

The image features several 3D-rendered red virus particles of varying sizes scattered across a white background. The particles have a spherical shape with numerous small protrusions on their surface, resembling coronaviruses. They are positioned around the central text, with some appearing larger and more prominent than others.

COVID-19

The Rise of Telehealth in Healthcare

Global Pandemic Leads to Changes in Telehealth Rules

Telehealth has been long touted as a way to deliver medical care to people in underserved areas and to deal more efficiently with issues ranging from minor emergencies to mental health. Yet, the adoption was slow, until now.



“The adoption of telemedicine shifted into hyper-drive over the past month, with virtual healthcare interactions on pace to top 1 billion by year’s end.”

~ Forrester Research

With the virus raging, barriers to telehealth services have quickly come down.

- **Easing of regulations** including use of **consumer-friendly services** like Skype or Zoom, addition of **new provider types**, and U.S. state modifying requirements for **out-of-state physicians** and **preexisting provider-patient relationships**
- Favorable **reimbursement updates** from CMS and private payers
- CMS added **80 additional services** to reimbursement schedule
- **Technology advancements** including upgrades to **broadband infrastructure** in rural America and internet-connected **medical devices**
- Canadian Medical Association is taking similar steps to **remove regulatory and hegemonic professional barriers in Canada**

Beyond COVID-19

Pandemic served as catalyst for rapid adoption of telehealth services

The many benefits of telehealth are expected to drive long-lasting and widespread transformation in healthcare including:

- Increase patient engagement and satisfaction
- Improve patient convenience, efficient post-operation follow-up
- Expand access to care for remote, at-risk, and rural patients
- Leverage limited physician resources
- Reduce costs of care delivery
- Lower hospital readmission rates
- Improve efficiency
- Provide access to specialty care
- Connect medical organizations into one virtual network
- Improve patient outcomes



“I think the genie's out of the bottle on this one. I think it's fair to say that the advent of telehealth has been just completely accelerated, that it's taken this crisis to push us to a new frontier, but there's absolutely no going back.”

~Seema Verma, CMS Administrator



97%

Patients satisfied with their first telehealth experience and would recommend the program

Source: Harvard Business Review



1 million

Americans are using remote cardiac monitors

Source: American Telemedicine Association

Virtual healthcare *Delivery of medical services and access to convenient care through use of digital technology*

Healthcare Use Cases Include:

- Audio/video-conferencing
- eVisits – email / secure messaging
- Electronic scheduling
- Remote patient monitoring
- Store-and-Forward - Image and file uploads
- e-Prescriptions
- Integration with EHR systems
- Mobile health and education via apps
- Analytics and reports
- Billing and online payment





\$2,750

Healthcare providers saved almost \$2,750 per patient when using telehealth instead of in-person physical therapy when discharged after knee-replacement surgery.

Source: Veritas study, conducted by the Duke Clinical Research Group



80%

Emergency virtual visits wind up “resolving the episode of care” without a trip to the emergency department (ED) or another site of care.

Source: Jefferson Health

Since the start of the pandemic, the use of telehealth services has increased by 50% nationwide, according to research by Frost and Sullivan consultants, and virtual interactions could reach nearly 1 billion by the end of this year, according to some analysts.

Telehealth Technology

Principal Components for Telehealth include:

1. **Connectivity (Internet / Broadband)**
2. **Hardware**
 - High Resolution Cameras
 - Microphones
 - Monitors
3. **Software** – cloud, integrated with EHR, etc.
4. **Live Videoconferencing (Synchronous)**
 - Store and Forward (Asynchronous)
 - Remote Patient Monitoring (RPM)
 - Mobile Health (mHealth)
5. **Digital medical devices**
 - Vital Signs Monitors. Otoscopes, Stethoscopes, etc.



