



# About RoyceMedia Technologies Pte Ltd

RoyceMedia, founded in 1997, is Asia Pacific's premier IT and OT solutions supplier. Our professionals create customized solutions to match our client's demands, boosting creativity and productivity. Staying technologically ahead and exceeding expectations are our goals.



## Cybersecurity

Cybersecurity is the ultimate safeguard for your digital world, protecting your sensitive information, computer systems, and networks from cyber threats.



## Information Technology

Specializes in integrating diverse IT systems and technologies to optimize and enhance business processes.



## Operation Technology

Enhance your operations with our OT specialists, who will optimize your physical processes for enhanced performance.



## IoT

Utilize our expert system integration services to unlock the full potential of IoT. We enhance productivity, security, and scalability based on your specific requirements.

# Global go-to-market strategy

## Our company



Name : RoyceMedia Technologies

Address: 211 Henderson Rd, Singapore 159552

Phone: +65 6323 2139

### Partners



# CHAN SIEW KIN (S.K. CHAN)

Chief Technology Officer



Ambitious, result orientated IT solutions architect with over 20 years' experience in High Availability and Fault Tolerant Solutions.

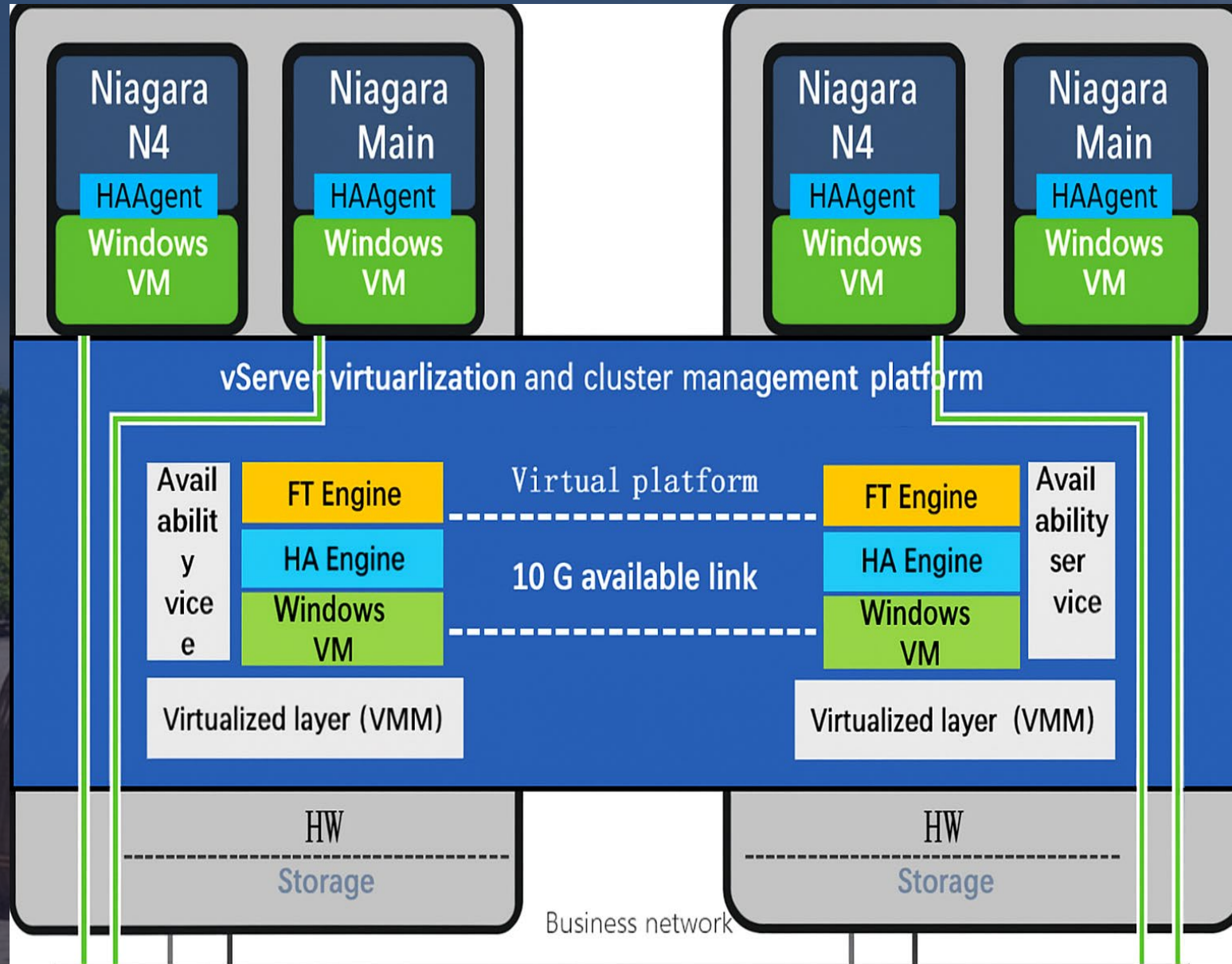
Proficient and experienced IT leader in project implementation on Microsoft Windows Server, VMware, Linux KVM, HP Switches, Cisco Switches, Cisco Firewall, FortiGate Firewall, Watch Guard Firewall, and EMC SAN Storage.

In today highly digitalised and computerised world, our users always demand services that never sleep, operations that never break.

Fault tolerance isn't a luxury—it's the lifeblood of modern business continuity.



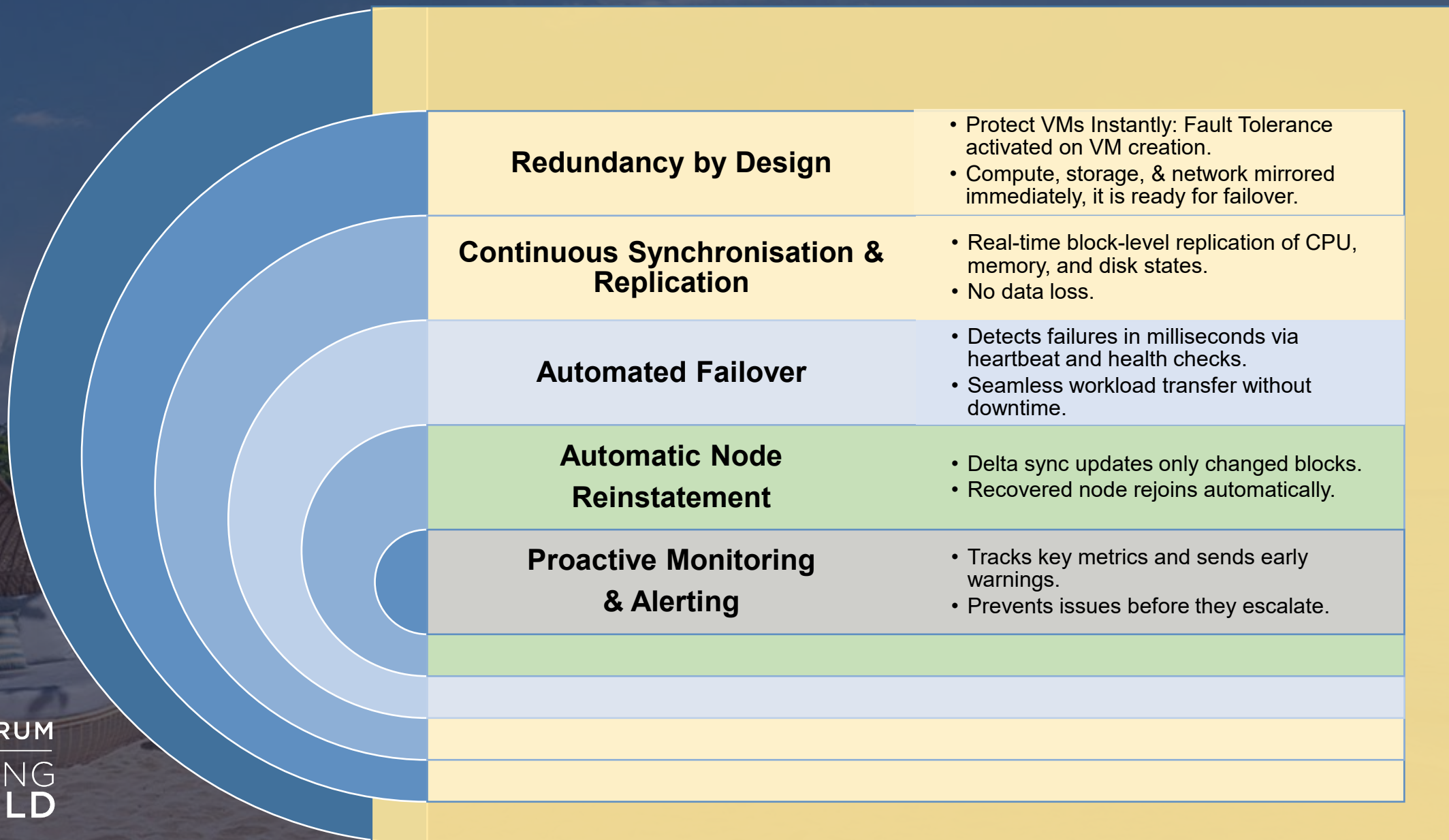
# vServer FT Architecture Overview



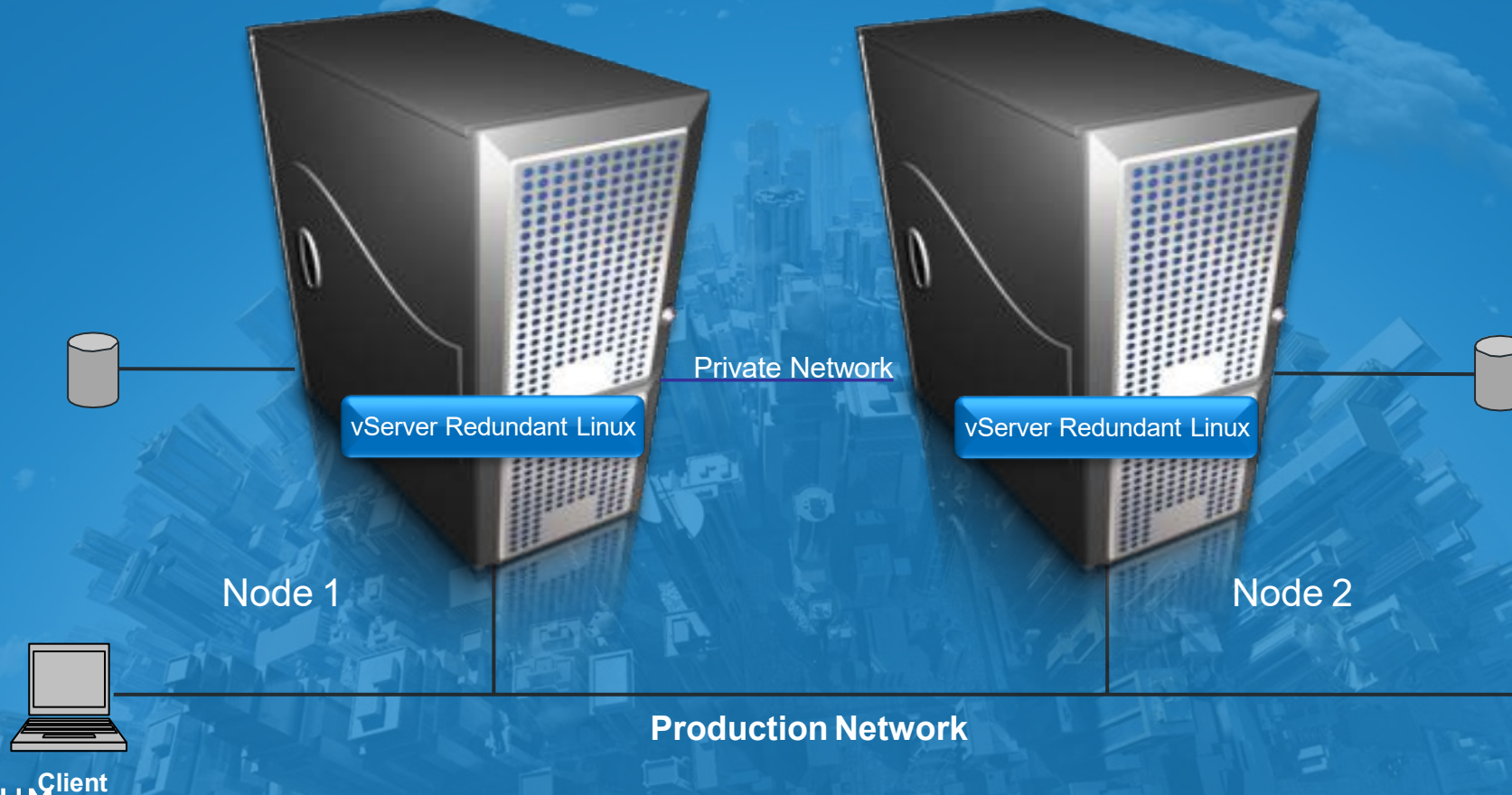
- Ensure Continuous Service: Layered fault tolerance protects compute, storage, and network.
- Spanning 2 Hosts for System Resiliency: vServer hypervisor cluster across two physical hosts.
- Synchronize VM States: Engines share state via private cluster bus.
- Monitor Health: Heartbeats over dedicated management VLAN.



