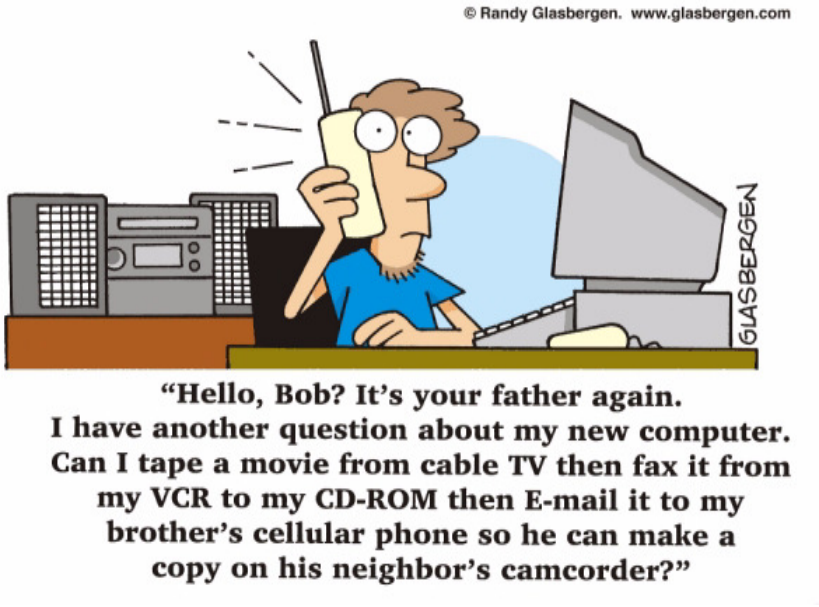
Enjoy broadband as simple as using a telephone

2003 April

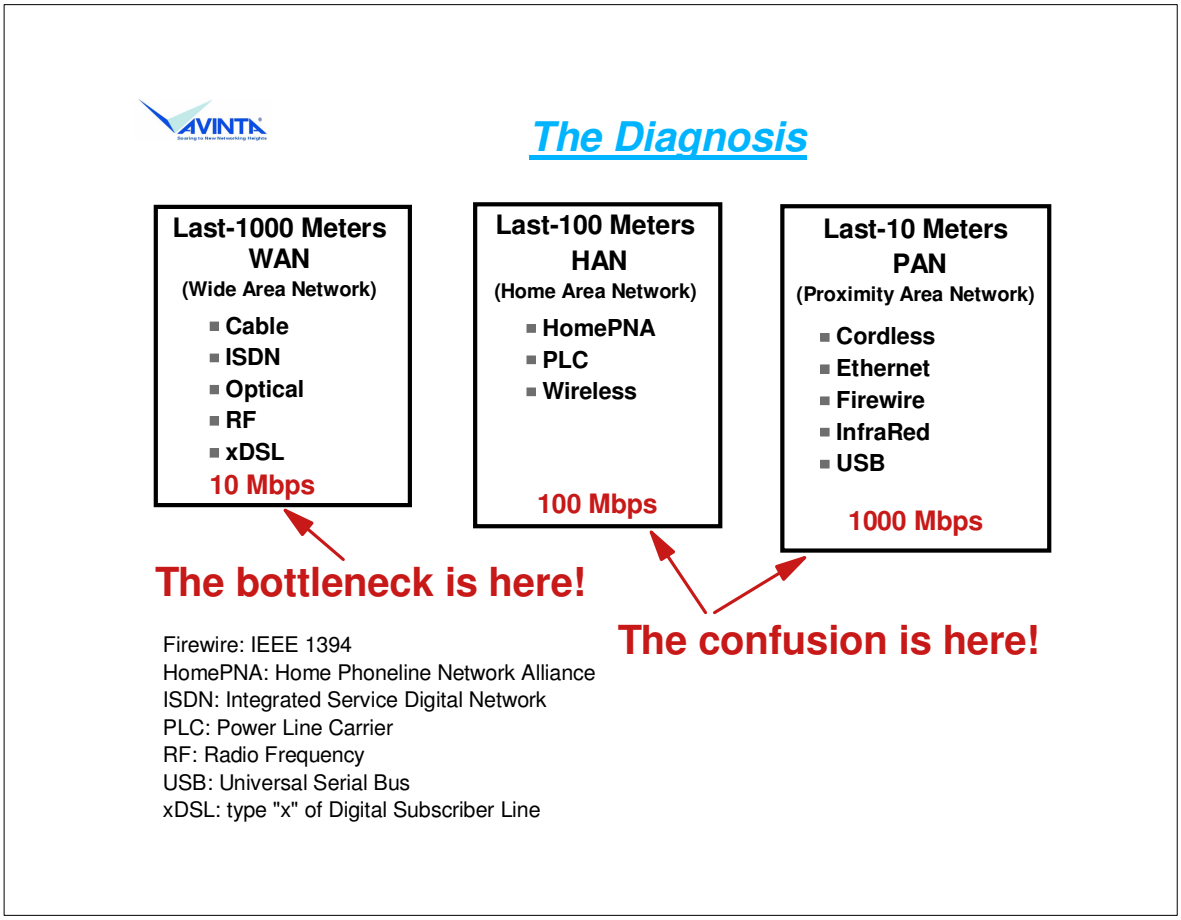
Avinta Communications, Inc.
756 San Aleso Ave., Sunnyvale, CA 94085-1445 U. S. A.
Abraham Y. Chen
TEL: +1 (408) 734-5295 X66 FAX: +1 (408) 734-5296
eMail: AYChen@Avinta.com Website: www.Avinta.com

