configure central Hub for adding new point into existing network;
- No need static public IP address for Spoke any more;
- Spoke communicate directly with Spoke without go through central hub;



Configuration on NR500 router:

- Hub Address:
 - Enter Hub address to connect to DMVPN hub
- NHRP (Next Hop Resolution Protocol):
 - To Solve the dynamic ip address issue of Spoke
- MGRE (Multiple GRE):
 - Mainly use for VPN tunnel establishing
- IPSEC (Internet Protocol Security):
 - Use for data encryption through the VPN tunnel



DYNAMIC ROUTING

Status	Static Route	RIP	OSPF	BGP	
Route Table Information					
Index	Destination	Netmask	Gateway	Metric	Interface
1	0.0.0.0	0.0.0.0	192.168.111.11	0	wan
2	192.168.5.0	255.255.255.0	0.0.0.0	0	lan0
3	192.168.10.1	255.255.255.255	192.168.111.200	20	wan
4	192.168.111.0	255.255.255.0	0.0.0.0	0	wan

RIP

one of the oldest distance-vector routing protocols which employ the hop count as a routing metric. The largest number of hops allowed for RIP is 15.

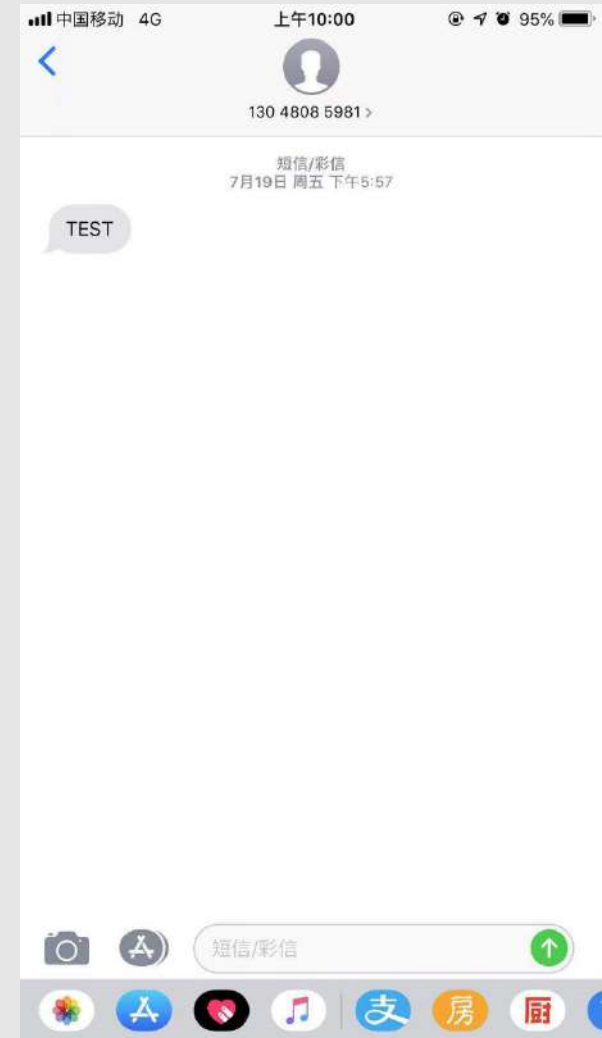
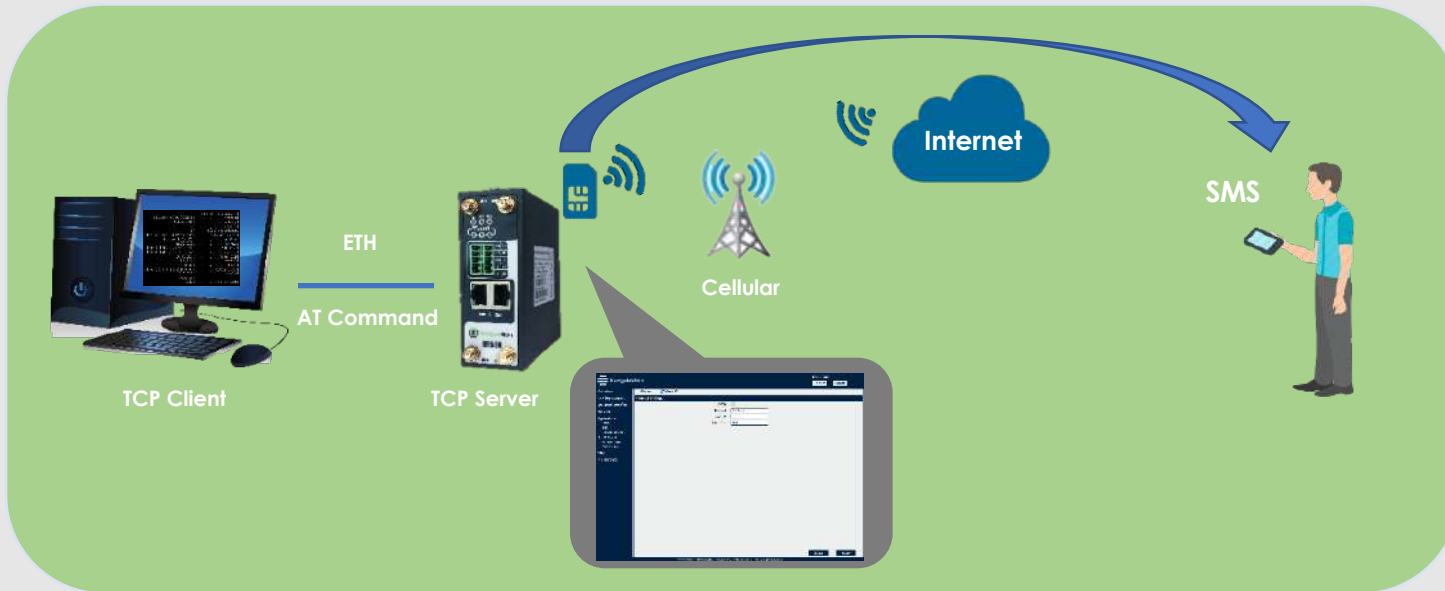
OSPF

