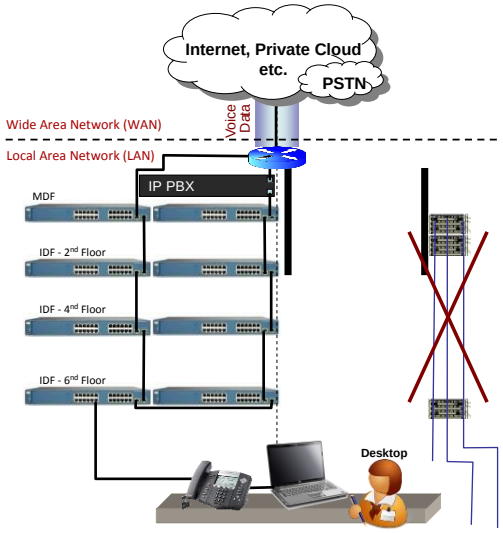
The Right Foundation for Today and Into the Future.

Billions of dollars have been wasted by companies who migrated to IP telephony in the past 10 years due to network technology limitations at the time. You will learn how to avoid such expenditure later in our overview. Making the right topology design decision can greatly reduce the total cost of ownership (TCO) while eliminating risk and disruption.

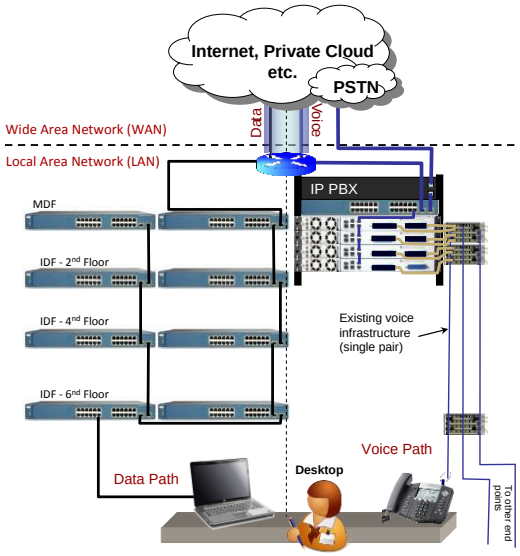
There are three converged LAN topologies to consider:

1. Desk Top Convergence - Daisy Chain: A single switch fabric with the IP phone acting as a switch for the data device connected to it.
2. Central Convergence: A Parallel voice LAN – A separate switch fabric supporting your voice and IP Phone requirements centrally converged.
3. A combination of both.

DESKTOP CONVERGENCE DESIGN



CENTRAL CONVERGENCE DESIGN

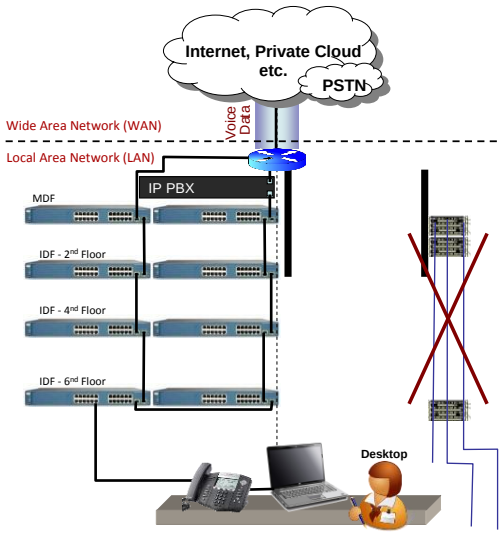


We will review each of the topologies and provide intelligence to ensure you make a sound business decision and avoid some of the mistakes being made by other organizations that are underestimating LAN readiness requirements. We will review quality of service (QoS), voice continuity, financial considerations, disruption, security as well as future proofing your network.

