A NEW GENERATION SYSTEM ARCHITECTURE FOR INTELLIGENCE SYSTEMS, TAKING ADVANTAGE OF MOORE'S LAW

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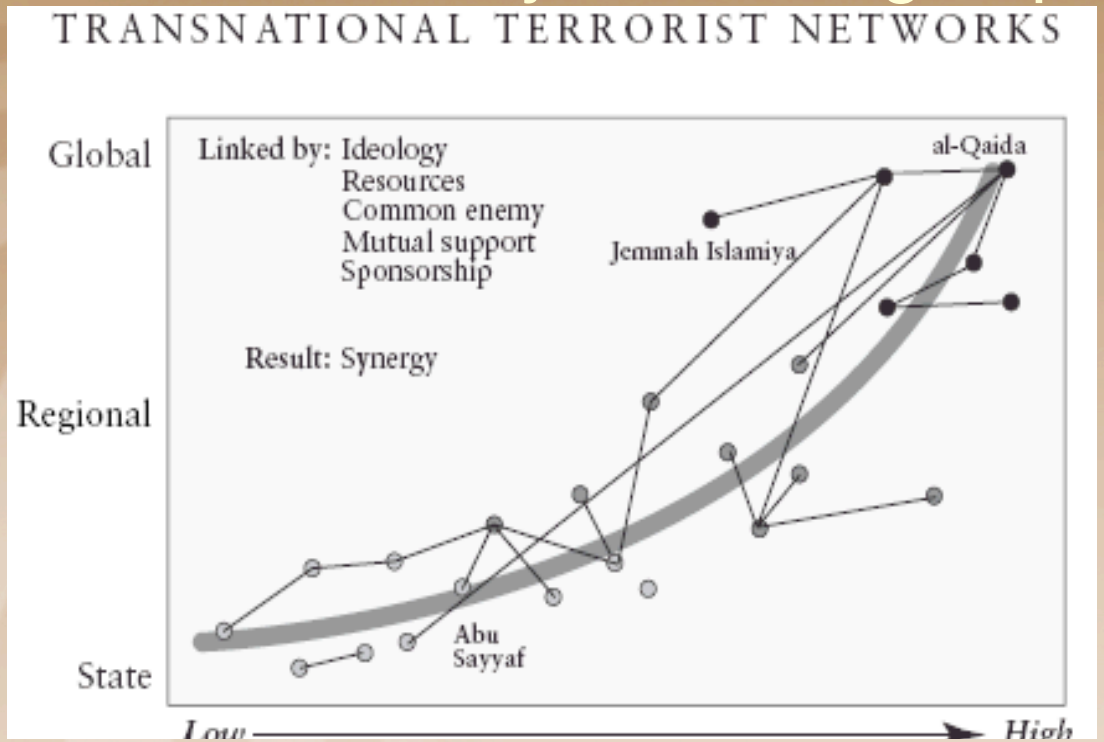
Content

- A changing world…
- Current solutions, measured against decision criteria
- The ideal solution, and the new architecture
- Summary and conclusion

A changing world

- Terrorism threat:
  - Flexible, transnational network structure
  - Enabled by modern technology
  - Interconnectivity between groups



A changing world …

- Communication
  - Any place, any time, through various means
  - 70% of communications by 2009 through wireless and broadband (Gartner)
  - Dual mode Wifi/mobile phones; dual mode satellite/mobile phones
  - Skype, VoIP and encryption
  - Instant messaging
  - UMTS, UMB, OFDM
- Tomorrow shall be different, yet again!

A changing world…

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- Moore's law – double every 18 – 24 months
- Storage
  - 1956: 5 MByte disk storage at USD10'000 (IBM)
  - Q1 2007: 1 TByte on 5 platter HDD (Hitachi)
  - Less than USD1 per GByte
  - 21 TB (raw) in 4U 19" (soon 31.5 TB) available
- Processing power
  - 1997: 500 nm technology
  - 2007: 45 nm technology (Intel)
  - Nanotechnology 30 nm
  - Quad Core 1.8 GHz CPU, 2 x 4 MB cache commercially available

