



VoltServer Digital Electricity™ Powers
Convergence Operations

May 2018

VOLT SERVER DIGITAL ELECTRICITY™ (DE) POWERS CONVERGENCE

2018 will be a “moving year” for converged communications, digital transformation, and collapsing building management silos. Useful service and application outcomes will be delivered by orchestrating the actions of several previously disparate real estate building management, IT, and communications service provider systems. Market names emerging include Digital Transformation, Converged Connectivity, and Smart Ceiling/ Building/Campus/City. For this article we will simply call the phenomena “Convergence” and the useful outcomes “Convergence Applications”.

EXAMPLES OF “CONVERGENCE” IN 2018:

LTE/Cellular Densification: LTE coverage (“bars”) and actual data-rates (Mbps & Gbps) will be densified inside millions of buildings worldwide and will not be funded by the major Mobile Network Operators (MNOs). Real estate lease rates, lease durations, and tenancy itself will be determined by cellular quality in work and living spaces. LTE-A, LTE-Unlicensed, CBRS, Gigabit-LTE, 5G, Public Safety LTE and location beacons will enrich cellular experience and reach, while DAS remotes, D-RAN radios, small cells and Wi-Fi Access Points (APs) fight for the right to transmit.

PoE Expansion: Power-over-Ethernet (PoE) solutions will expand from powering and communicating with Wi-Fi Access Points (APs), desk telephones, and security cameras, to now power and communicate with LED light fixtures, motorized blinds/shades, IoT and occupancy sensors, location beacons, LTE and CBRS small cells, HVAC thermostats, ceiling fans, skylight valves, industrial PLCs, and biometric access locks and controls. Consider the example of a hotel. When a guest or conference room is not in use, the system will orchestrate the dimming of lights (less electricity), lowering of window shades (reduced solar loading/heat), and will turn the thermostat 3 degrees to the good (less HVAC/Chiller energy consumed), while logging vacancy (better real estate utilization). And with SFP connected, plenum rated PoE switches; fiber and power can be driven deep into work zones from one central location.

GPON Adoption: GPON (Gigabit Passive Optical Networking) networks will drive multi-wavelength fiber directly into work zones, bypassing IDF closets to deliver fiber data speeds directly to set-top box 4K televisions, videoconferencing systems, interactive kiosks, computers, gigabit speed broadband service routers, facial recognition security cameras, mobile edge computing servers and fast “front-haul” connections to local wireless communication systems in the work zone. And many GPON ONTs are actually PoE switches, which in turn can enable many of the Convergence Applications of Active Ethernet backhauled PoE switches.