Option One: Desk Top Convergence – "Daisy Chaining":

Data switch reach limitations and wiring requirements limited the options available to businesses when it came to converging voice and data local area networks. These limitations resulted in the methodology of layering voice on the data switch fabric. Typically this methodology requires the customer to consider:

- Network assessments
- Rip and replace of switch infrastructure
- Closet requirements such as power availability, back-up power & cooling. Every IDF closet with PoE switches will require power, cooling and back-up power not only for the switch but for the IP phone devices
- Configuration for convergence before trialing the new voice solution
- Different network topologies across every location



The complexity, disruption and unknowns associated with this topology often leads to higher LAN readiness costs and project delays. Nemertes study of 1,400 companies highlights that 65% of companies under estimated LAN readiness with average cost of $420 per drop. Copy of study enclosed. In addition, Gartner predicts that through 2015 at least 50% of hyper-converged solutions will suffer from a poor network design that will degrade application performance, cause high levels of end-user dissatisfaction and fail to lead to improved employee efficiency. Voice is the most sensitive application and a daisy chain topology will need to be closely managed as new users, applications and devices are added to the network.

Business Considerations

We believe that technology should enable your business; not burden it with complexity and compromise. Often customers are not informed of the business impacts of utilizing one converged LAN topology over another. This may be due to conflict of interest and/or lack of understanding of alternative options. Our objective is to ensure you have knowledge to consider some key business elements before making a final decision.

Quality of Service. We will work with you to ensure proper configuration of you LAN to support QoS. However, given the constant changes, demands and potential human error, no one can guarantee you QoS.

Voice Continuity. Voice will go down if the data LAN fails, given that voice is dependent on the data LAN and sharing the same physical path.

Financial Considerations and Risk: It is difficult to provide not to exceed pricing for LAN readiness due to the many unknowns associated with the environment. Financial considerations include:

- Professional services around planning, configuring, trouble shooting and managing the project. The more complex and greater the variables, the higher the professional services cost both internally and by your provider.
- Power: Every IDF closet will now need to be equipped with enough power, cooling and backup power to support the PoE switches and end points connected to it. The larger the deployment the more complex power management becomes.

- Infrastructure: Having the proper cable infrastructure to support the new requirement can greatly increase costs. In many large established environments cabling costs can be as high as $800 per drop. In addition switch distance limitations may require additional infrastructure to be put in place to support the IP phone.
- PoE switch considerations: Understanding that PoE port utilization may not be maximized given the switches will reside in the IDF closets. The PoE requirements are critical to IP phone uptime so we need to ensure the PoE switches chosen have robust power features such as power sharing, load balancing AC/DC options and hot swappable power supplies.

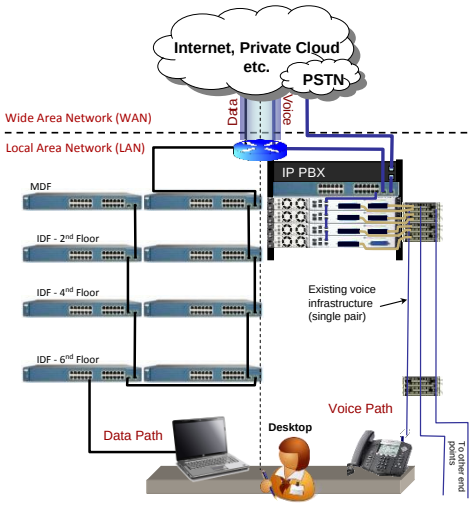
Operational Disruption and Risk. Most often this methodology would require a rip-and-replace of the existing LAN backbone to support convergence. This often leads to the disruption of operations and the potential for the network to go down. In addition, for some industries there are different networks; operational networks and customer networks that need to be provided. This may lead to further complexity and inefficiencies given these requirements.

Security. For many customers, the security of data intelligence is very important. The introduction of voice on the network creates more complexity around managing the network from a security standpoint.

Minimizing Future Costs: This leads us to our very first statement that $Billions will be wasted due to network limitations and lack of foresight. Over the past decade tens of millions of 10/100 IP phones have been deployed on a PoE switch backbone using the daisy chain topology. Data networks are refreshed every 5 to 7 years. Many of these customers are now looking at moving to a Gigabit backbone to support the new data speed requirements. With this topology a perfectly good IP phone and the PoE switches will need to be replaced. In addition, the potential software upgrades required and phone configuration requirements will increase professional services costs in the future.