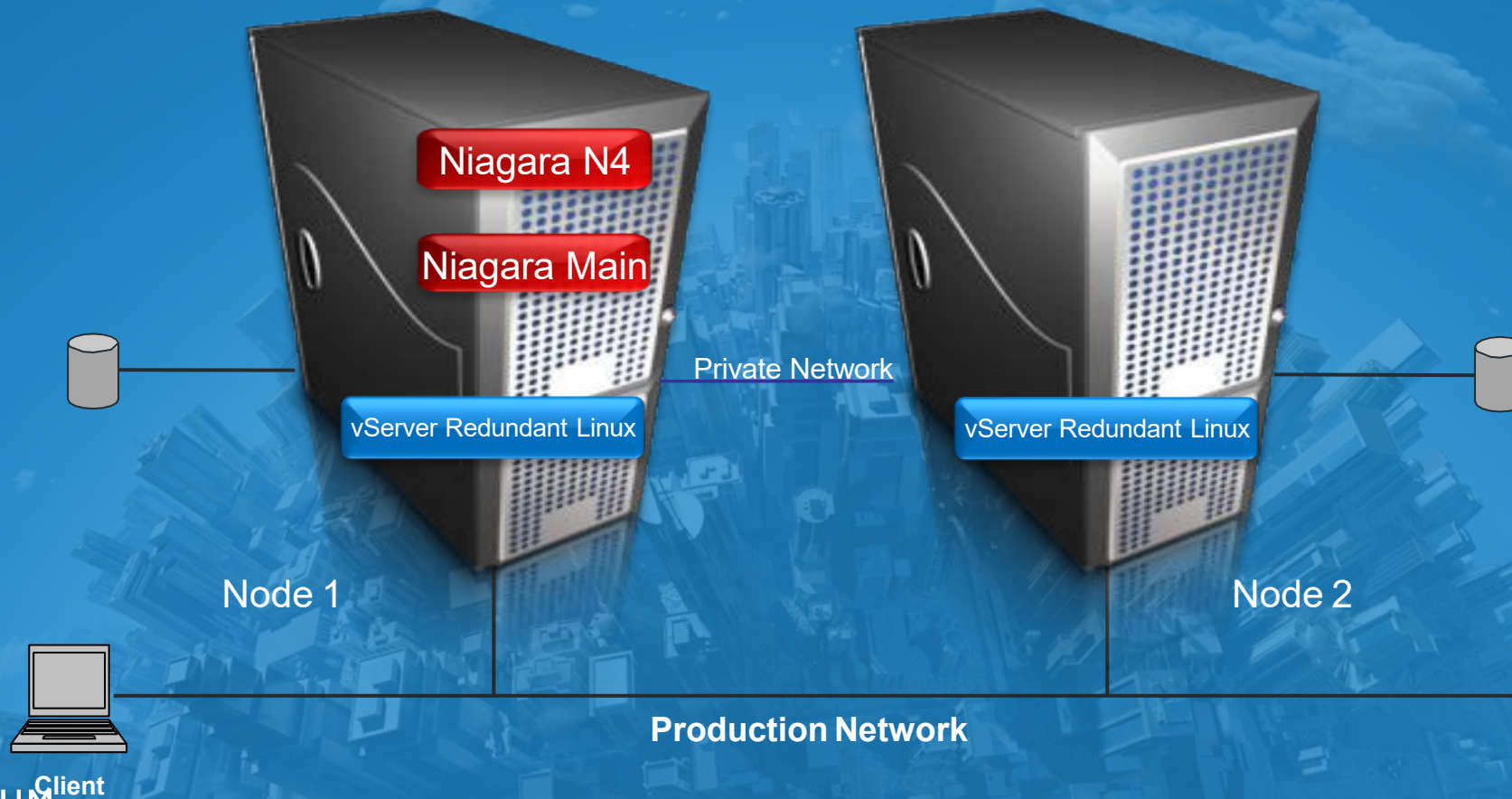
# Five Pillars of vServer Fault Tolerance



# vServer FT Theory of Operations (Preparation)

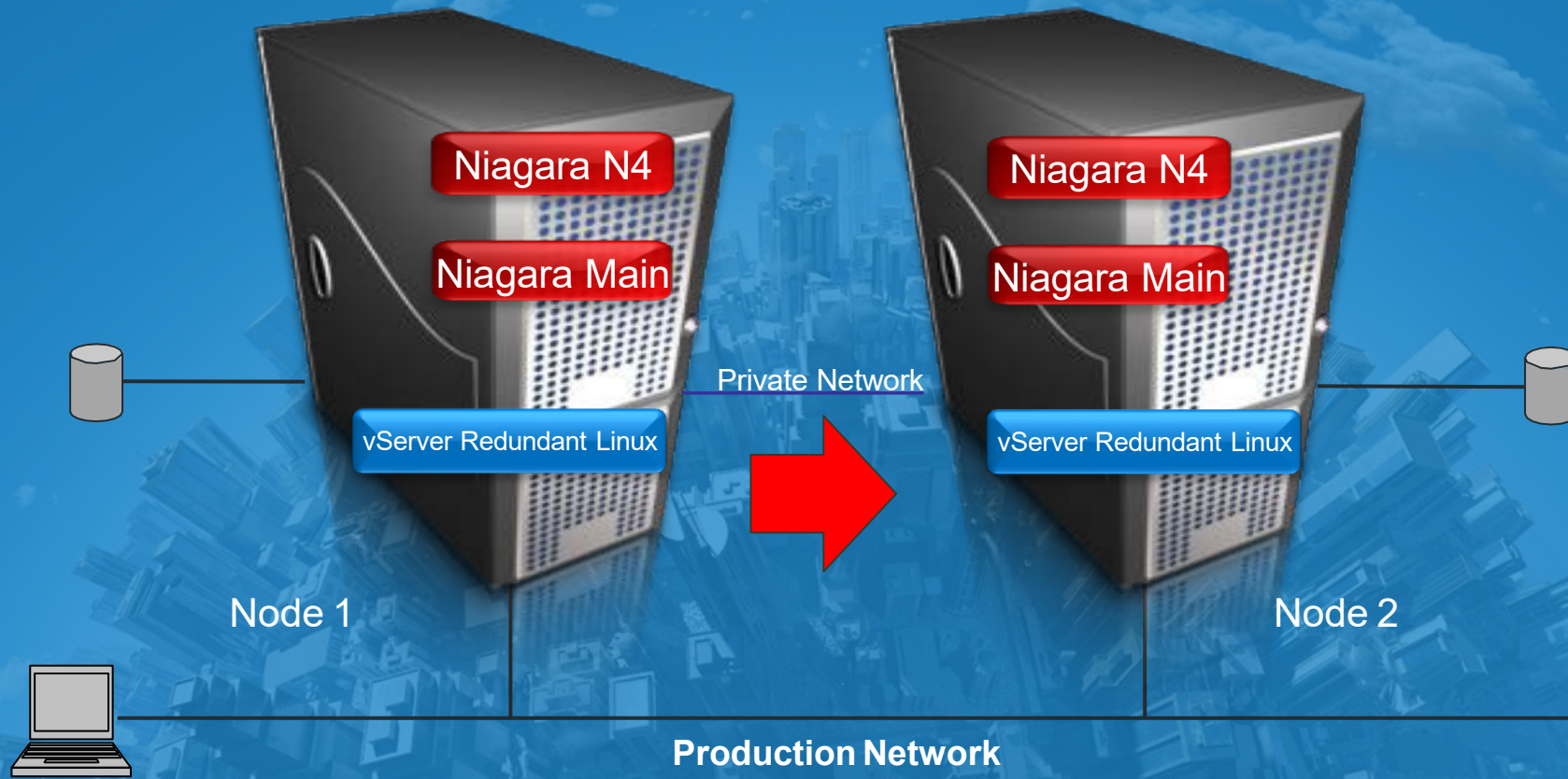


# vServer FT Theory of Operations (Protecting VM)



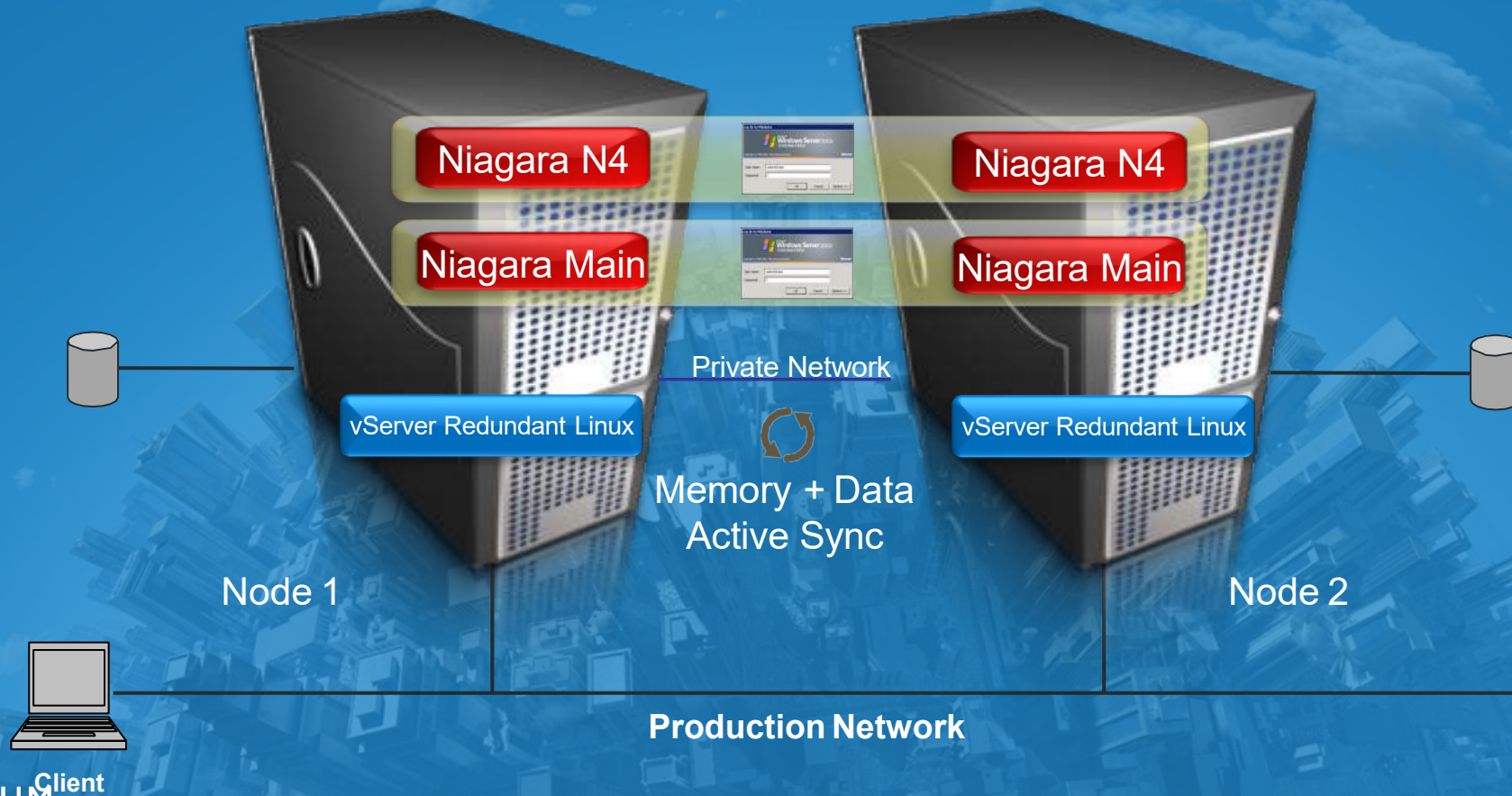
# vServer FT Theory of Operations (Self Mirroring)