Open Shortest Path First (OSPF) was designed as an interior gateway protocol (IGP), for use in an autonomous system such as a local area network (LAN).

BGP

Border Gateway Protocol (BGP) is a standardized exterior gateway protocol designed to exchange routing and reachability information among autonomous systems (AS) on the Internet.

AT OVER IP



Solution

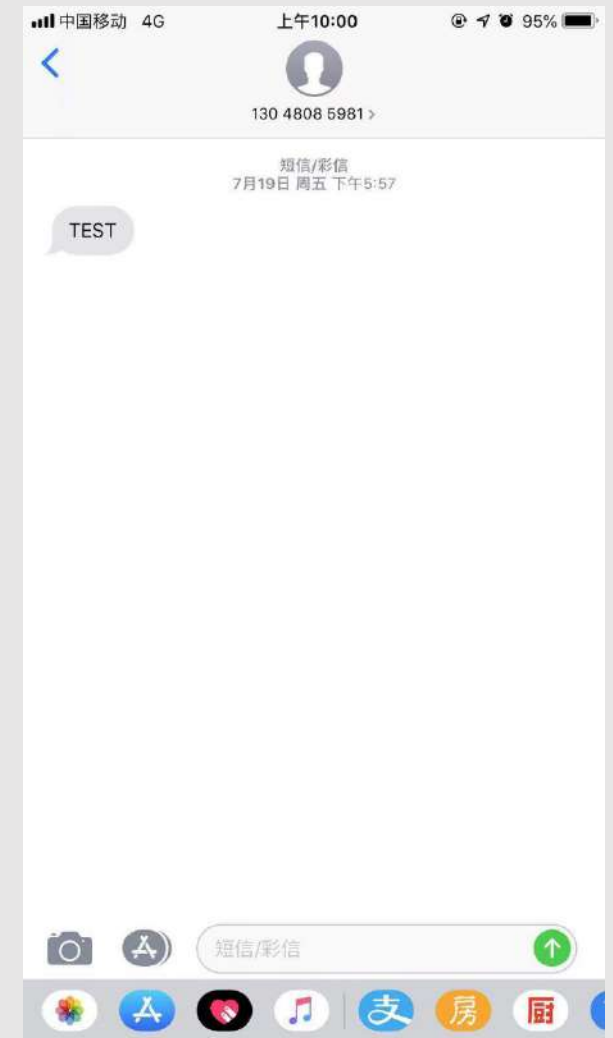
- NR500 router works as TCP Server and dial up successfully with a SIM card.
- TCP Client connect to TCP Server and send the AT Command to control NR500 module to do some actions. For example to control the module to send out the SMS message to the special phone number.