Health IT Infrastructure for Digital Connected Solutions

Health IT Infrastructure is struggling to support the volumes of data generated by telehealth, wearables, remote patient monitoring and IoT medical devices

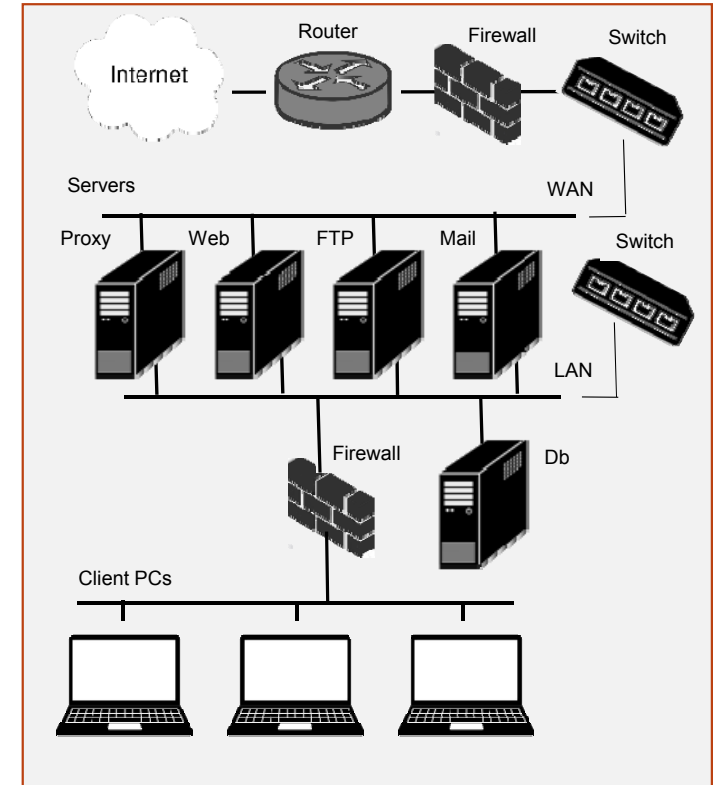
Assess your infrastructure for vulnerabilities to ensure successful implementation of virtual health technology:

1. Build redundancy into your telehealth infrastructure to minimize disruption of patient care

- Ensure dependable internet connection and bandwidth suitable for the data volume and high resolution imaging
- Establish backup power protection for computers and network apparatus
- Consider data sovereignty, data privacy, security and regulations

2. Modernize legacy infrastructure to support next generation of computational, storage and communication capabilities

- Switches, Routers, Gateways
- Storage infrastructure
- Server Infrastructure
- Edge gateways
- Power and cooling infrastructure
- Monitoring and management tools