TRIDIUM



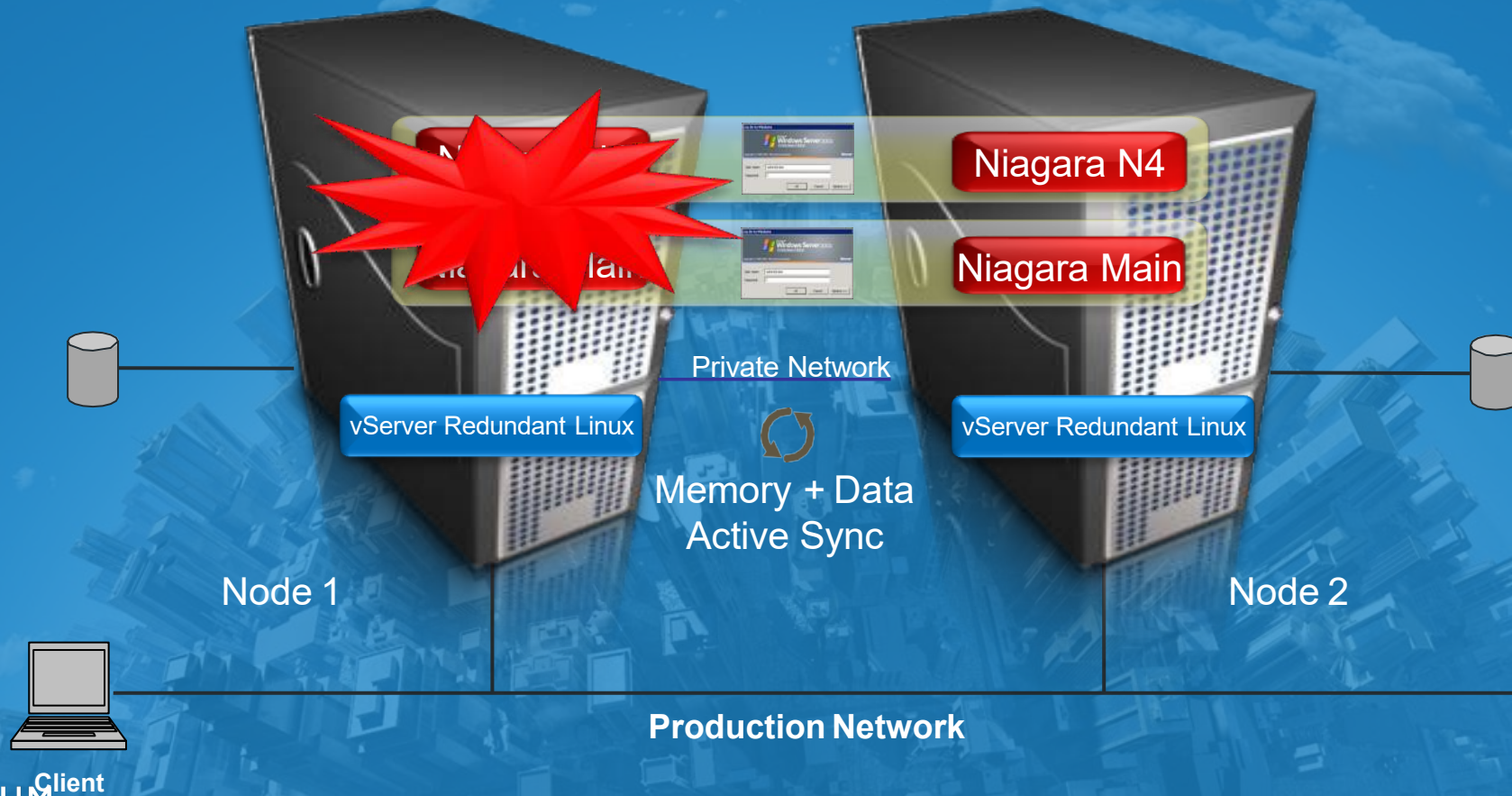
# vServer FT Theory of Operations (FT Mode)