Changes around us

- "Everything that can be invented has been invented." — *Charles H. Duell, Commissioner, U.S. Office of Patents, 1899.*
- "This '*telephone*' has too many shortcomings to be seriously considered as a means of communication." — *Western Union internal memo, 1876*
- "I see no progress in this industry. These clocks are no faster than the ones they made a hundred years ago." — ***Henry Ford**, while visiting a museum.*
- "There is no reason anyone would want a computer in their home." — *Ken Olson, president/founder of Digital Equipment Corp., 1977*

Current solutions

- Most often dedicated hardware
  - Recorders and dedicated DSP cards
  - Switch matrices
  - DCME's (in case of satellite interception)
  - Fax and data demodulation units
- Often stated as latest technology (but only latest chips in an old architecture)
- Result
  - Strongly vendor dependant
  - Difficult/expensive to support
  - Difficult to adapt/expand

  => Not suitable for tomorrow…

Investment/decision criteria

- Intelligence
  - Will the system provide us with unique intelligence required cost-effectively?
- Investment protection
  - Will our investment be protected in a world of changing technological, threat and communications environments – can it adapt?
- Support
  - Will we be able to support the system in the long run cost effectively?

Conclusion

- Did not know yesterday what we know today
- In 10 year's time things will be vastly different again
- Existing solutions are not suitable
- New architecture must:
  - Address investment criteria
    - Unique intelligence value
    - Adaptable to changing threat and communication environments
    - Supportable
  - Use benefits of Moore's law to be relevant for the next 10-15 years

The ideal solution

Changing communications environment
(Satellite, landline, mobile; circuit and packet switched; different protocols)

↓

Suitable active/passive gateways
(E1/T1, E3/DS3, STM-1/-4, IP)

↓

Off-the-shelf Processing and Storage
(Networked architecture; distributed implementation; content capturing - records and stores everything; content enrichment – speech analysis, etc)

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Integration API

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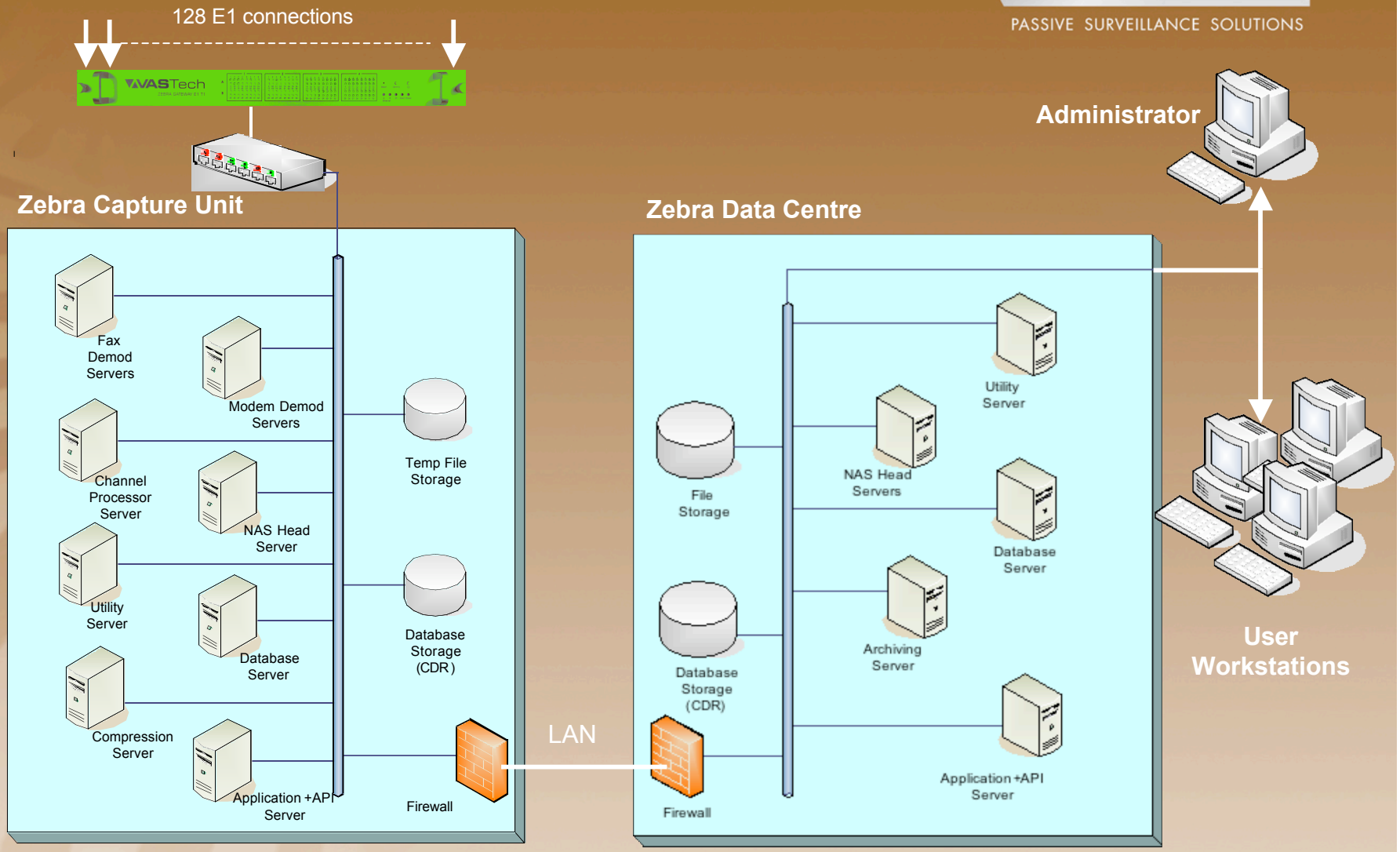
Industry leading applications
(Intelligence mining, extraction)