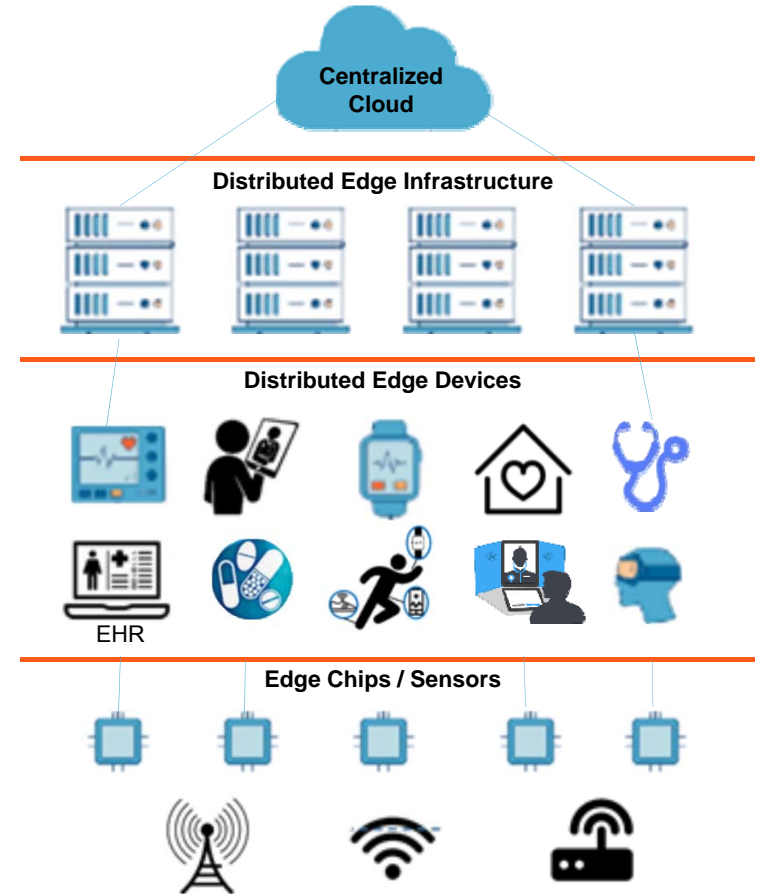


Health IT Infrastructure for Digital Connected Solutions

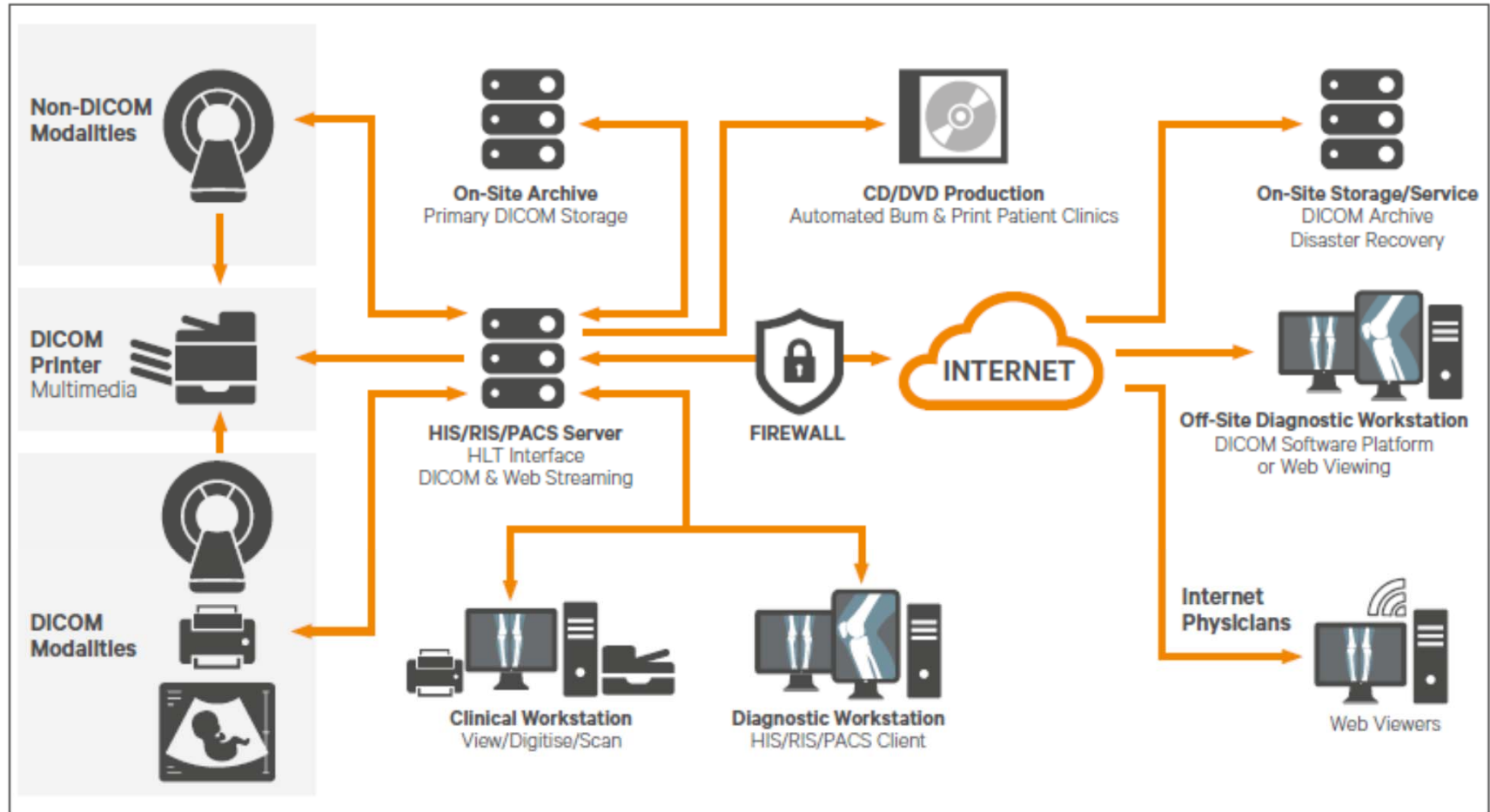
Leverage on-premise edge infrastructure to create resource efficiency for clinicians, increasing productivity and decreasing cost per patient