TRIDIUM

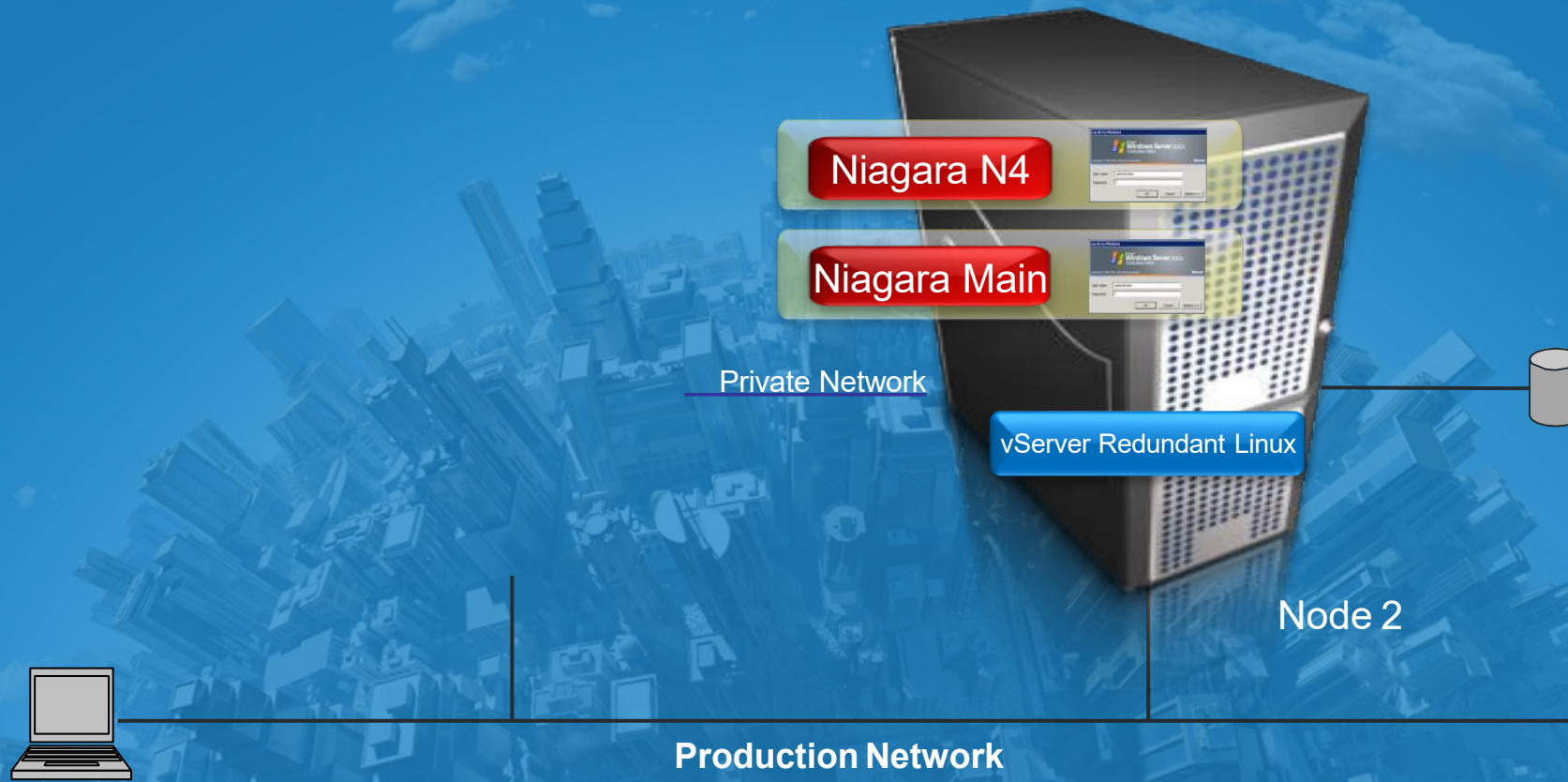


# vServer FT Theory of Operations (Fault)

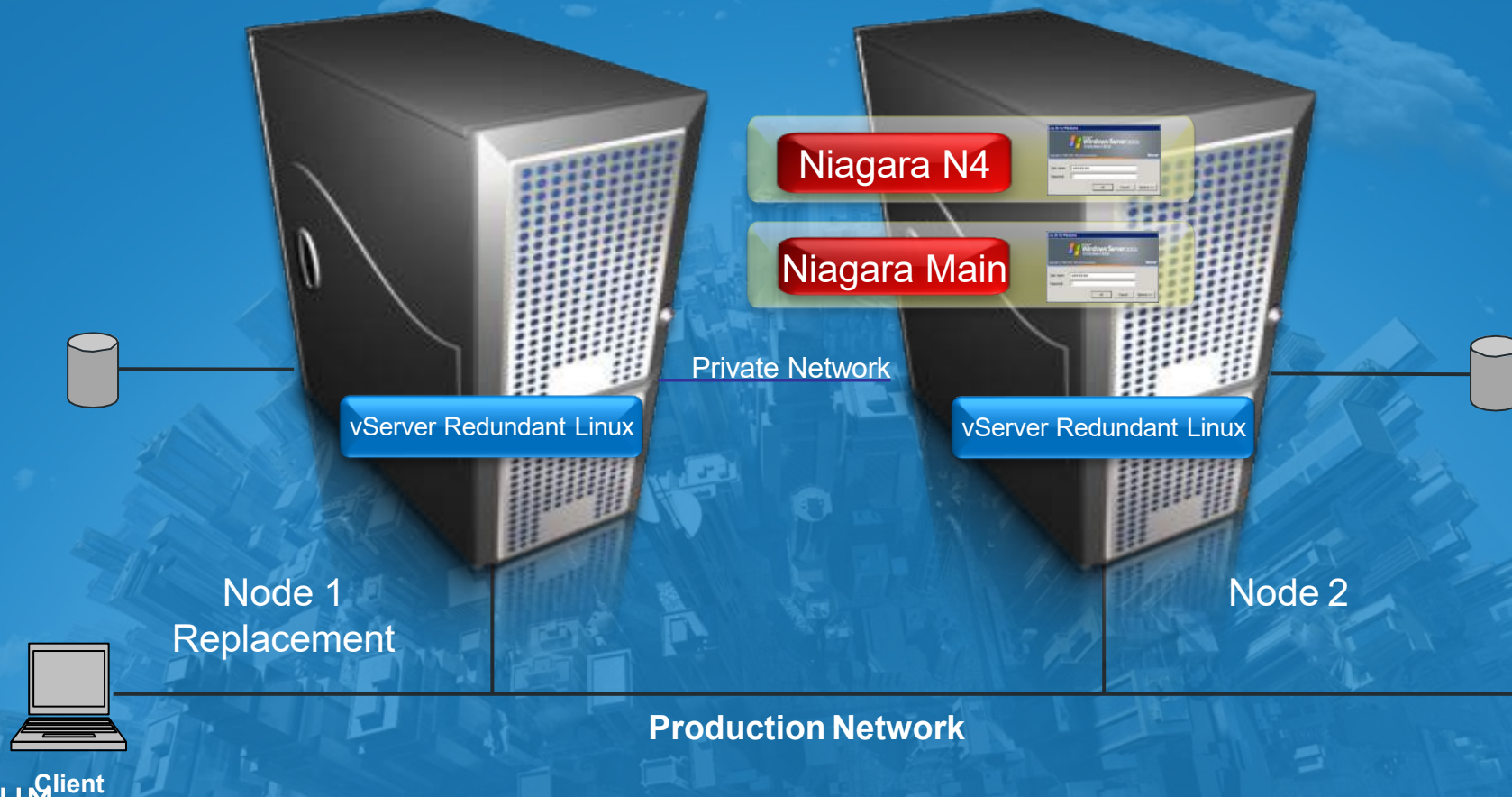
TRIDIUM



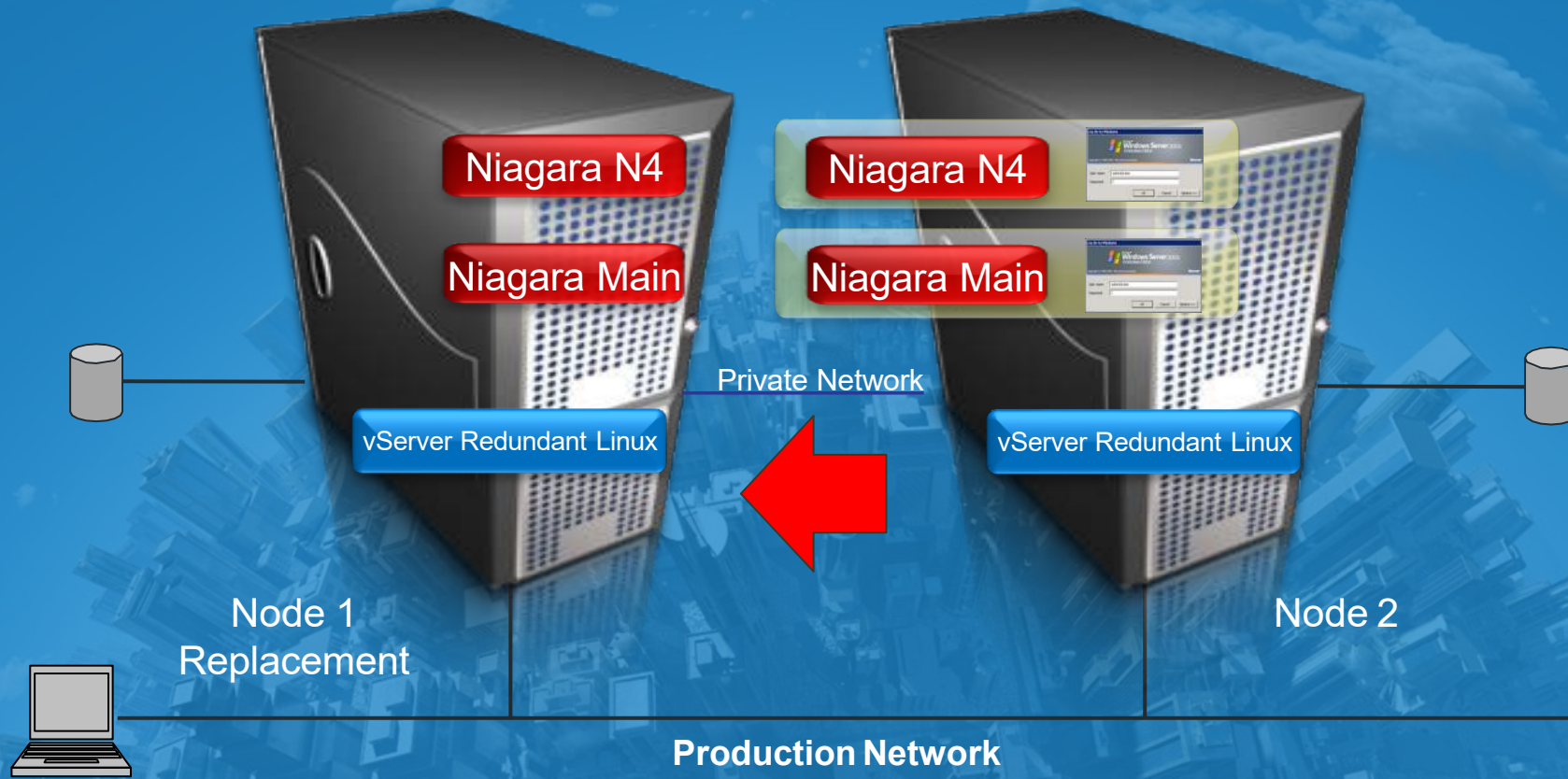
# vServer FT Theory of Operations<sup>TRIDIUM</sup> (TakeOver)



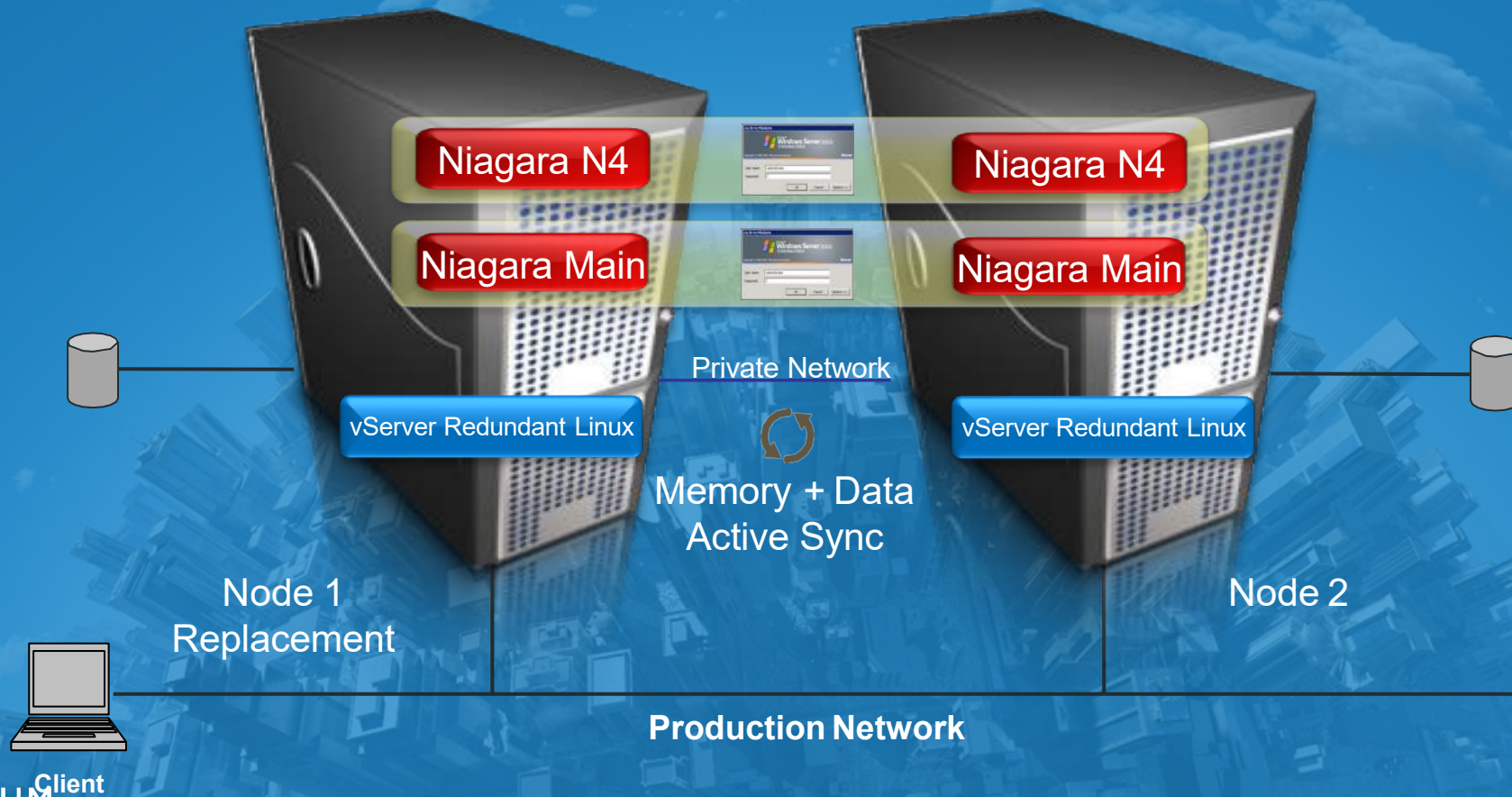
# vServer FT Theory of Operations (Self Healing)



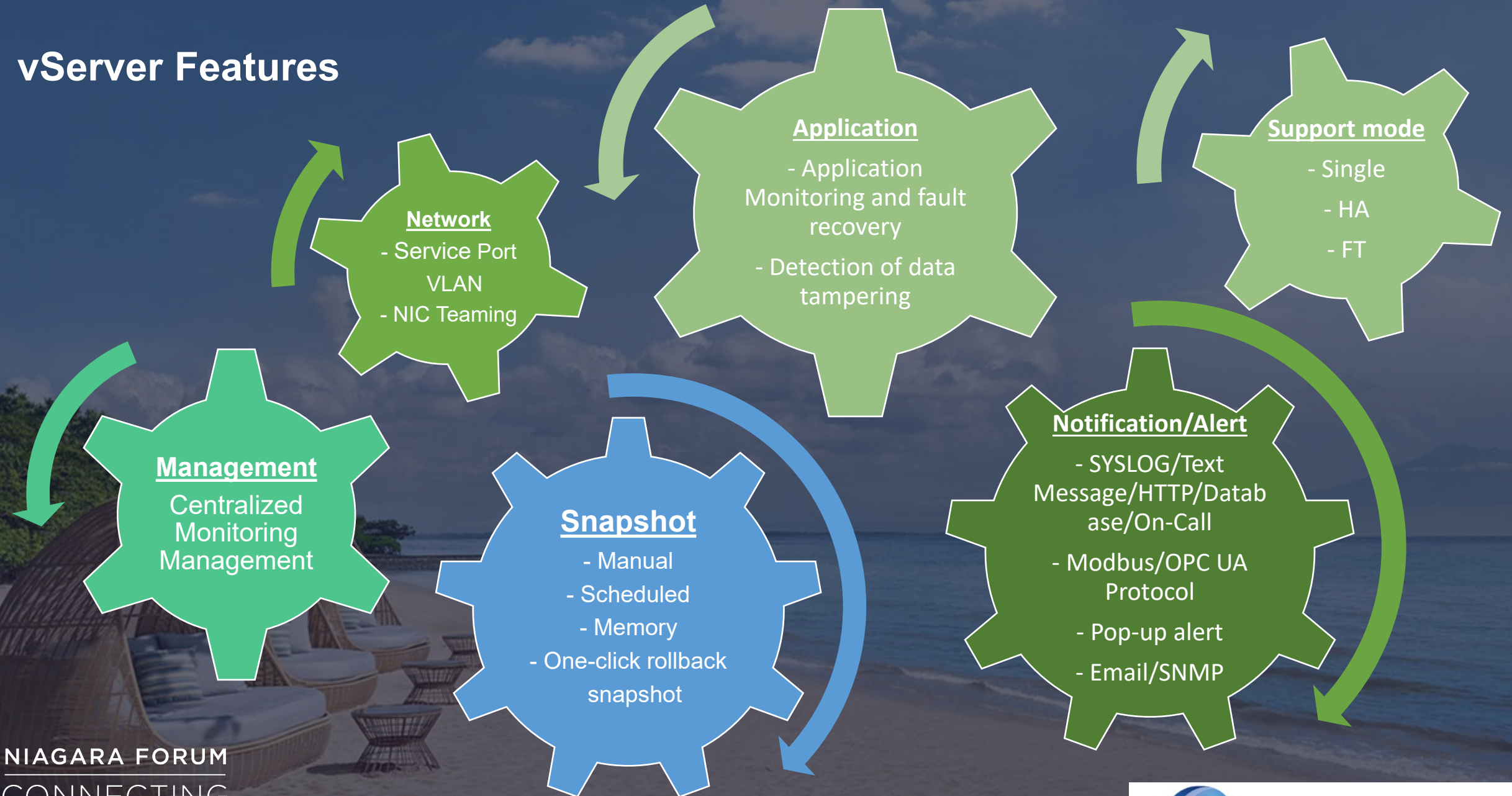
# vServer FT Theory of Operations (Auto Resync)