- One of our PCs at home was probably the best performance Win98 model when we bought it 3 years ago. Recently, a friend recommended my wife to upgrade it to WinXP. The process seemly went smoothly except a few reminding MSGs saying certain peripherals need new drivers.
- By the time she completed the upgrade, besides the main PC seemed to be functioning, **dial-up modem, R/W CD-ROM, home networking, even parallel printer and auto power shut off** had stopped working!
- Except the dial-up modem, we still have not been able to get other subsystems online again. In fact, they all have been declared by WinXP as "legacy" devices. And, no WinXP compatible drivers can be found.
- Luckily, this pricey PC has a conventional power switch that we can turn it on & off. Otherwise, we literally have to pull its plug, everytime we need to shut it down since it will turn itself back on if we shut it down by the soft power switch.
-
- If maintaining a PC's functionality is so difficult, relying on **CTI** (Computer Telephony Integration) to provide day-to-day communications would be even harder.

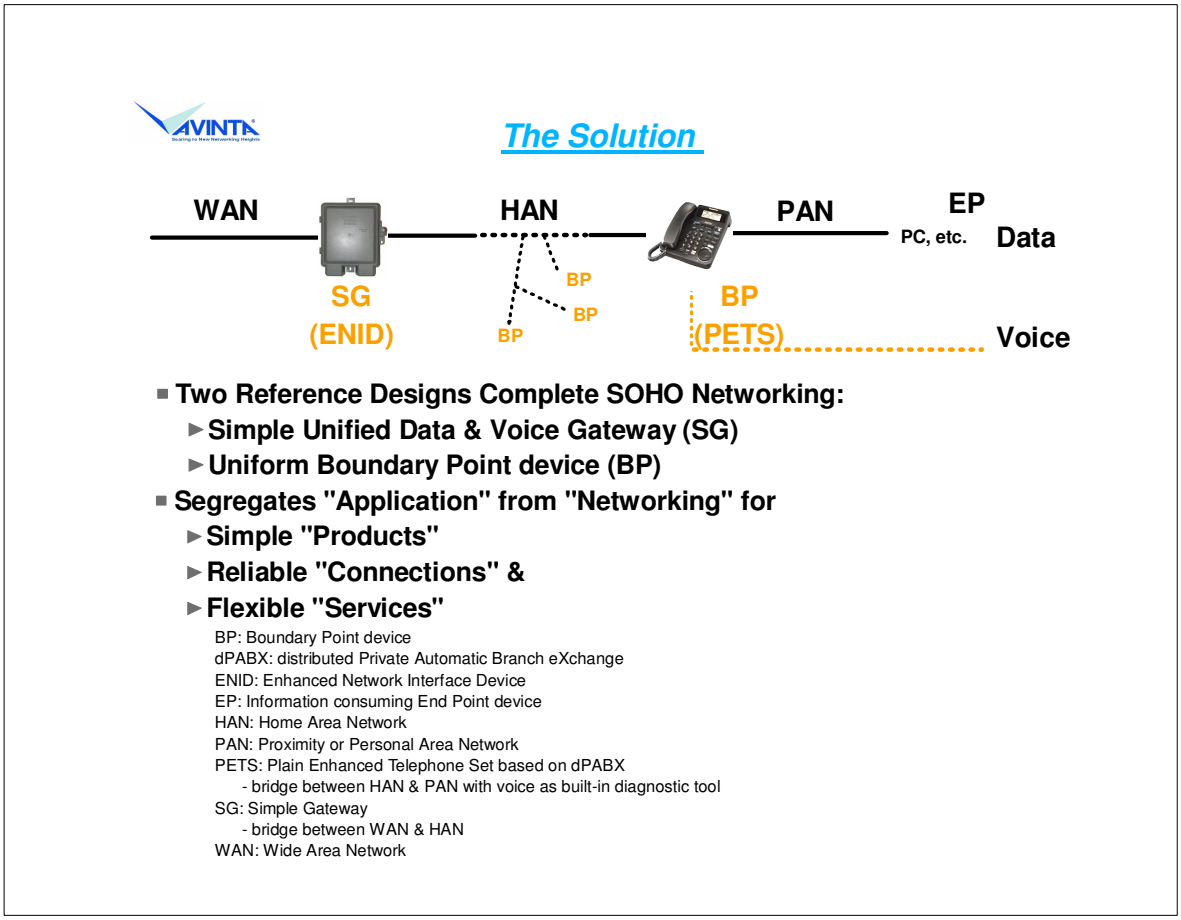
The Problem



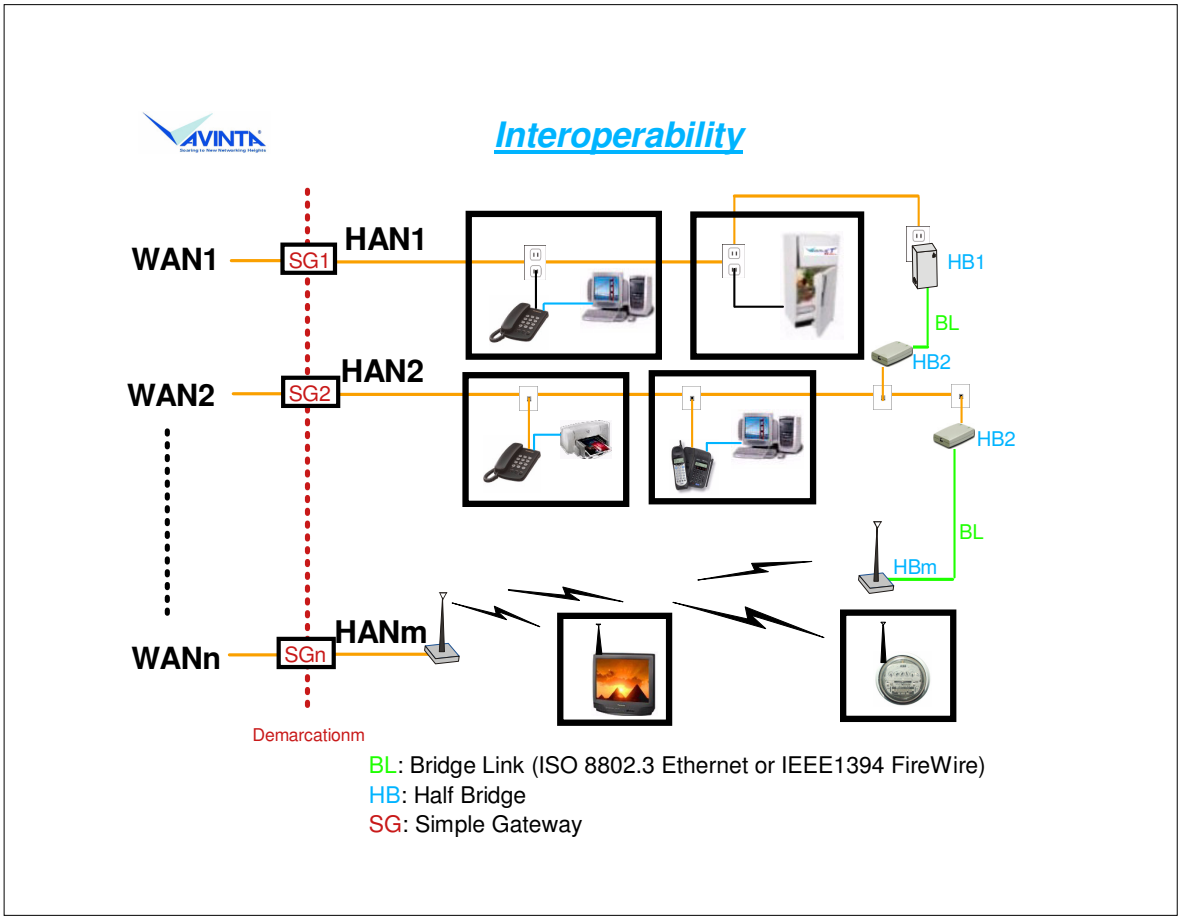
- This 1996 cartoon, (copyright license paid for) showing a person using a telephone to ask for help on data applications, clearly expressed the consumer perception or "blue sky dream" about how broadband should function.
- From the history of FAX protocol advances **(G1, G2, G3 through G4** without any change in PSTN), this level of "transparency" through the traditional telephony system based on narrowband analog technology appeared to be QED (Quite Easily Done).
