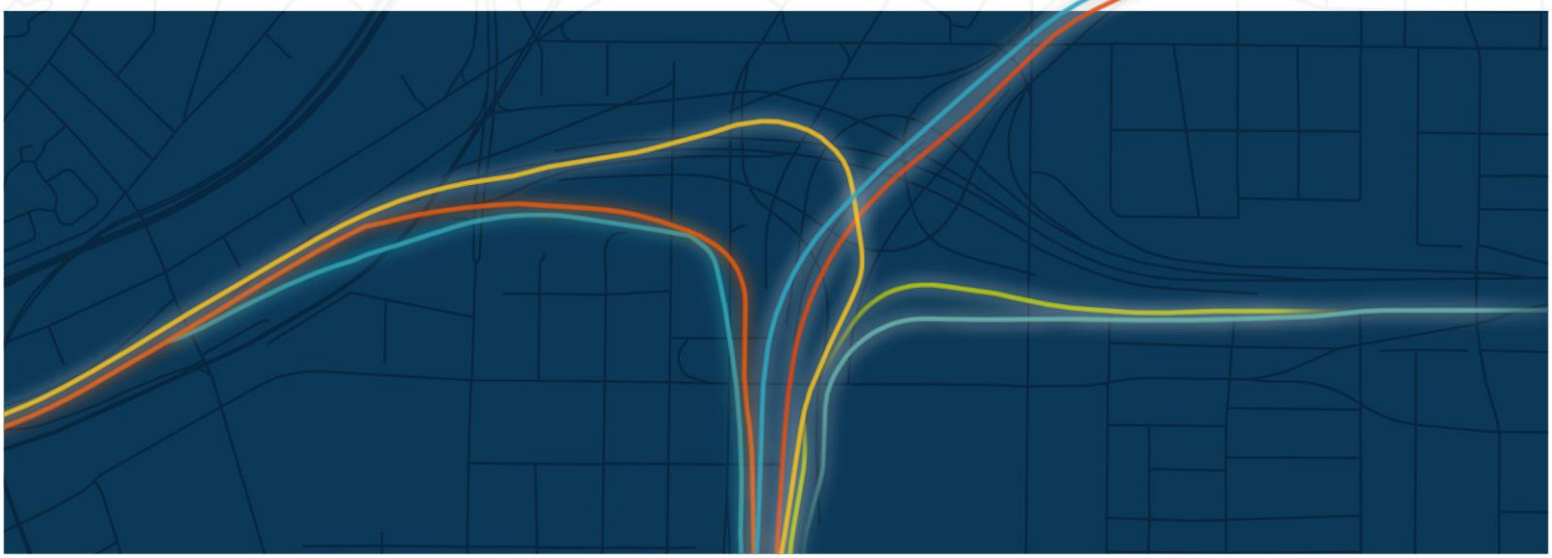
TripSpark
MOVING TOGETHER

Novus 7 DR/MED Hardware Specifications

TRADE SECRET
VERSION 7+



NOVUS 7 DR/MED Hardware Specifications | June 2022 Edition

TRADE SECRET

This edition is based on product version Novus 7+

Trapeze Software ULC dba as TripSpark Technologies reserves the right, to be exercised at its sole discretion and without notice, to change, modify or adapt the contents of this edition in order to accurately reflect any future upgrades to the TripSpark proprietary software. In the event of such changes, TripSpark expects, but does not represent or guarantee, that this current edition will continue to remain reasonably accurate insofar as it describes the basic functions of the TripSpark proprietary software. Furthermore, depending on your system settings, certain functionality, such as application screens, may not function exactly as shown or described in this document.

Contents

Novus 7+ MINIMUM SYSTEM REQUIREMENTS

NovusDR/MED Hardware Specifications

NOTE: These specifications serve as a general guideline for current and prospective customers. Our customers use a wide range of operating models that provide different load on the system, so a detailed discussion to fine tune the proper specs for your operation should be held with TripSpark.

Novus is a browser-based product that runs as a service on a windows operating system. From a workstation perspective, only a computer with network connectivity and a current internet browser is required. The application is typically installed on a dedicated application server, which connects via an ODBC to a database server. If driver MDTs (mobile data terminals) are also in use, that is typically installed on a separate app server. Furthermore, add-ons such as Passenger Portal and Notifications can typically be installed on existing servers (needs to be verified with TripSpark). Below lists recommended + supported hardware and operating server versions. Please reach out to TripSpark for any additional required details.

Recommended Workstation Specifications

Requirement	Supported
Operating System	Windows 7, 8, 10, 11
Browser	Chrome, FireFox, Edge (current versions)
Software for reports	Required: Adobe Reader Optional: MS Word, Excel
Min specs	4GB RAM, 2 CORE, 21” 16 x 9 Monitor that supports minimum 1024 x 768 resolution (dual monitors are recommended)
Network	Network connectivity (to access the Novus application)

Additional Workstation Notes:

1. Workstations should have Novus link setup as a trusted site.
2. Pop-up blocker should be disabled.
3. Intel i5 or higher processor is recommended, with a minimum clock speed to 1.5Ghz.

Supported Server Operating Systems

PLEASE NOTE: As of Novus 7, Windows Server 2012 will no longer be supported due to the sunsetting of this version by Microsoft. Please ensure you are operating on the most recent versions of OS/SQL for best performance of TripSpark software.