# vServer FT Theory of Operations (Recovery Complete) <sup>TRIDIUM</sup>



# vServer Features



# FT Solutions - Functional Comparison Table

| Function/ Module |                                         | vServer FT | SoftwareA FT | SoftwareB FT |
|------------------|-----------------------------------------|------------|--------------|--------------|
| CPU              | X86                                     | ✓          | ✓            | ✓            |
|                  | ARM                                     | ✓          | ✗            | ✗            |
| VCPU             | No. of vCPUs for Single VM              | Unlimited  | Unlimited    | ≤8 vCPUs     |
| vDisk            | vDisk capacity for Single VM            | ≤ 64TB     | ≤ 16TB       | ≤ 2TB        |
|                  | Manual snapshot                         | ✓          | ✓            | ✗            |
| Snapshot         | Scheduled snapshot                      | ✓          | ✗            | ✗            |
|                  | Memory snapshot                         | ✓          | ✗            | ✗            |
|                  | One-click rollback snapshot             | ✓          | ✗            | ✗            |
| Application      | Application monitoring & fault recovery | ✓          | ✗            | ✗            |
|                  | Application start/stop dependencies     | ✓          | ✗            | ✗            |
|                  | Detection data tampering                | ✓          | ✗            | ✗            |
|                  |                                         |            |              |              |

# FT Solutions - Functional Comparison Table

| Function/ Module               |                                                            | vServer FT | SoftwareA FT | SoftwareB FT |
|--------------------------------|------------------------------------------------------------|------------|--------------|--------------|
| Network                        | Service port VLAN                                          | ✓          | ✗            | ✓            |
|                                | NIC Teaming                                                | ✓          | ✗            | ✓            |
| Users & Permission             | Multi-user/role<br>Mgtm/Customizable Permission Allocation | ✓          | ✗            | ✓            |
|                                | SYSLOG/Text<br>Message/HTTP/DB/on-call                     | ✓          | ✗            | ✗            |
| Notification/Alert             | Modbus/OPC UA Protocol                                     | ✓          | ✗            | ✗            |
|                                | Pop-up alert                                               | ✓          | ✗            | ✗            |
|                                | Email/SNMP                                                 | ✓          | ✓            | ✓            |
| Operation & Maint<br>Interface | WEB API (Host/VM runtime slate)                            | ✓          | ✓            | ✓            |
|                                | CLI (Host/VM runtime slate)                                | ✓          | ✗            | ✗            |
| VM built-in tools              | Maint Shutdown or restart VM/Host                          | ✓          | ✗            | ✗            |
| Management                     | Single/FT working mode config conversion                   | ✓          | ✗            | ✓            |
|                                | Centralised monitoring Mgtm                                | ✓          | ✗            | ✓            |

# Snapshot Function

SummaryPerformanceDR & FTGuest app monitoringSnapshotEventLog

Take snapshotRestore snapshotEditDelete snapshotDelete allExportCloneSnapshot scheduleCopy verificationRefresh

N4\_Windows

install\_software

config\_modbus

configapp

You are here

On-demand snapshot

Create snapshots on demand for extra redundancy and data protection.

Snapshot Management

Create snapshot

Rollback snapshot

VM copy verification

Verify or trace historical data through VM copy data.

Snapshot plan configuration

Snapshot type

Snapshot plan

Copy verification

Finished soon

Snapshot plan

The snapshot will be automatically generated according to the schedule specified below. Note: For VM in FT level, the fault tolerance of the VM will become invalid while generating the snapshot.

Enable snapshot schedule

Snapshot period

Sunday

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

Snapshot interval

22:00

to

06:00

,

every

1

Hour(s)

30

Minute(s) create a snapshot

Timed snapshot

01:30

create a snapshot

If the count of generated scheduled snapshots exceeds the max count of scheduled snapshots specified here, the oldest scheduled snapshot will be deleted.

Max count of snapshots planned to be kept

4

Previous

Next

Finish

Cancel

Plan your scheduled snapshot

# Application monitoring and fault recovery

App Monitoring configuration wizard

- ✓ Welcome
- ✓ Deep check for OS
- ✓ Data tampering detection
- ✓ Other Deep-check resources
- ✓ Process check
- ✓ NT service check
- ✓ Deep check the application
- Resources dependence**
- Process performance monitor...
- Maintenance schedules
- Ready to complete

### Resources dependence

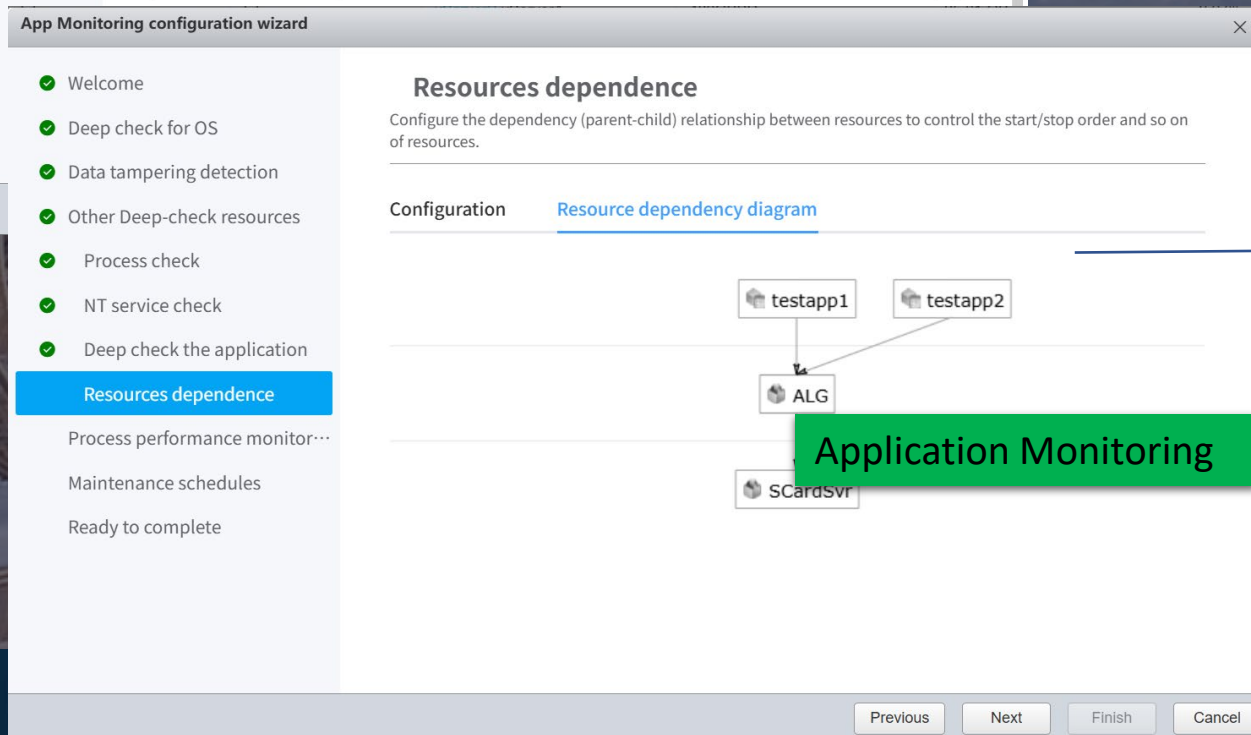
Configure the dependency (parent-child) relationship between resources to control the start/stop order and so on of resources.

[Configuration](#) [Resource dependency diagram](#)

| Resource name    | Depend on pare... | The dependent c... | Restart this resource w...          |
|------------------|-------------------|--------------------|-------------------------------------|
| Process-testapp1 | ALG               |                    | <input checked="" type="checkbox"/> |
| Process-testapp2 | ALG               |                    | <input checked="" type="checkbox"/> |
| Service-ALG      | SCardSvr          | testapp1, testapp2 | <input checked="" type="checkbox"/> |
| Service-SCardSvr | Please select     | ALG                |                                     |

## Resource start/stop dependencies

Supports configuration monitoring processes, NT Services, etc.  
Specifies start/stop dependencies between resources.



## Dependency diagram

Graphical display of dependencies.

# Data Tampering Monitoring and Detection

App Monitoring configuration wizard

✓ Welcome

✓ Deep check for OS

**Data tampering detection**

Other Deep-check resources

Process check

NT service check

Deep check the application

Resources dependence

Process performance monitor...

Maintenance schedules

Ready to complete

## Data tampering detection

Determine whether data has been tampered by malware or infected by viruses by releasing sample files and periodically checking the contents of the sample files

|                        |                                                                                                                                                                                 |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ▼ Data tampering alarm | <input checked="" type="checkbox"/> Enable                                                                                                                                      |
| Scheduled snapshot     | <input checked="" type="checkbox"/> Pause the scheduled snapshot when the data tampering alarm is triggered (manually re-enable the scheduled snapshot after removing the risk) |
| Sample catalog         | <input type="text" value="D:\DataSample"/>  Select...                                        |
| Sample catalog         | <input type="text"/>  Select...                                                              |
| Sample catalog         | <input type="text"/>  Select...                                                              |
| Sample catalog         | <input type="text"/>  Select...                                                              |
| Sample catalog         | <input type="text"/>  Select...                                                              |

**Data tampering detection**

Previous

Next

Finish

Cancel

## Specify the data directory to be tested

In the specified directory, release the sample file and periodically check its contents to determine whether the data has been tampered with by malware or infected with a virus.

If data tampering is detected, an automatic alert will be triggered to flag the incident, enabling users to intervene and address the issue promptly.