- So, it is puzzling why the modern digital broadband technology can not deliver the equivalent.
- Right now, **consumers are confused and service providers are frustrated**. (Maybe equipment **vendors thought that they are in control and engineers are having fun.)**
- Last year, Cahner In-stat had an article, "Reasons the Residential Gateway Market Hasn't Taken off.... Yet." It shed some light in this angle.



- Among many SOHO broadband transmission technologies, they can be categorized into 3 groups.
- The common broadband pipes, get fatter as the signal progresses from WAN to HAN and then to PAN, because the distance to be covered gets shorter. That is, **the product of distance and bandwidth is a constant.**
- Consequently, information carried on WAN can not fill the HAN. Similarly, PAN can absorb everything on HAN and still with spare.
- If service or information is extracted or derived from the WAN pipe through Residential Gateway (RG) at the entrance to a premise, HAN will have even less to carry.
- On the other hand, these derived services would require installing additional pipes to reach the final destinations.
- And, IAD demands many more unnecessary subnet IP addresses.
- In addition, these technologies have been stepping over one another by the overlapping promises of marketing slogans.
- So, the current approach to SOHO networking is very confusing, if not illogical. When consumers are confused, they do not purchase.
- If we view these pipes are all variations of Ethernet, **linkink up these three sections concisely** may be the key to solve the problem.