Supported Server OS
Windows Server 2016 (64 bit)
Windows Server 2019 (64 bit)

Supported SQL Database & ODBC versions

PLEASE NOTE: As of July 2022, SQL 2012 will no longer be supported by Microsoft, and as a result can no longer be supported by TripSpark.

Database Version	Required Driver
Microsoft SQL Server 2014 (64 bit)	ODBC Driver 11 for SQL Server
Microsoft SQL Server 2016 (64 bit)	ODBC Driver 13 for SQL Server
Microsoft SQL Server 2019 (64 bit)	ODBC Driver 17 for SQL Server

Additional Server Notes:

- Standard (STD) or enterprise (ENT) versions of SQL are supported (not express). NOTE: Enterprise version includes an 'ONLINE' mode that enables nightly maintenance tasks to be run without locking table access

Recommended Server Specifications

Trips Per Day	Database Server (RAM / PROC / DATA)	Novus Application Server (if separate) (RAM / PROC / APP)	Supporting Modules Server (if applicable) ***
< 500	16GB / 4CORE / 100GB / STD	8GB / 4 CORE / 100GB	8GB / 2CORE / 100GB
500-1000	16GB / 4CORE / 250GB / STD	16GB / 8 CORE / 100GB	8GB / 2CORE / 100GB
1000-2000	32 GB / 8CORE / 500GB / STD	16GB / 8 CORE / 100GB	16GB / 4CORE / 100GB
2000-5000	48 GB / 12 CORE / 1TB / ENT*	App 1: 16GB / 16 CORE /100GB* App 2: 16GB / 16 CORE / 100GB	16GB / 4CORE / 100GB
5000-10000	64 GB / 16 CORE / 1TB / ENT*	App 1: 24GB / 24 CORE / 100GB* App 2: 24GB / 24 CORE / 100GB	16GB / 4CORE / 100GB

*Agencies above 2000 trips per day (or agencies with high map density using internal maps) require 2 application servers for optimal performance as noted in the above grid

**SQL Server Enterprise version is recommended which supports regular index rebuilds, and index statistics recalculations, without locking tables.

***Supporting modules are defined as: XGATE (used in conjunction with our mobile apps), Notifications or Passenger Portal

Additional Server Notes:

1. Each Service/Application server should have a dedicated RAID-1 storage for redundancy.
2. Novus can run in a virtualized environment, but performance may be adversely impacted at high trip volumes. For agencies that operate >1000 trips per day, the database server should be on a physical server with a SSD, but the application server can be virtualized as long as the specifications are met.
3. Additional processing cores and RAM should be allocated if you plan to host additional software on the Novus application server. Additional RAM should be allocated for sites with high numbers of concurrent users. TripSpark must be consulted if high numbers of concurrent users are expected to assess usage characteristics to determine suitable RAM requirements.
4. The number of cores shown is for the number of processor sockets on the motherboard.
5. All server processor cores must be Xeon 2GHz or processors of equivalent performance.

Network Requirements

NOTE: Novus can be configured to be accessible over the internet or internal network.

Network requirements
High speed internet connection – minimum 10MB download, 2MB upload
100Mbps minimum NIC cards in all hardware (1Gb recommended)

Additional Requirements:

- A reverse proxy: IIS or Apache (with a certificate purchased by the agency) for SSL configuration (TLS 1.2 minimum)
- The agency must setup nightly backups & maintenance plans on the SQL server
- Remote access (especially during the deployment phase) for TripSpark staff is recommended.

Cloud Based Solutions

Novus works on Windows Server environments for the application so long as the hardware specs meet the physical server specifications and Microsoft SQL Server specifications previously outlined in this document.

Novus has not been tested in Amazon's AWS at this time. TripSpark does use Microsoft's Azure for QA and testing purposes only, so if a cloud-based tool is used, Azure is our recommendation. Novus does not support any AWS or Azure native tools, and no development has been done specifically for either platform.

TripSpark does not have expertise inhouse with respect to setting up, troubleshooting, diagnosing, or resolving cloud-based solutions. If a customer chooses to use a cloud-based solution, the customer **must** discuss with TripSpark technical personnel regarding suitability. The customer will be solely responsible for setting up, troubleshooting, diagnosing, and resolving issues associated with the cloud-based solution.

Also:

- The database server is typically the most important to have on a physical machine once trip volumes exceed a few thousand trips. If using a cloud-based solution, TripSpark recommends using the next hardware tier above the recommend one (so if a site falls within the 1000-2500 tier, the 2500-5000 tier should be used). This is only needed for the database server.
- Cloud based solutions are 'elastic', meaning that server configurations can be easily changed. When a customer grows to another tier of trip count, the servers will need to be updated to reflect the change (more CPU/RAM added).
- When deploying on a cloud-based solution, a region closest to the agency must be selected (so if in the eastern US, this region must be selected).
- TripSpark supports LDAP using internal servers, however cloud-based LDAP uses a different protocol that has not been tested by TripSpark. Only Novus authentication will be supported at this time when using a cloud-based solution.
- TripSpark strongly suggests using a dedicated host model on cloud solutions, so that hardware resources are using only for our applications, ensuring performance is maximized.
- TripSpark recommends using ***managed disks*** for storage. Standard-SSD or regular disks for PROD, TEST, and XGate: (E10 and up) Premium-SSD for SQL: (P10 and up). E = Standard SSD, P = Premium.