NIAGARA FORUM  
CONNECTING  
THE WORLD

TRIDIUM

# Network - Service Port VLAN

**Add network-vServer1**

| Network                | Business network(Bridge) ▼                                                                                                                                                                           |   |  |         |             |  |                    |                     |   |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--|---------|-------------|--|--------------------|---------------------|---|
| NIC                    | team0(58:47:ca:79:64:76) ▼                                                                                                                                                                           |   |  |         |             |  |                    |                     |   |
| VLAN ID                | <input checked="" type="checkbox"/> 3                                                                                                                                                                |   |  |         |             |  |                    |                     |   |
| IPv4                   | <input checked="" type="radio"/> Enable <input type="radio"/> Disabled                                                                                                                               |   |  |         |             |  |                    |                     |   |
| DHCPv4                 | <input type="radio"/> DHCP <input type="radio"/> Static                                                                                                                                              |   |  |         |             |  |                    |                     |   |
| Gateway                | . . .                                                                                                                                                                                                |   |  |         |             |  |                    |                     |   |
| Preferred DNS server   | . . .                                                                                                                                                                                                |   |  |         |             |  |                    |                     |   |
| Alternative DNS server | . . .                                                                                                                                                                                                |   |  |         |             |  |                    |                     |   |
| IP address             | <table><thead><tr><th>Address</th><th>Subnet mask</th><th></th></tr></thead><tbody><tr><td>172 . 16 . 13 . 11</td><td>255 . 255 . 255 . 0</td><td>✖</td></tr></tbody></table> <div>Add address</div> |   |  | Address | Subnet mask |  | 172 . 16 . 13 . 11 | 255 . 255 . 255 . 0 | ✖ |
| Address                | Subnet mask                                                                                                                                                                                          |   |  |         |             |  |                    |                     |   |
| 172 . 16 . 13 . 11     | 255 . 255 . 255 . 0                                                                                                                                                                                  | ✖ |  |         |             |  |                    |                     |   |
| IPv6                   | <input type="radio"/> Enable <input checked="" type="radio"/> Disabled                                                                                                                               |   |  |         |             |  |                    |                     |   |

OK Cancel

Select NIC

Assign VLAN ID

Assign IP address

**vServer1**

|           |                               |   |                                               |
|-----------|-------------------------------|---|-----------------------------------------------|
| network 1 | team0(58:47:ca:79:64:76)(1Gb) |   | 10.10.11.11                                   |
| network 0 | team0(58:47:ca:79:64:76)(1Gb) | 3 | 172.16.13.11                                  |
| host-only |                               |   | 192.168.149.1<br>192.168.149.0 / 255.255.2... |

**server2**

|           |                          |  |             |
|-----------|--------------------------|--|-------------|
| network 1 | team0(58:47:ca:7c:73:43) |  | 10.10.11.12 |
|-----------|--------------------------|--|-------------|

**Topology information**

**vServer1 vSwitch topology**

**host-only**

VM(0) No physical adapter

**network 1**

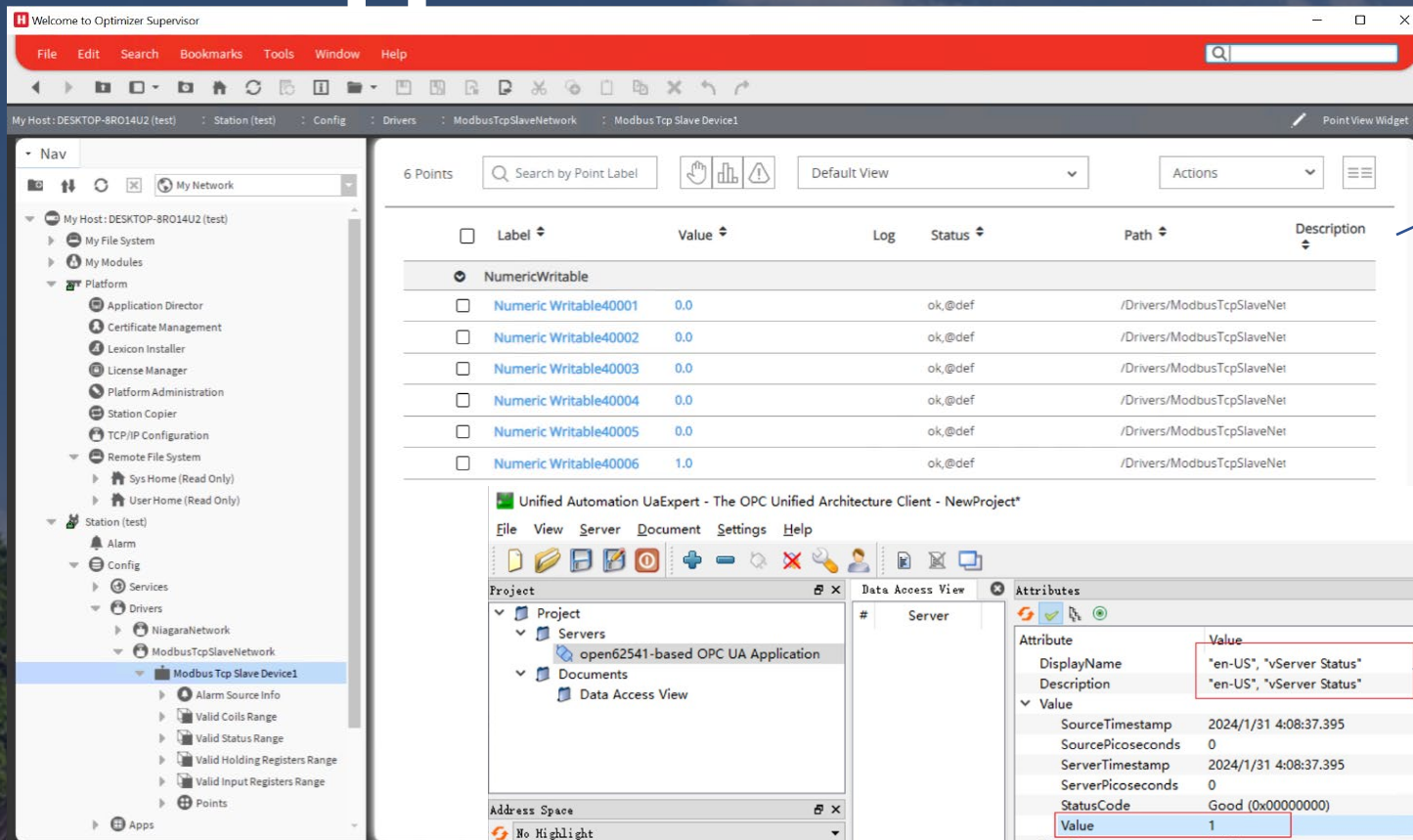
VM(2)

- vm\_OPC\_Client  
MAC address84:3D:4D:2D:...
- vm\_OPC\_UA\_server  
MAC addressA4:DD:70:79:C...

**network 0**

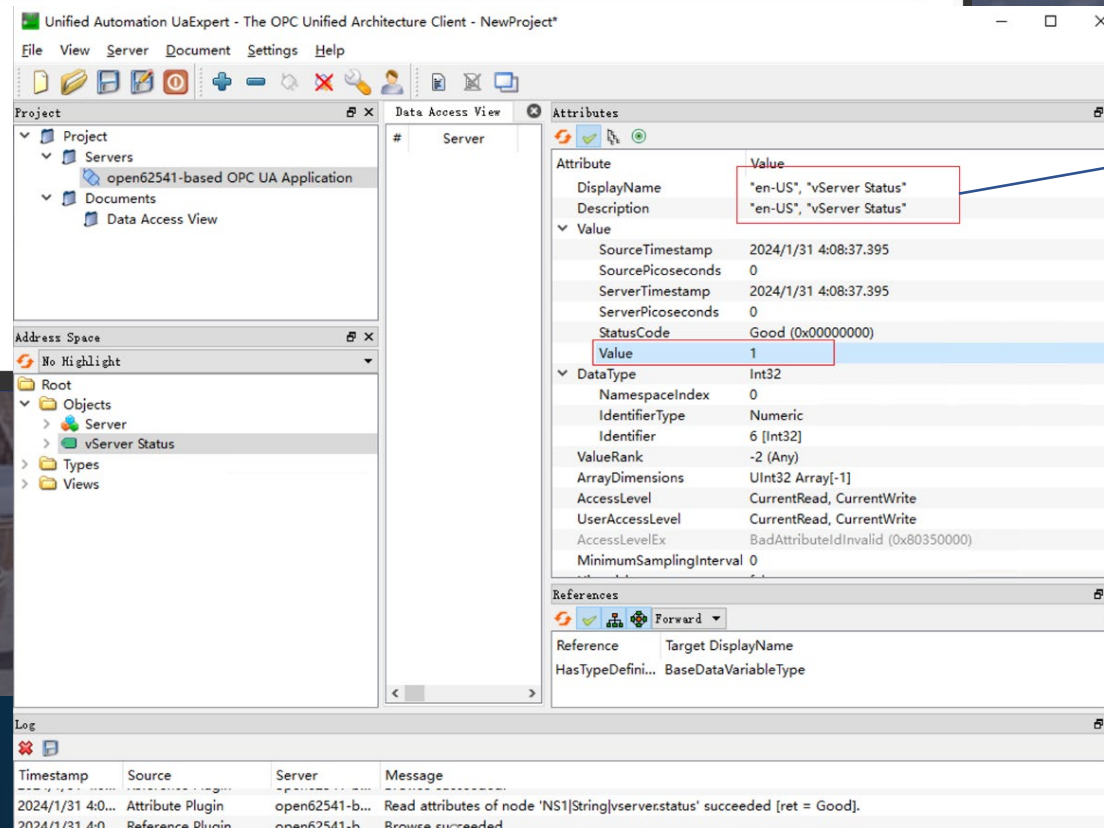
VM(0) team 0

# Supported Protocol Notification



## Modbus Protocol Notification

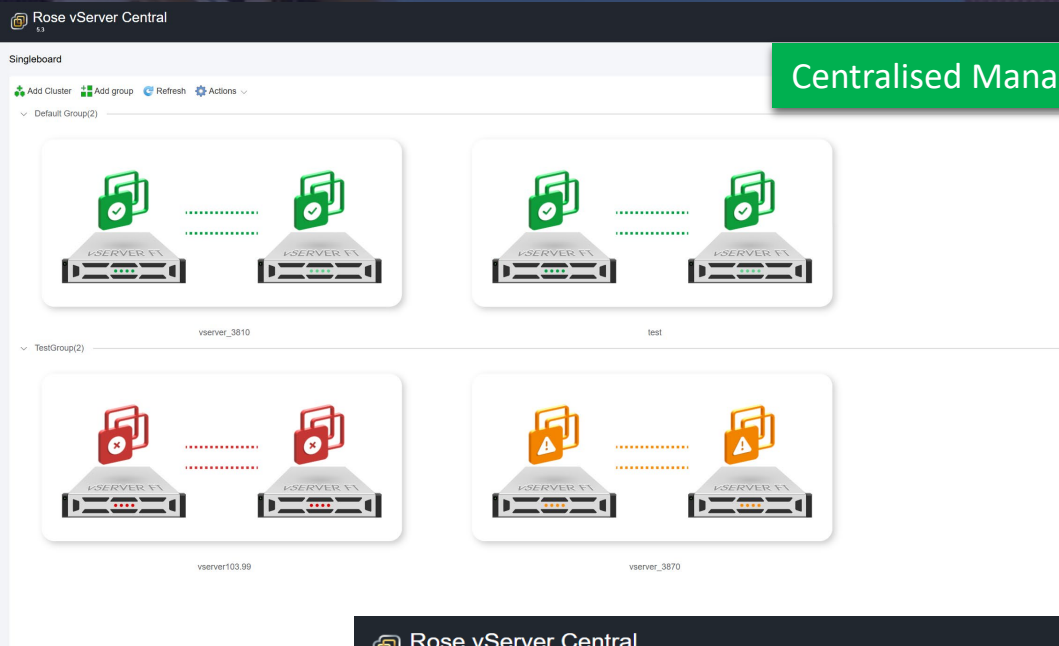
Real-time notification of multiple operating statuses with FT (application/network/online/offline/Host).