Zebra Architecture



Zebra Architecture

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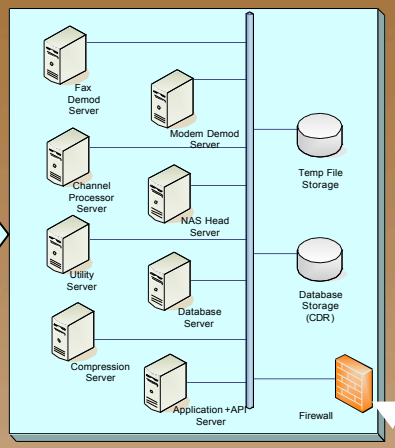
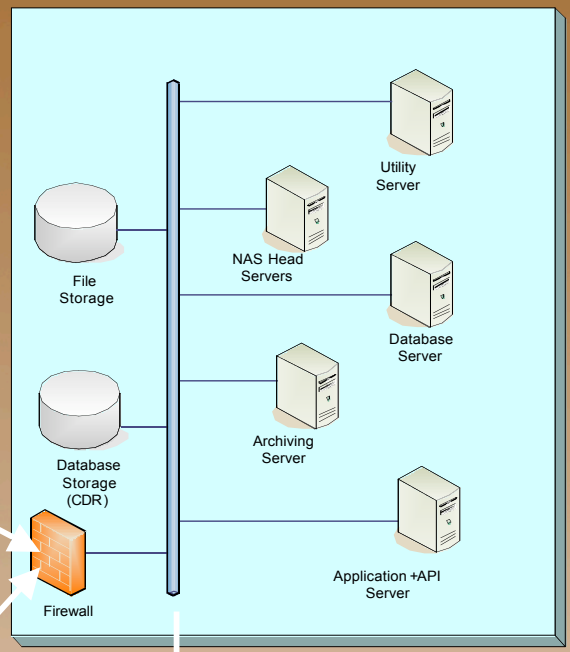
Remote Capture Unit 1