Option 2: Central Convergence

The very first IP phones only had one data port because the ideal topology was to build a separate LAN for voice. Although proven to be most reliable, it was received with resistance given the costs and disruptions associated with building a separate network. This topology can be achieved one of two ways: If you have a separate CAT5 drop at every end point we can put a traditional PoE switch in the IDF closets. This will still require power management consideration for the IDF closets. The other alternative is to leverage some proven PoE switch innovation designed specifically for this purpose. The Phybridge switches were the first network switch globally to deliver Ethernet and Power over Ethernet over a single pair of telephony grade wire with 4 times the reach of traditional data switches. Customers are leveraging their existing, proven reliable voice infrastructure creating a separate network path for voice communications, complimenting an existing data network with a single point of central convergence, while optimizing their organization's IT infrastructure for voice and data convergence. The Phybridge switches were designed specifically to handle any organization's existing or future real-time voice requirements, delivering a robust platform and ensuring voice quality of service today and into the future. Data Sheet is available.



Quality of Service. Every IP phone has a dedicated physical path. This point-to-point topology ensures packets travel in order, on-time without contention.

Voice Continuity. The LAN topology can be configured to allow for voice continuity; even if the data LAN fails, your voice will survive.

Financial Considerations and Risk: By leveraging an existing proven reliable voice infrastructure it is easier for us to budget the total cost of LAN readiness and provide other financial benefits including:

- The voice infrastructure is identical in every location and by leveraging this existing infrastructure we can reduce the professional services costs around planning, configuring, trouble shooting and managing the project.
- Power: The extended reach of the PoLRE switches allow us to consolidate the PoE requirements of the phones in the existing MDF closets. By doing so we have fewer locations and improve the PoE port utilization of the switches. Often the MDF closets are well equipped to support power, cooling and back up power requirements, so these costs will be greatly reduced. In addition the Phybridge switches have power sharing, load balancing for redundancy and can support either AC or DC power source and include hot swappable power supplies. A robust power management strategy that is greatly simplified.
- Infrastructure: The existing two wire infrastructure is proven reliable and designed for voice with a point-to-point topology. The Phybridge switch innovation allows us to leverage such infrastructure.

One of our clients, Trans Union, migrated 1,400 users on 10 floors in a single weekend, fast tracking the project by 6 months and saving over $1.5 million in LAN readiness costs leveraging the Phybridge switch innovation. Case study attached.

Operational Disruption and Risk. Firstly we can leverage the existing infrastructure and gracefully migrate users on your terms with no disruptions to operations or network. In addition given the flat network design you can pick specific phones that you want to convert to IP and move the wiring pairs in the MDF to a Phybridge backbone and deploy the new IP phone. You can migrate by user, by floor or by building, given the design of your current voice infrastructure. In addition, it is very easy to complete a real world trial so you can see first hand the effectiveness of the solution.

Security. The physical separation of voice combined with the switch capabilities allows you to create the most secure converged topology possible.

Minimizing Future Costs: Every data LAN refresh will no longer require you to buy new IP phone or PoE switches. The only change is the data switch for the higher bandwidth requirement. In addition configuration costs will be much less.

Technology innovation is being introduced to help solve complex problems, remove barriers and reduce costs for businesses. This innovation allows organizations like yours to have a choice on how best to optimize the LAN for voice and data convergence.

Option 3: A combination of Both Desk Top and Central Convergence.

Strategies for considerations where you already have PoE switch infrastructure in place.

1. The PoE switch can support wireless access points for data while creating a standard, centrally converged LAN topology across every building.
2. The other alternative is we use the daisy chain topology in those areas you have PoE and use the Phybridge switch innovation in other buildings or locations.

In closing our objective is to ensure you have the knowledge to make a sound business decision regarding your IP Telephony migration. We are here to support in your success.