AT OVER TELNET

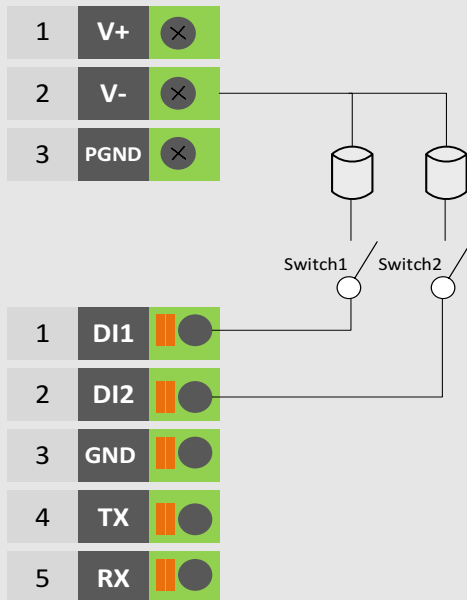


Solution

- NR500 enable AT Over Telnet with the special port and dial up successfully with a SIM card.
- PC connect to NR500 via Telnet protocol and send the AT Command to control NR500 module to do some actions. For example to control the module to send out the SMS message to the special phone number.



DIGITAL IO

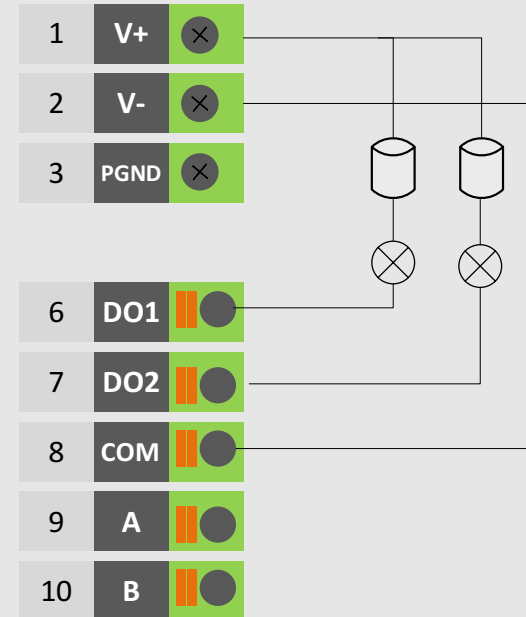


DI ELECTRICAL CHARACTERISTICS

1. Galvanic isolation;
2. Over-Voltage Protection: 36 VDC
3. Over-Current Protection: 100mA per channel @ 25°C

Dry Contact Typical Application

Switch ON(Short to V-): DI Logic LOW
 Switch OFF(Open): DI Logic HIGH



DO ELECTRICAL CHARACTERISTICS

1. Galvanic isolation;
2. Over-Voltage Protection: 36 VDC

Wet Contact Typical Application

DO Logic LOW: Switch ON(LED ON)
 DO Logic HIGH: Switch OFF(LED OFF)



- Digital I/O stands for Digital Input and Output.
- Digital Inputs allow a microcontroller to detect logic states, and Digital Outputs allow a microcontroller to output logic states.
- NR500 router support 2 x Digital Input and 2 x Digital Output