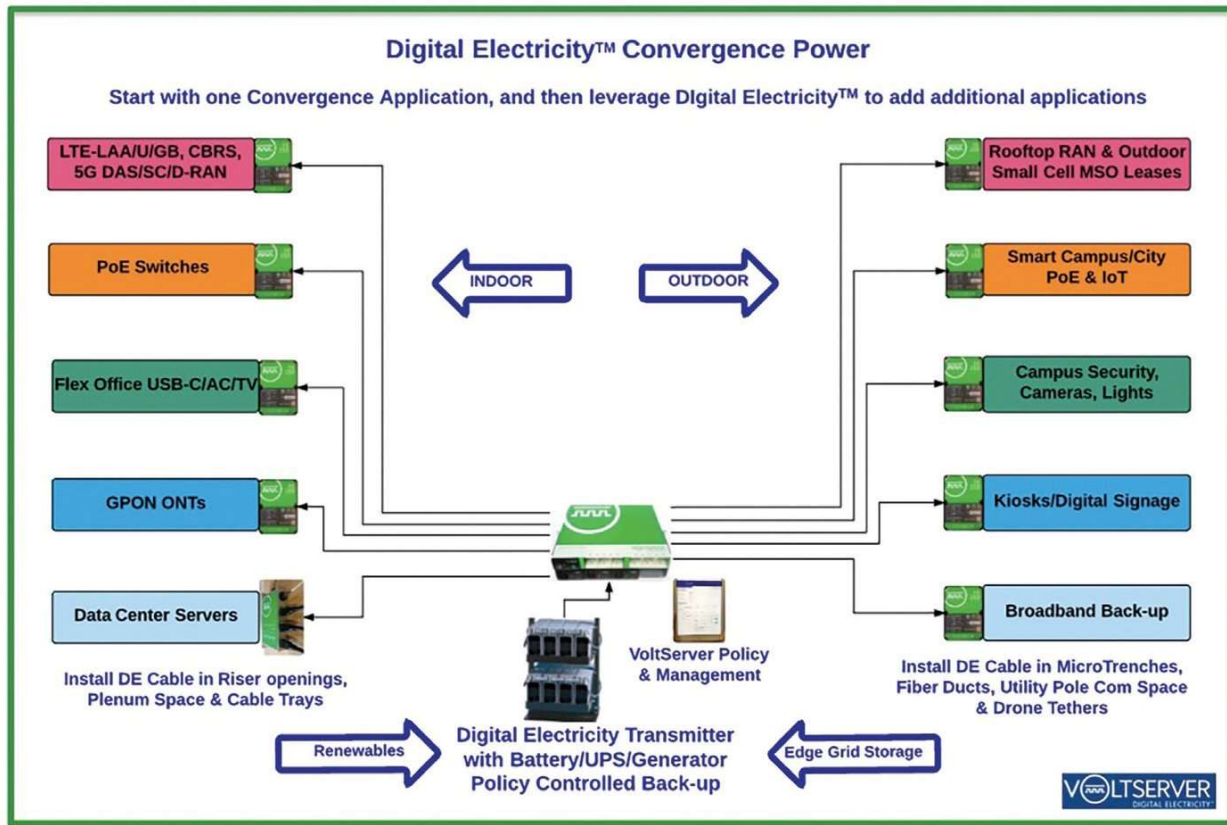
ENTER DIGITAL ELECTRICITY™

OK. So this is supposed to be an article about the benefits of using Digital Electricity™ in Convergence Applications. Every Convergence Application needs data connectivity AND POWER at each device location in the Convergence dance. Yes, we have wall outlets in most building rooms. But when you look higher up on the walls, up to the ceiling, in to the plenum spaces, on the sides and roofs of buildings, across the sidewalks and out in the parking lots: no power outlets.

The challenges include:

- How do we get Convergence Power where/when/how we want and need it?
- How do we get that Convergence Power installed there quickly and inexpensively?
- How do we get back-up or “critical power” to Convergence locations that need power even when main grid AC power is lost (e.g. public safety DAS, emergency lights, 911/999 call bearing LTE DAS remotes, a trader’s desktop)?
- How do we future-proof move/add/change flexibility with Convergence Power inputs as our businesses grows and change, and as new tenants and new technologies come and go?
- Can Convergence Power be green, and easily connected to renewable and more reliable energy sources?