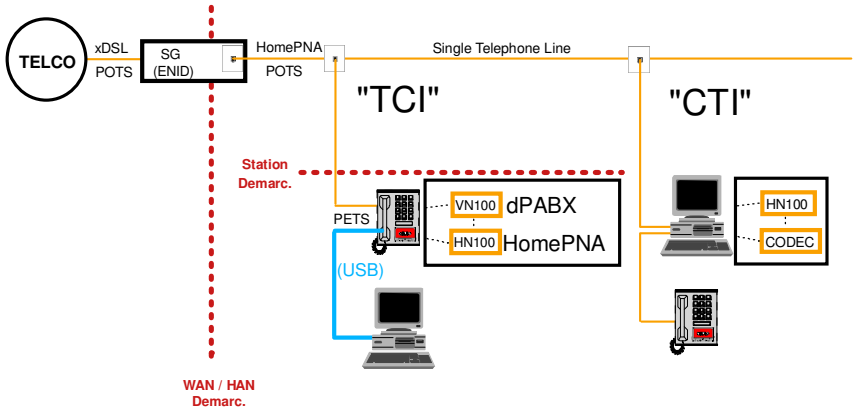


- Based on **dPABX** technology that makes individual telephones on the same line behave as if they are part of a PABX, AvintaNET Architecture identifies two physical devices to interconnect the three groups of transmission "pipes" in the previous slide. These devices are simplify the implement & operation compared to the industry's current approach.
- **SG is a simple router & PETS is a media conversion bridge.** All transmission technologies known today can utilize this architecture.
- Only voice is identified as the inherent application at each PETS. Technically, it is utilized as diagnostic tool. With **Voice First, there is no more QoS** issues.
- A clear broadband channel to every EP is to deliver the "More" part of the system. That is, let the Consumer Electronics (entertainment, PC, data, etc.) continue to be fragmented. Manufacturers can produce whichever single function devices that they believe are in high demand.
- PETS provides a single focal point for broadband SOHO networking with a familiar appearance of POTS.
- With SG to interface WAN & HAN, PETS to interface HAN & PAN as **demarcations, installation, operation, maintenance and even improvements can be independently performed.**
- AvintaNET integrates and coordinates different transmission technologies in an orderly fashion.
- Perhaps the **most significant contribution** of AvintaNET architecture is the segregation of "Application" from "Networking". All of the subsystems closer to the WAN core are to concentrate on providing reliable connection for delivering broadband. End Point devices should focus only on providing services. Thus, they can be as flexible as the consumer wishes.