3. Leverage the power of edge computing to support:

- Growing demand to collect, analyze, and secure healthcare IoT data at scale
- Turn video monitoring into actionable intelligence.
- Process real-time operational action triggers, and reduce IoT data storage and transport requirements
- Heavy data processing and analysis driven by big data or AI
- AI to help clinicians make faster and more informed decisions at the point of care.
- Creating data repositories using AI to help clinicians use more data at a faster rate to give more accurate diagnoses.
- 5G connections making it easier for people in rural communities to benefit from telemedicine, improve image quality and speed, utilize augmented and virtual reality experiences to treat patients



Typical Picture Archiving and Communications System (PACS)



Vertiv Health IT Infrastructure Solutions

Power • Thermal • IT Management • Edge Data Center



Power & IT Management Virtual Health Applications

Access devices in the same building, on campus, at a large site on the other side of the world or distributed across multiple small edge sites.

Desktop and Small Power Protection Solutions



**Vertiv™ Desktop
400-600VA UPS**



**Liebert® PST5™ 350-850VA
Offline UPS**



**Liebert® PSA5™ 500-1500 VA
Line-Interactive UPS**



**Liebert® PSI5™ 750-5,000 VA
Line-Interactive UPS**

IT Management Desktop



**Cybex™ SCM100
Series Secure Desktop Matrix**



**Cybex™ SC800/900 Series
Secure Desktop KVM Switches**

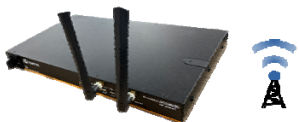


**Vertiv™ Avocent LongView
KVM Extender**



**Vertiv™ Avocent
SwitchView Desktop KVM**

IT Management Enterprise/Control Room/Edge



**Vertiv™ Avocent ACS
Console Server**



**Vertiv™ Avocent MergePoint
Unity Digital KVM Switches**



**Vertiv™ Avocent Matrix High
Performance KVM**



**Vertiv™ Avocent DSView
Remote Management Software**



Confidential. Property of Vertiv.

Vertiv Solutions for Rack & Small IT Infrastructure

Modernize legacy network closet and health IT infrastructure to support next generation of computational, storage and communication capabilities

Power Protection Solutions



Vertiv™ VR
Rack



Liebert® PSI5™
750-5,000 VA Line-
Interactive UPS



Liebert® PSI5™
1500-3000 VA Lithium-
Ion Line-Interactive UPS



Vertiv™ Liebert® GXT5
500-10,000 VA Online
Double Conversion UPS



Liebert® APS
5kVA - 20kVA
Modular UPS



Liebert® ITA2 3PH
10kVA, 208V UPS



Liebert® EXS 3PH
10kVA, 208V UPS

Power Distribution Solutions



Vertiv™
Geist™
SwitchAir®
Airflow
Management
Solution



Vertiv™ Geist™ Basic Rack PDU



Vertiv™ Geist™ Metered Rack PDU



Vertiv™ Geist™ Monitored Rack PDU



Vertiv™ Geist™ Switched Rack PDU



Vertiv™ Geist™
Environmental
Sensors



Vertiv™ Geist™
Universal Power
Distribution Unit

Vertiv Solutions for Health IT Infrastructure

Modernize legacy network closet and health IT infrastructure to support next generation of computational, storage and communication capabilities

Thermal Management Rack / Small Room Solutions



**Vertiv™ Geist™
SwitchAir® Airflow
Management Solution
for Network
Equipment**



**Vertiv™ VRC Rack
Cooling System,
3500 Watts**



**Liebert® Mini-Mate,
Ceiling-Mounted
temperature, humidity
control and air filtration
Cooling System 3.5-28kW**



**Liebert® DataMate
Mission Critical
Cooling System,
5-10.5kW**



**Liebert® CRV In
Row Cooling
System, 19-40kW**

Thermal Management Monitoring & Sensor Solutions



Vertiv™ Environet™ Alert



**Vertiv™ Wireless
Sensor Network**



**Vertiv™ Geist™
Environmental
Monitors**



**Vertiv™ Geist™
Temperature, Humidity,
Dew Point Sensor**



**Liebert® Point Leak Detection
Sensors and Cable**

Confidential. Property of Vertiv.