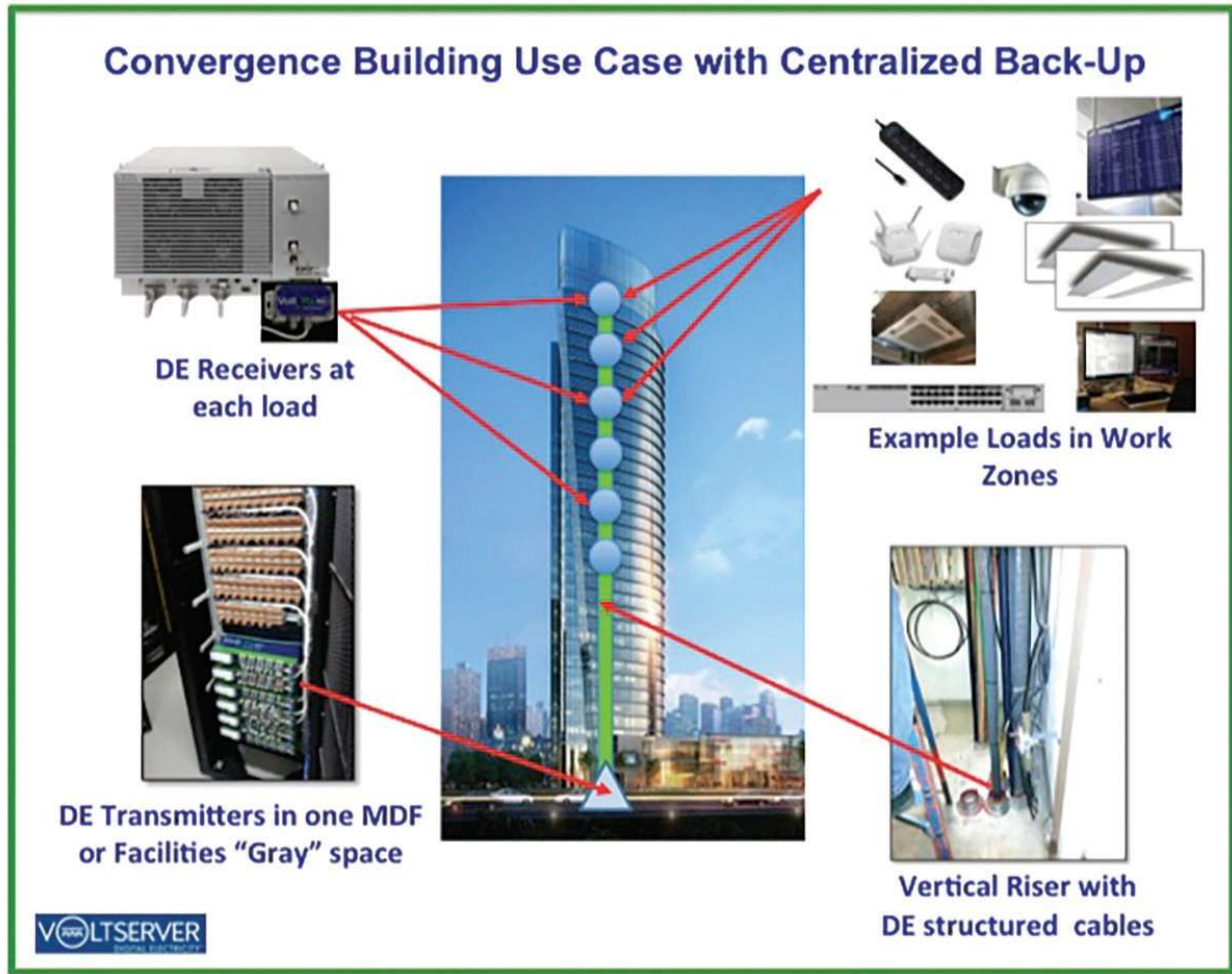
For the rest of this article, let’s call these desired outlets “Convergence Outlets”. These outlets are also known as “Service Outlets” in ANSI and BCSI structured cable parlance, in contrast to a standard 110/208/240VAC wall outlet. VoltServer’s Digital Electricity™ (DE) solution delivers high power Convergence Outlets (hundreds of Watts) from hundreds or thousands of feet away from one centralized power source (up to 6500’/2Km). DE Receiver “outlets” can power DAS remotes, D-RAN radio heads, high power LTE small cells, Power-over-Ethernet (PoE) switches, and multiple limited power 57VDC ports for GPON ONT applications. DE Receivers deliver Convergence Outlets where/when/how you need them. VoltServer’s DE Transmitter is an internationally approved and listed Limited Power Source. DE is delivered using off the shelf structured cabling, unlocking the power to speed and simplify initial installations, move/add/changes (MACs), while significantly reducing total cost of ownership to keep pace in this lightning fast digital age.



VoltServer’s DE is installed in hundreds of marquee venues including airports, convention centers, hotels, hospitals, sports stadiums and arenas, Class A office towers, and condominium buildings in 5 countries. DE is also being employed to power outdoor LTE small cells and RAN radios, converged broadband street furniture. DE is even powering tethered drones and balloons carrying LTE and public safety radios for disaster recovery, public safety, remote coverage, and temporary entertainment events. Volume 1 Issue 2 of Connected Magazine provides a great primer on Digital Electricity starting on page #4. Now we will focus on the application of DE for Converged Applications in connected and converged real estate.

Digital Electricity™ provides a centralized power transmission source in the MDF, “Grey” or “Facilities” space. DE is then projected directly to Convergence loads in each IDF, or directly to loads in each work zone, over structured cabling. When projecting power directly to work zones, IDF real estate can be saved in existing buildings, and preserved for leasable uses in new construction. DE Receivers in the IDF and work zones can power a wide range of Convergence loads. Each DE Receiver can be selected to receive critical power backup from the centralized DE Transmitter, using DE policy software to administer ON/OFF, timer, and priority policies across a network of DE Receivers. You can install DE for one immediate need, like powering a public safety DAS, or powering a PoE switch that in turn powers and controls LED lighting fixtures. Then expand DE to power other important Convergence loads as you go. And if you are not sure what law, local code, or tenant need will require backup critical power, you are future-proofed, as you can add a critical power source at the DE Transmitter location whenever needed