## OPC UA Protocol Notification

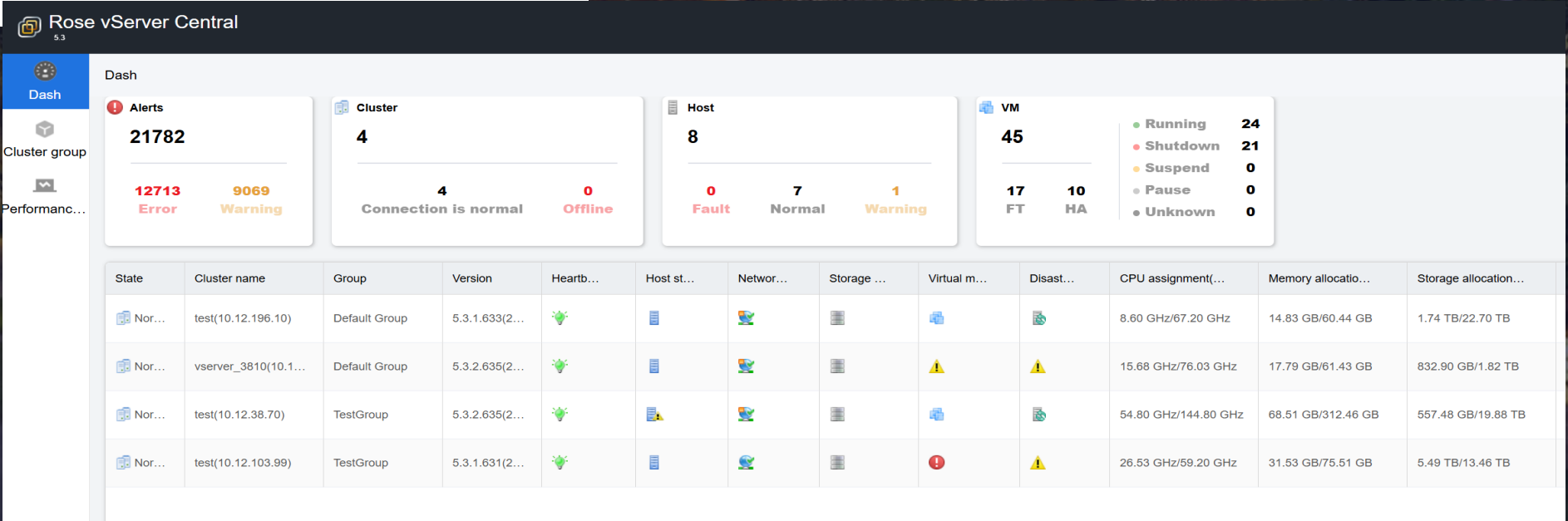
Real-time notification of FT summary operating status.

# Centralised Management

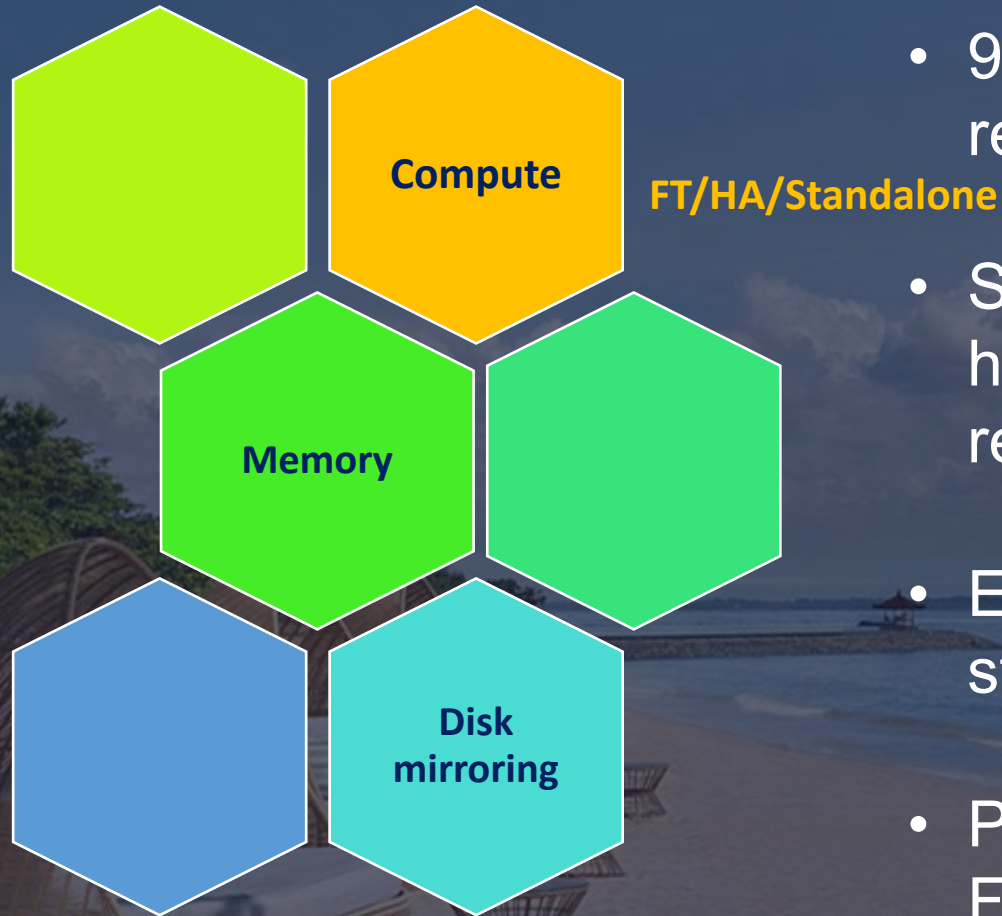


## Multi-instrument view/Grouping

Supports fault-tolerant grouping and centralised management of multiple FT solutions.  
Easy management, combined operating status (normal/warning/error/offline).  
Multiple dashboard modes to suit user habits.



# Why vServer FT ?



- 99.999% uptime, boosts user trust and revenue continuity.
- Simplified maintenance windows, since hardware replacement for one node doesn't require a full shutdown.
- Enhanced disaster recovery with warm standby server
- Predictable SLAs, backed by automated Fault Tolerance.

# Case Study Industries

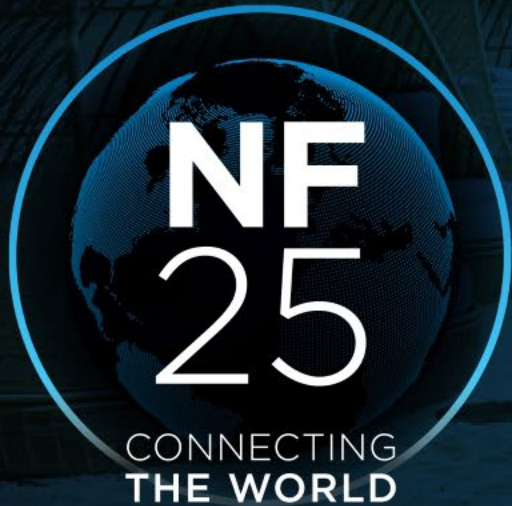


# Automated OSE/TSE Report for Energy Audit and Compliance

Powered by Niagara



# Introduction to OSE/TSE Report



**ROYCEMEDIA**  
Premier IT Solutions Provider

# Introduction to OSE/TSE Report



OSE/TSE report is an Operational/Total System Efficiency Report. It is commonly associated with building cooling systems, that details energy usage and system performance of the building.



The report identify ways to reduce energy cost, improve sustainability, and comply with regulations such as Green Mark Scheme.



The report is used to analyse the efficiency of equipment such as chillers, pumps and cooling tower.

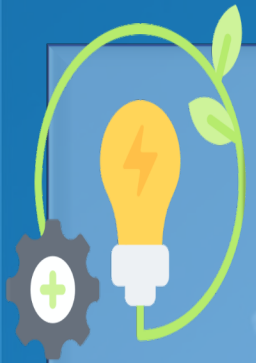


It can also be used for generating energy audit report for HVAC system.

# What is the purpose?



# What is the purpose?



## Assess Energy Efficiency

- It measures the energy performance of a building's cooling systems under normal operating conditions.



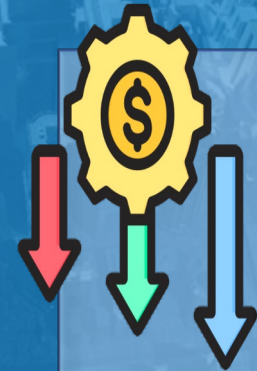
## Identify Areas for Improvement

- Can leverage OSE and Niagara to streamline audit processes. They can deliver more accurate and timely reports to clients, enhancing their service quality and efficiency.



## Ensure Sustainability

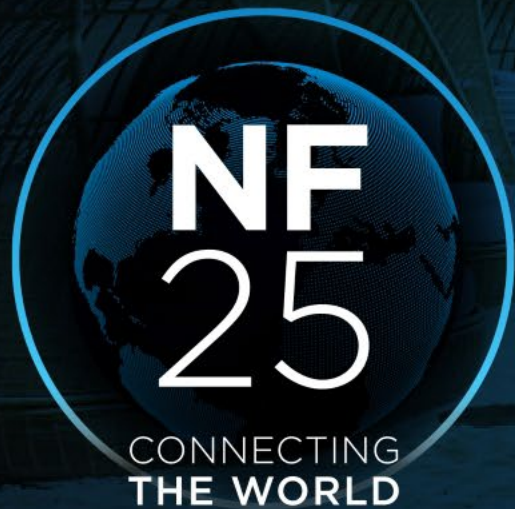
- By optimizing energy usage, OSE reports contribute to a building's overall environmental sustainability.



## Reduce Operating Costs

- Recommendations in the report aim to lower energy expenses through optimized system performance.

# How it works?



# How does it work?

This summarizes the steps involved in the OSE/TSE compliance automation, highlighting key processes.

## Data Collection

Data is gathered from permanent instrumentation system installed on site via Niagara4

## Analysis

The collected data is used to calculate the Operational System Efficiency (OSE) of the building's cooling system.

## Reporting

A detailed report is generated, outlining the system's performance, identifying areas of **inefficiency**, and providing **recommendations** for energy savings and improved operations.

# Automation with Niagara



**ROYCEMEDIA**  
Premier IT Solutions Provider

# Automation with Niagara



**Time & Cost Savings**  
Automation reduces manual reporting effort



**Accuracy & Reliability**  
Data integrity is ensured through Niagara integration.

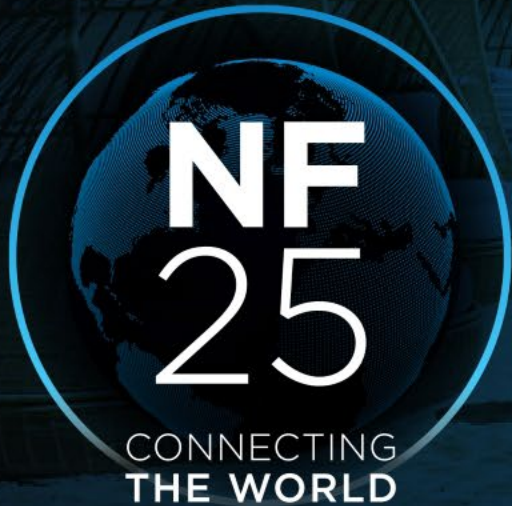


**Sustainability Insights**  
Provides actionable analytics to improve energy performance.



**Future-Ready**  
Built on Niagara, enabling integration with other digital building solutions.

# Report Sample Page



Date :18/02/2019

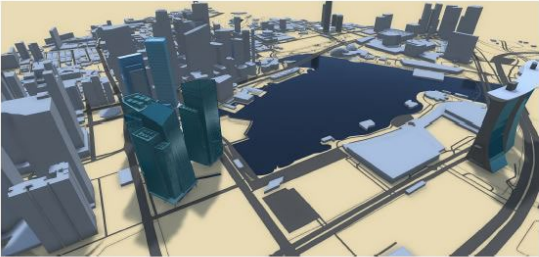
ENERGY AUDIT REPORT FOR BUILDING COOLING

SYSTEM

FOR

BUILDING A

AT



Submitted By

Daniel

PE (Mech) Registration No': 1235.