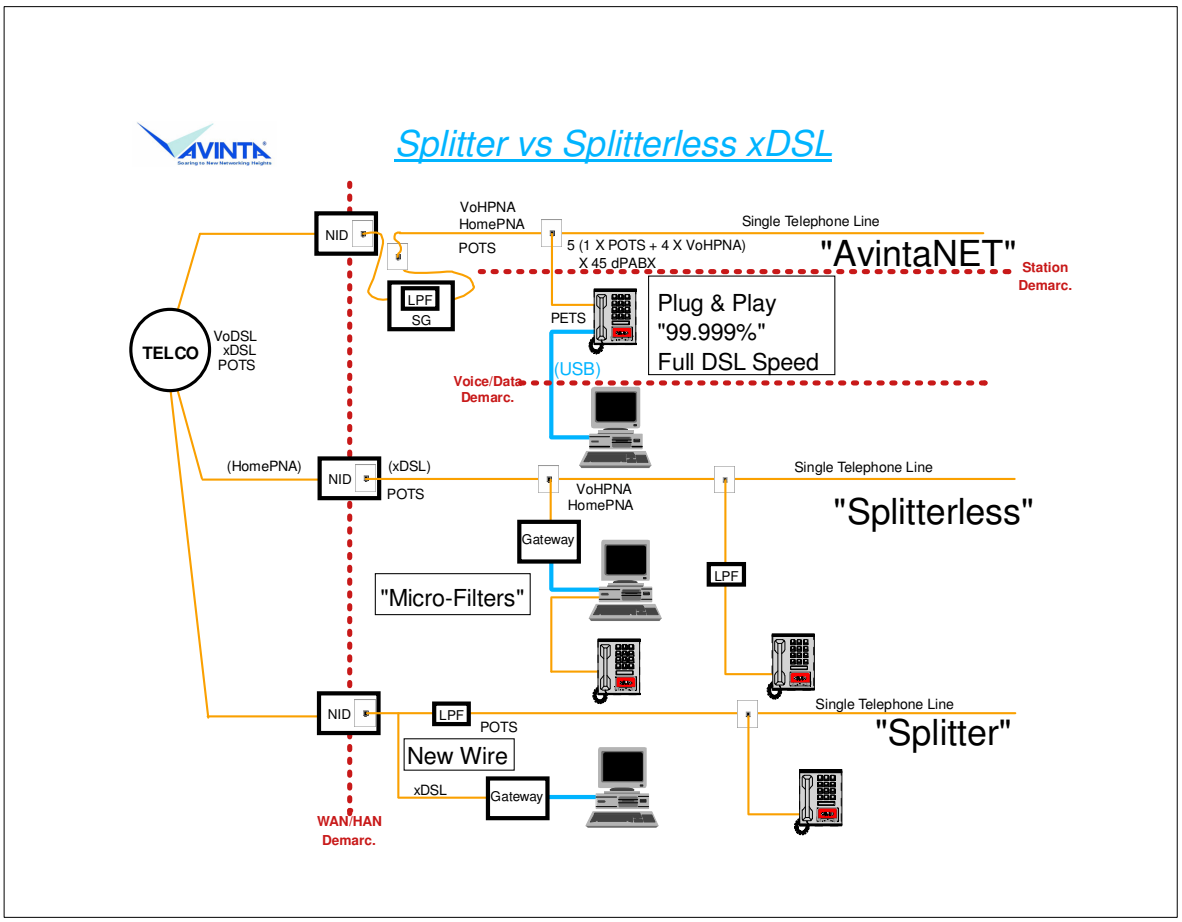
- Each customer premises should start with **a simple structure of one primary HAN** that is connected to WAN through a Simple Gateway.
- HAN segments with other transmission technologies could be added, if and only if the property owner desires so. For such situation, use medium conversion bridges to add special purpose HAN segments.
- The bridges between any pair of HAN technologies should be made of **two half-bridges**. This allows each HAN technology provider to make only one half-bridge to a Bridge Link (BL) of common transmission technology such as Ethernet (already exists in most cases) or FireWire.
- This diagram depicts a HomePNA based HAN2 serving as the primary transmission medium for the premises. Half-bridges are used to link PLC & Wireless segments together via HB1 & HBm, respectively, to form a larger HAN.
- If HAN1 & HANm are connected to WAN1 & WANn via SG1 & SGn, respectively, WAN1 & WANn services would be available to all nodes on HAN1, HAN2, ... HANm.
- If HAN1 ... HANm operate on protocols different from HAN1, protocol conversion software would be implemented in the HBs, making them HGs (Half Gateways).
- There has been at least one company who has tried to implemente a **modular RG with n:m, WAN:HAN** configuration and already **given up**.

"TCI" (AvintaNET) vs. "CTI"