MODBUS SLAVE

Modbus Slave



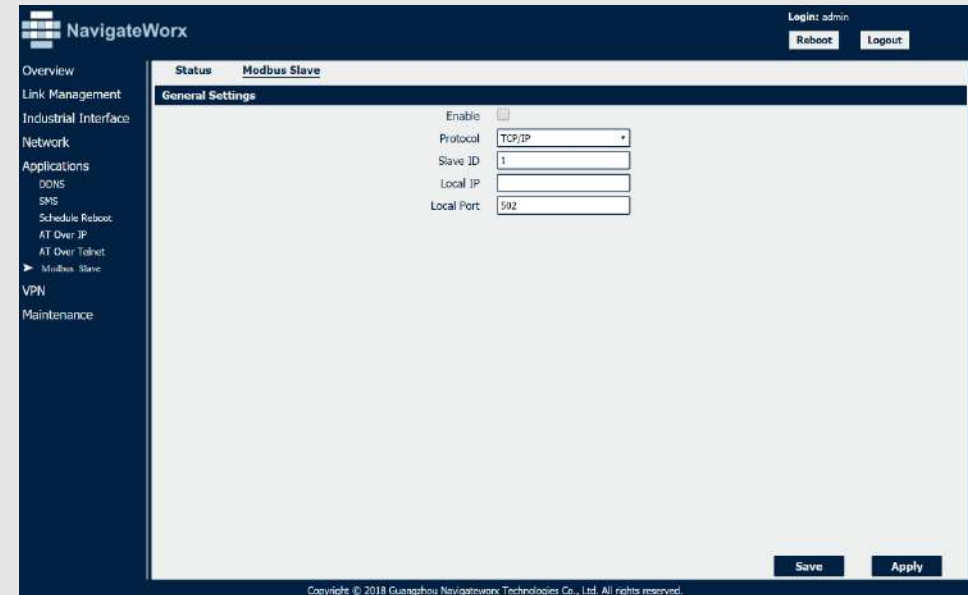
Modbus TCP



Modbus Master

Solution

- NR500 router runs as Modbus Slave with static public IP address with SIM card.
- Modbus Master connect to NR500 router (Modbus Slave) via TCP connection.
- Modbus Master read the statue of Digital IO and control DO.



GPS POSITIONING

- GPS
- A-GPS
- GPS status displayed on webpage
- GPS data send to remote GPS server

The screenshot shows a web interface for GPS management. On the left is a dark blue sidebar menu with the following items: Overview, Link Management, Industrial Interface, Network, Applications (with sub-items: DDNS, SMS, Schedule Reboot, Exosite, and GPS), and a reflection below. The main content area has a header with 'Status' (highlighted in a red box) and 'GPS'. Below this is a 'GPS Status' section containing a table with the following data:

	Status	Fixed
Satellites Visible	14	
Satellites Used	8	
Latitude	51.038231	
Longitude	13.718402	
Altitude	187.300003	
Horizontal speed	0.000000	km/h

MULTIPLE FUNCTIONS



Cellular (ESIM)



Serial Connection



Account Management



Wi-Fi AP or Client mode



Multiple VPN tunnels



Rich syslog output



WAN support, Multiple LAN



Firewall, port mapping, DMZ



DDNS support



Digital Input and output



NTP Client, schedule reboot



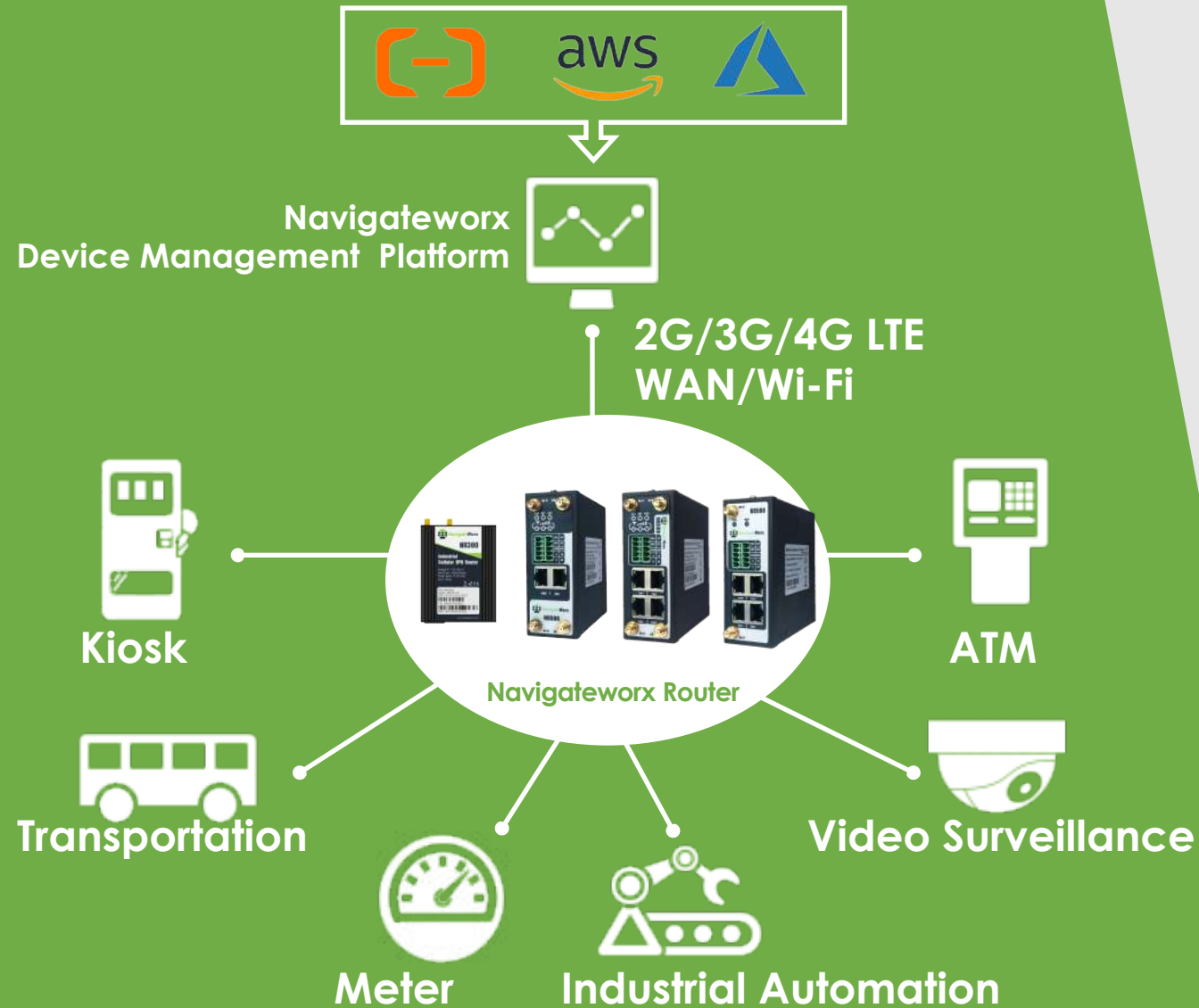
Platform (MQTT)