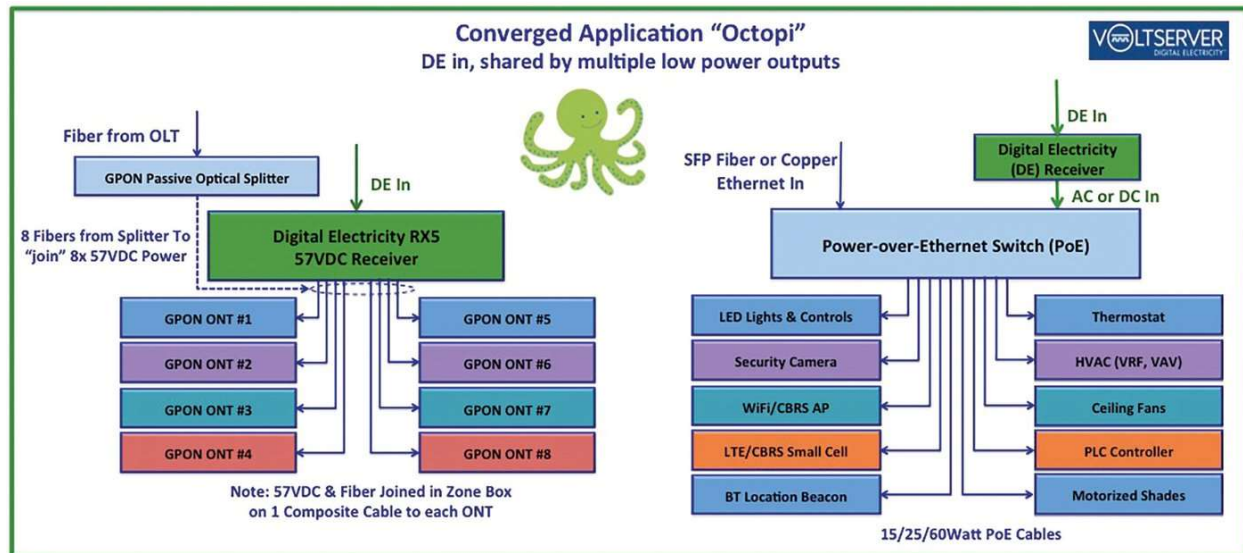
vs. having to install individual UPSs, batteries and conduit runs to AC outlets out in valuable IDF and work spaces when the need to add resiliency calls.



“OCTOPUS” CONVERGENCE OUTLETS:

Finally, let’s take a look at how we can leverage a small number of DE circuits from one central location directly into work zones, with critical power as an option, to now power several local Convergence loads from one or two DE circuits. We cheekily call a device that takes in one DE line, but has multiple Convergence Outlets sharing that one DE line an “Octopus”.

The PoE switch is a wonderful Convergence Octopus. DE comes into one DE Receiver, and in turn powers a PoE switch that has 4 to 24 PoE ports that power a wide range of Convergence loads.



For fast fiber GPON networks, GPON ONTs are essentially PoE switches with high-speed fiber data, and 57VDC power inputs. In a GPON network, VoltServer is delivering a DE Receiver Octopus that takes one or two DE inputs, and outputs 8 ports of Class2 100Watt limited 57VDC power. This allows each GPON zone to be powered remotely and centrally backed-up from one MDF where the GPON OLT resides, and then combine 57VDC fresh in the zone vs. from a distant IDF closet (less electricity used!). The RX5 DE Receiver can also support 24VDC and 12VDC versions for distribution center and industrial floor applications.

2018 will deliver real and valuable Convergence Application outcomes for connected real estate properties and organizations. Getting data and power quickly and flexibly to where it is needed is a requirement. Many Convergence Applications will require or benefit from critical back-up power when the AC grid is unavailable. And future proofing the data and power feeds into Convergence zones to empower expansion and reuse for new and enhanced applications is an imperative. Digital Electricity is providing the power platform as a key ingredient in this Convergence platform. We look forward to a Convergence "moving year", partnering to deliver world-class solutions with the entire Convergence ecosystem.

DIGITAL ELECTRICITY BENEFITS

TOUCH-SAFE POWER WHERE/WHEN/HOW YOU NEED IT

>1000 WATTS AND UP TO 2KM DISTANCES OVER STRUCTURED CABLE

20X POE POWER & DISTANCE - POWER WHOLE 1800W POE SWITCHES

POWER DIRECTLY FROM MDF TO WORK SPACE ZONES FOR "FLEX OFFICE" APPLICATIONS

IEC LIMITED POWER SOURCE (LPS) - DATA CABLE, NO CONDUIT, LOW-COST LABOR

SPEED INSTALLATIONS & SIGNIFICANTLY REDUCE TIME-TO-REVENUE/SERVICE

SLASH INSTALLATIONS COSTS & USE LESS ELECTRICITY

POLICY CONTROL CENTRALIZED BACK-UP/UPS

ALL DC POTENTIAL: REDUCE AC/DC CONVERSIONS