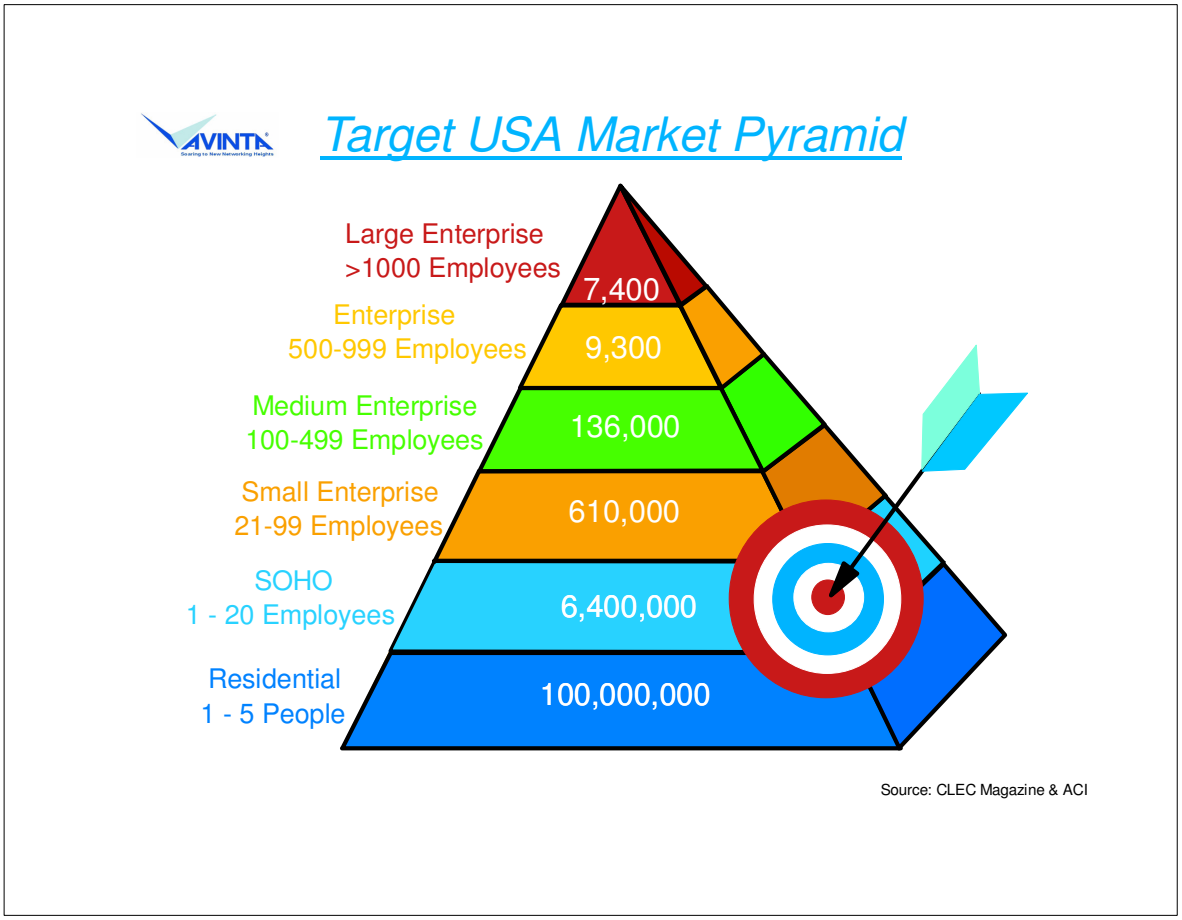


TCI: Telephony Computer Integration
CTI: Computer Telephony Integration

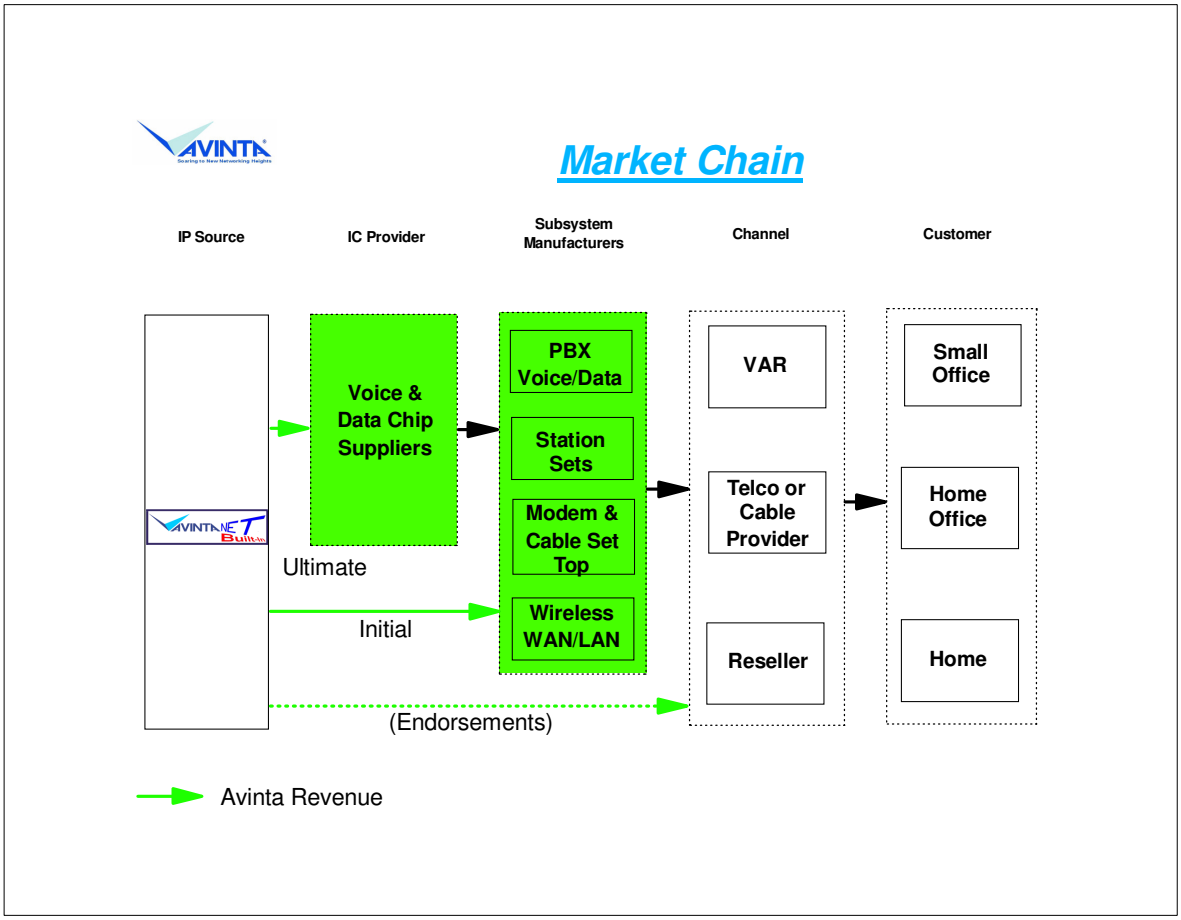
- By compressing CTI equipment to provide voice only, PETS emerges.
-
- For data application, plug in PC etc. behind PETS. This completes TCI.
-
- Most of data equipment abnormalities such as PC related "blue screens" can be isolated from voice communication.