Navigateworx Device Management Platform

October, 2019

www.navigateworx.com

APPLICATION



With the development of IoT applications, IoT devices have now penetrated into various industries, such as intelligent transportation, environmental protection, public safety, industrial monitoring, etc., forming a complete ecosystem. The stability of the data communication network is a key part of the entire application.

Therefore, when more and more devices are deployed, the possibility of device failure is greater. If you effectively manage the health of your network devices, it will become a major concern for many companies.

KEY FEATURES



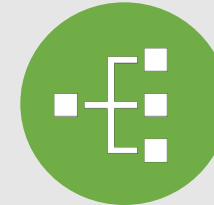
Device Statistics

Real-time view a wide range of current model, product management, online quantity, number of offline devices, number of inactive devices.



Device Monitoring

Real-time view each device current running information of the device, CPU, memory, firmware version, current interface type, etc.



Device Maintenance

Support for upgrading configuration files, firmware to devices remotely.



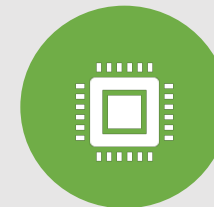
User Management

User management, you can create new user groups, or you can create new users to manage devices in the same group.



Friendly UI

User-friendly UI design, login with web browser to manage the platform. Module design, simple operation steps, no need to spend a lot of time training.



High Stability

7 x 24 hours of operating design, multi-layer verification of device connections, avoiding the connection of invalid devices and causing server performance degradation.

SERVICE

Platform	Navigateworx Device Management Platform	
Location	Public server (e.g. Amazon AWS, Alibaba Aliyun)	Customer's private server
Version	Available. Navigateworx Device Management Platform installed on Aliyun public server, providing testing account for our clients.	Provide Navigateworx software with limited license for clients to install on their own server.
Service	<ol style="list-style-type: none">1. General admin account for all clients2. Allow to create next level user account for device maintain	<ol style="list-style-type: none">1. Installation package: Navigateworx DMP+ User Manual+ Installation guide2. Support customer to install on their local server3. Online consultant and best effort technical support
Free	Please contact your Sales Representative	

HARDWARE SPEC

CPU	MEMORY	DISK	OS	DEVICE ACCOUNT	NETWORK
4 (3.1GHz Intel® Xeon® Platinum 8000)	8GB	128GB	Centos7+	0-1K	10MB
4 (3.1GHz Intel® Xeon® Platinum 8000)	8GB	256GB	Centos7+	1K-2K	20MB
4 (3.1GHz Intel® Xeon® Platinum 8000)	8GB	512GB	Centos7+	2K-4K	100MB
4 (3.1GHz Intel® Xeon® Platinum 8000)	8GB	1024GB	Centos7+	4K-6K	100MB

Q & A