Vertiv Solutions for Health IT Edge Infrastructure

Server and Storage Racks and Modular Solutions for Telehealth, PACS, HIS, RIS Systems & 5G Applications

Micro and Edge Data Center Solutions



Vertiv™ VR
Rack System



Liebert® Mini
Computer Room
Enclosure



Vertiv™
SmartRow™



In-Row Cooling,
SmartAisle™



Vertiv™
SmartMod™

DC Power Infrastructure for Edge / 5G Deployments



Vertiv™ XTE 801 Series
Network Edge Enclosure



NetSure DC Power
Solutions



NetSure DC Power
System for Wireless
Access



NetSure ITC DC Power
Rack Solutions



NetSure DC Power
Distribution Panel

Who to Target?

Hospitals • Outpatient Care • Retail Healthcare



Who to target?



HOSPITALS

- **Rural and community hospitals** implementing in emergency departments
- **Large hospital systems** including physicians, outpatient facilities, mHealth, post-surgery, chronic care management
- **Healthy hospital list** from Definitive Healthcare
- Hospitals receiving government **funding** from COVID / FCC



OUTPATIENT CARE

- Physicians offices **owned by hospital systems**
- Independent physician offices with **1-2 physicians**
- Physician groups with **100+ physicians** on staff
- Practices include **mental health**, **pediatrics**, and **general practice**
- **Therapy practices** including physical, occupational, and speech language
- **Urgent care clinics** and stand-alone **emergency centers**



RETAIL HEALTHCARE

- **Rural retail health** locations including:
 - Walmart
 - CVS / Target
 - Walgreens
 - Kroger
 - ...

65% of physician practices with a telehealth solution already in place plan to make further investments.

~Definitive Healthcare "2019 Outpatient Telehealth Study"

In Summary

- The crisis has highlighted the **value of virtual health** including telehealth, telemedicine, and remote patient monitoring
- **Adoption rates are skyrocketing** among physicians and consumers -- once in single digits, now 10x what they were as practitioners are quickly scaling up their services to meet demand
- Use **case applications are continuing to expand** across the healthcare environment from mental health providers and physical therapists to small physician offices and large health systems
- **Health IT demands are straining the IT Infrastructure** and creating challenges:
 - IoMT devices are everywhere generating data in near real-time requiring near real-time response
 - Patient records, images and remote procedures and diagnostics have driven an explosion of data
 - Availability, efficiency and scalability are needed to drive down cost and improve patient and provider satisfaction
- **Building a robust IT infrastructure will ensure seamless delivery of virtual health:**
 - Build redundancy into your telehealth infrastructure
 - Modernize legacy infrastructure to support next generation of computational, storage and communication capabilities
 - Leverage the power of **edge computing** to support the capacity, availability, and speed requirements

Questions for Healthcare Providers

- Does the hospital have the bandwidth to support sustained, elevated demand for telehealth services?
- Are the telehealth systems integrated with the EHR and PACS systems? Does your network support the latency requirements for seamless integration?
- Is your telehealth platform on-premise or cloud-based, or a hybrid?
- Do you have a backup power strategy for all telehealth workstations, mobile carts, and network connections to prevent service disruption?
- Is your network able to consistently deliver the quality, speed and availability these services require to play a more significant role in patient care?
- Do you have a strategy in place to support the increased data storage requirements for remote patient monitoring, AI and asynchronous telehealth data?
- Are you compliant with HIPAA privacy and security rules regarding patient information and medical data as your providers switch between systems?
- Is your IT infrastructure scalable to support future facility expansions that require network expansion?
- Are you controlling costs while keeping up with evolving health care standards?
- Do you have the resources and right skillsets to support the increasing infrastructure demands?