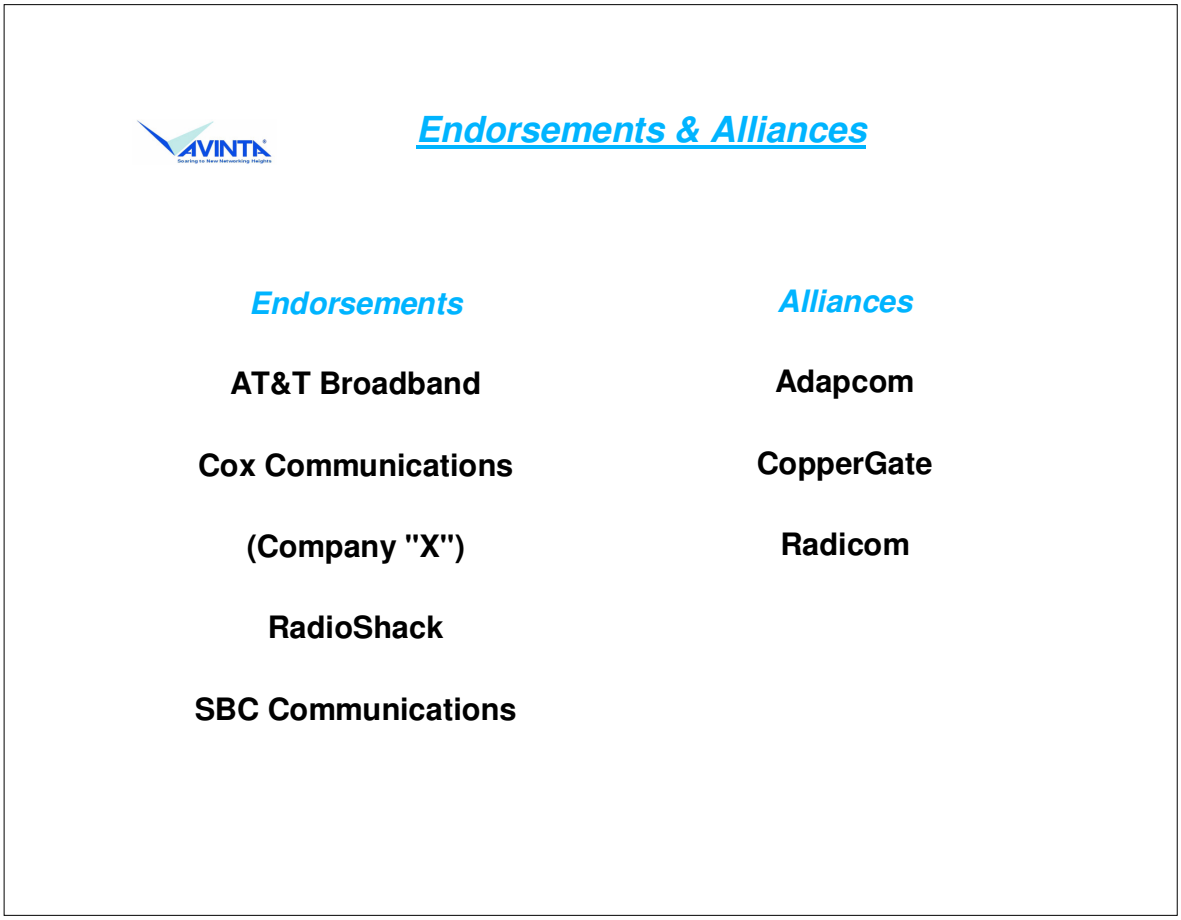
- SG is a simple media converting router at the NID. Built as a stand-alone external module connected in series with the phone line, opens up retail business possibilities.
-
- ENID consists of SG inside of NID.
-
- PETS is designed for voice communication only, all data streams are passed along to USB port unaltered. PETS can be quite simple and less prone to hiccups.
-
- The dependence on PC (even the self-install products) can not avoid the unpredictable behaviors related to PC.
-
- Also, the Micro-Filter due to xDSL signals flowing around customer premise is a RFI phenomenon that should be stopped at the source.
-
- Two magazines have given up "CTI" term:
  - "CTI" changed to "Communications Solutions"
  - "Computer Telephony" changed to "Communications Convergence"



- AvintaNET system architecture is based on Residential environment constraints.
-
- Initial product would be more suitable for SOHO because of the price point.
-
- As the basic functionalities (very few) become mature, mass production will allow AvintaNET products to enter Residential market without redesign.
-
- As the transmission technologies improve to offer more channels, AvintaNET can naturally expand to serve the Small Enterprise segment. (Or beyond?)
-
- Traditional "star" wiring with professional support will continue to offer better performance.