Energy Auditor Registration No': 91234.

5.1 Summary of Chilled Water Plant Operating Performance

| Daily Average Reading            | Period   |            | Unit   |
|----------------------------------|----------|------------|--------|
|                                  | Day Time | Night Time |        |
| Cooling Load                     | 174      | -          | RT     |
| Cooling Load Density             | 0.00     | -          | m2/RT  |
| Power Consumption                | 110      | -          | kW     |
| CHW Supply Temperature           | 9.54     | -          | deg C  |
| CHW Return Temperature           | 13.55    | -          | deg C  |
| CHW DeltaT                       | 3.58     | -          | deg C  |
| CHW Flow Rate                    | 35.07    | -          | l/s    |
| CHW Flow Rate vs Cooling Load    | 3.82     | -          | GPM/RT |
| CW Heat Rejection                | 211      | -          | RT     |
| CW Supply Temperature            | 27.51    | -          | deg C  |
| CW Return Temperature            | 13.55    | -          | deg C  |
| CW Delta T                       | 2.04     | -          | deg C  |
| CW Flow Rate                     | 65.84    | -          | l/s    |
| CW Flow Rate vs Cooling Load     | 7.71     | -          | GPM/RT |
| Chiller Efficiency               | 0.294    | -          | KW/RT  |
| CHW Efficiency                   | 0.026    | -          | KW/RT  |
| CW Efficiency                    | 0.055    | -          | KW/RT  |
| Cooling Tower Efficiency         | 0.039    | -          | KW/RT  |
| Overall Chiller Plant Efficiency | 0.671    | -          | KW/RT  |

Table 4 : Chiller Water Plant Performance Summary

6.0 Summary of Heat Balance

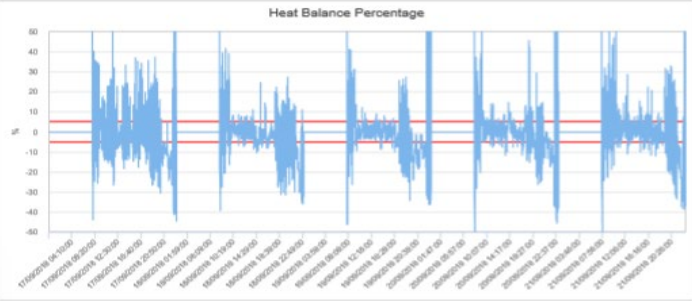


Figure 45 : System Level Heat Balance Plot

|                                     | Quantity | Unit  | Formula               |
|-------------------------------------|----------|-------|-----------------------|
| Sum of Total Electrical Energy Used | 2518     | kWh   | (A)                   |
| Sum of Total Cooling Produced       | 2999     | RTh   | (B)                   |
| Sum of Total Heat Rejected          | 3619     | RTh   | (C)                   |
| Chiller Plant Efficiency            | 0.840    | KW/RT | (A)/(B)               |
| Total Heat Balance Data Count       | 6902     | -     | D                     |
| Data Count > + 5% error             | 903      | -     | E                     |
| Data Count < -5% error              | 1563     | -     | F                     |
| Data Count within ± 5 % error       | 4436     | -     | (G) = (D) - (E) - (F) |
| % Heat Balance within ± 5 % error   | 64.27    | %     | 100 x (G) / (D)       |

Table 5 : Heat Balance Summary

# Report Sample Page

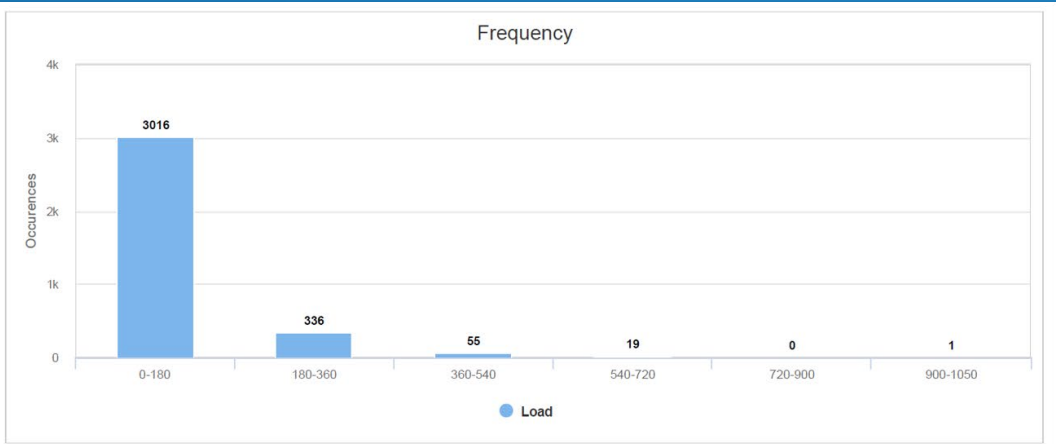


Figure 2: Histogram of Cooling Load Occurrences

## 6.0 Summary of Heat Balance

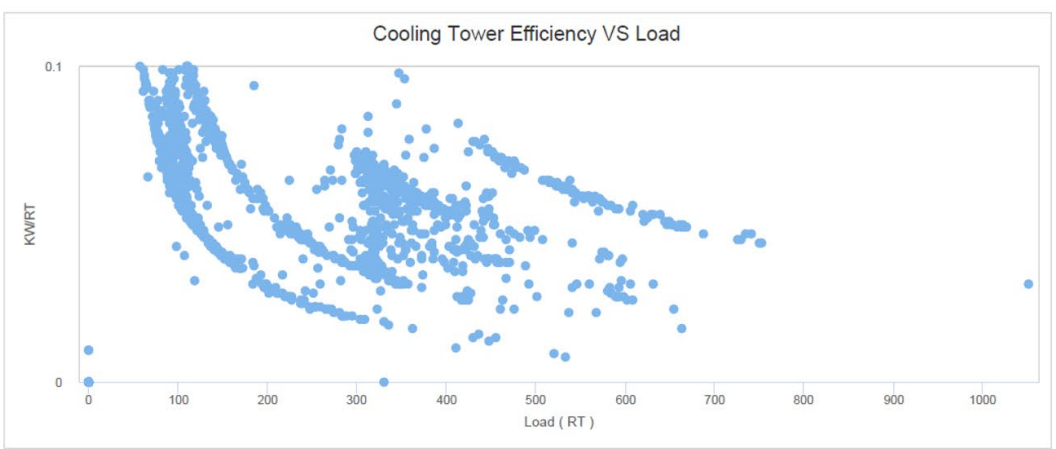
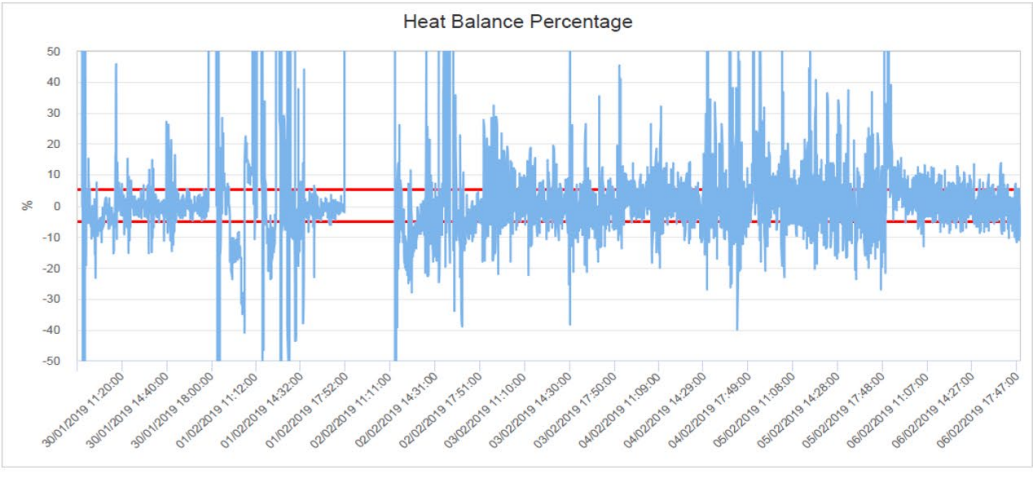


Figure 18 : Scatter Plot of Cooling Tower Efficiency Over Cooling Load

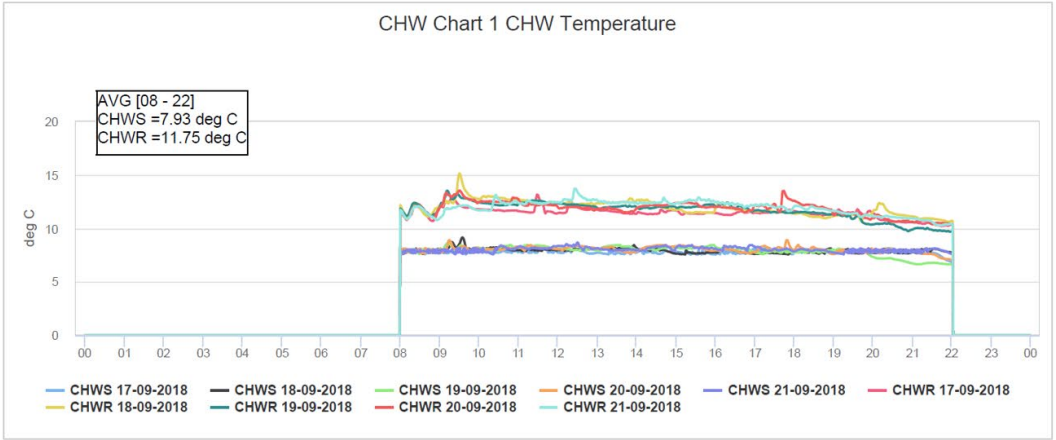
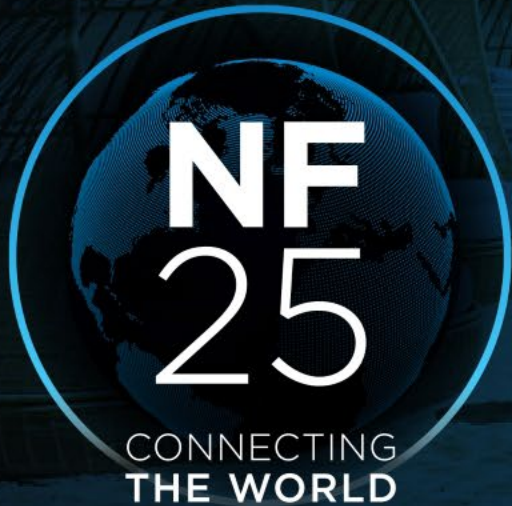


Figure 3: Super-Imposed Plot of Daily CHW Chart 1 Chilled Water Supply/Return Temperature °C

# THANK YOU





## Questions?

Thank you for joining us. We welcome any questions you may have about vServer, OSE powered by Niagara.

For enquiries, please contact [sales@roycemedia.com](mailto:sales@roycemedia.com)