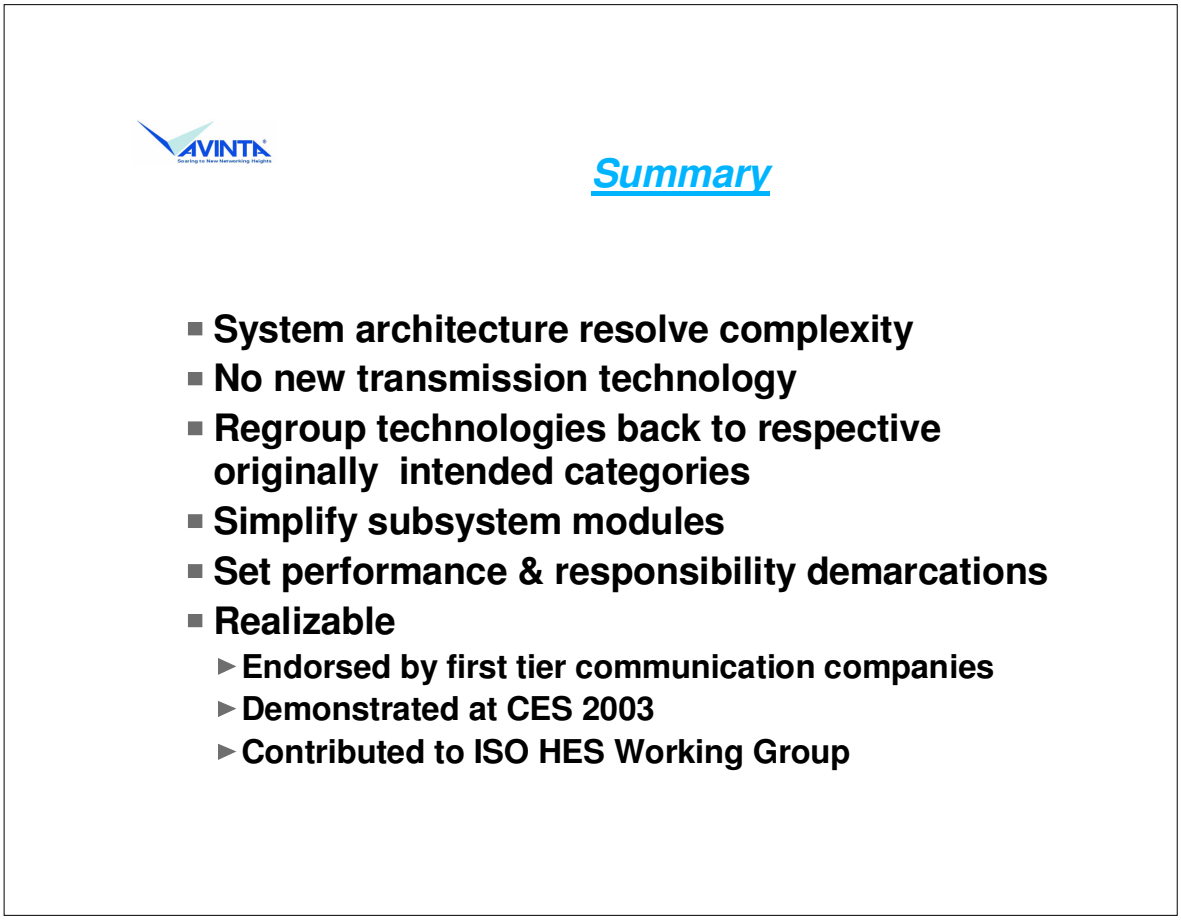


- Because the wide range of applications of our IP, the ideal path for IP licensing is through IC Provider.
-
- However, IC houses design new IC only after product functionalities are finalized by actual mass consumer usage.
-
- Since AvintaNET can be realized by simplifying existing H/W, F/W & S/W, the immediate starting point for marketing should be Subsystem Manufacturers.
-
- Since AvintaNET reduces the complexity of products, it may be viewed by manufacturers as less business revenue.
-
- The solution is to market initially through broadband Channel (the Carriers), because they need proper products for their subscribers to enjoy the broadband information stream.
-
- The mass producible identical design, allows PETS to be on retail store shelves at the same time, to shift the distribution burden off Carriers. (Like the POTS distribution channel shift in the late '70s through early '90s).



-
-
-
- This logic has been accepted by first tier communication carriers and distributors. They have indicated that they would like AvintaNET products be available to them.
-
- This significantly reduces the risk of a business based on AvintaNET system architecture.
-
-
- Adapcom is a Mini-DSLAM provider
- Strong synergy is growing between CopperGate and Avinta, because AvintaNET architecture would simplify HomePNA 3.0 demonstration and limit the efforts required to complete a reference design for others to follow.
- Radicom provides traditional analog POTS modems as well as ADSL modems.

-
-
-
-
-
- These companies are known in the field of their specialties.
-
- If Avinta markets products in the same filed, they will be our competitors.
-
- On the other hand they will be our licensees, if we offer IP to them.



-
-
-
-
- 100+Mbps HomePNA available in 2003 making HAN criteria (random wiring & capable of video) realistic
-
- Overall improved reliability and lowered cost both in capital and operating expenses