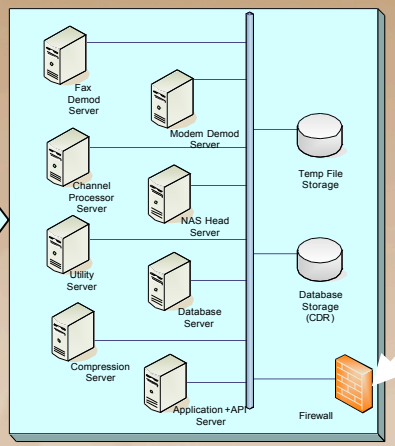
Master Data Centre

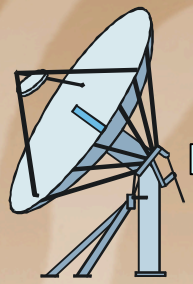


Switching Centres

Zebra Gateway

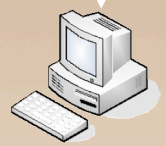
Remote Capture Unit 2



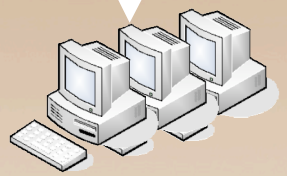


Satellite Systems

Zebra Gateway



Administrator



User Workstations

New Generation

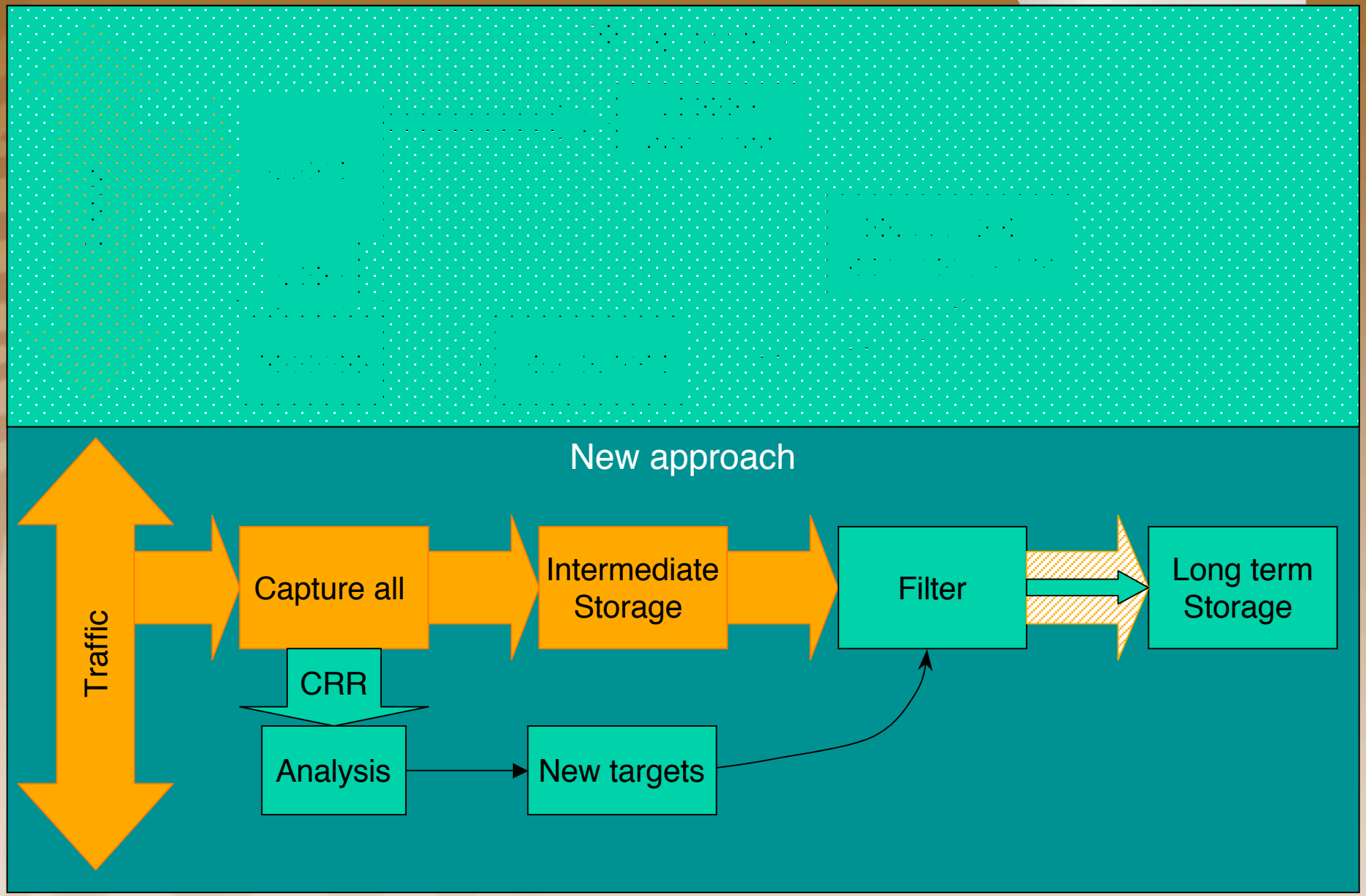
24 U

12,000 Ch

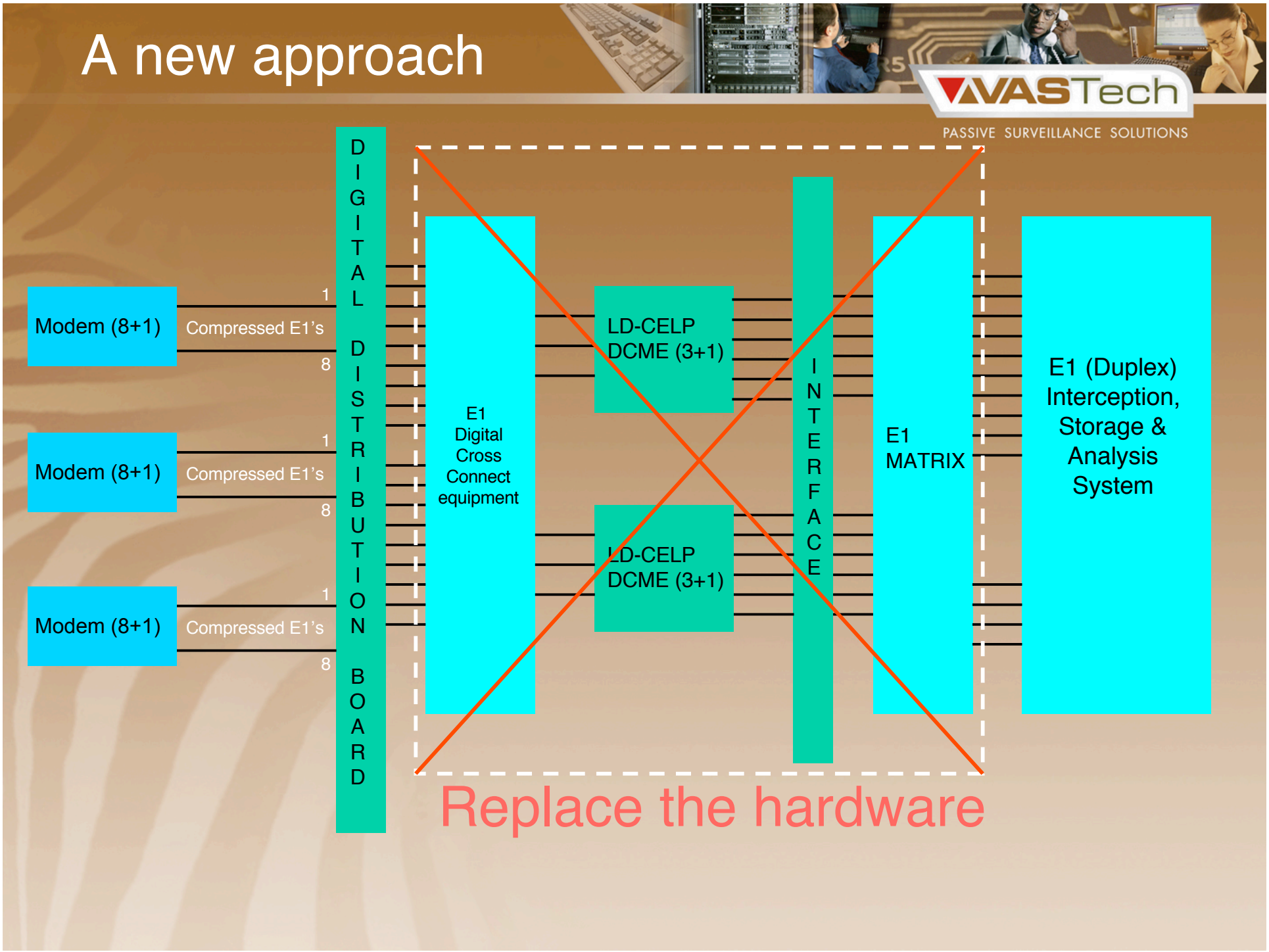
Key Characteristics

- Record all and filter – no switch used
  - Store everything, filter for known targets, search the past content for new targets
- Equally suited for TDM and IP networks
- Software-centric with Gateway and COTS hardware
- Extremely high density and high capacity
  - 512 stereo E1s (1024 E1 inputs) per 42 U 19” rack
  - 300,000 bi-directional channels
- Scalable and distributable
- 3rd generation architecture with future growth path
  - Flexible to address changing threat and telecommunications environments
- Designed for integration with other leaders
  - API and open database
- CIC mapping

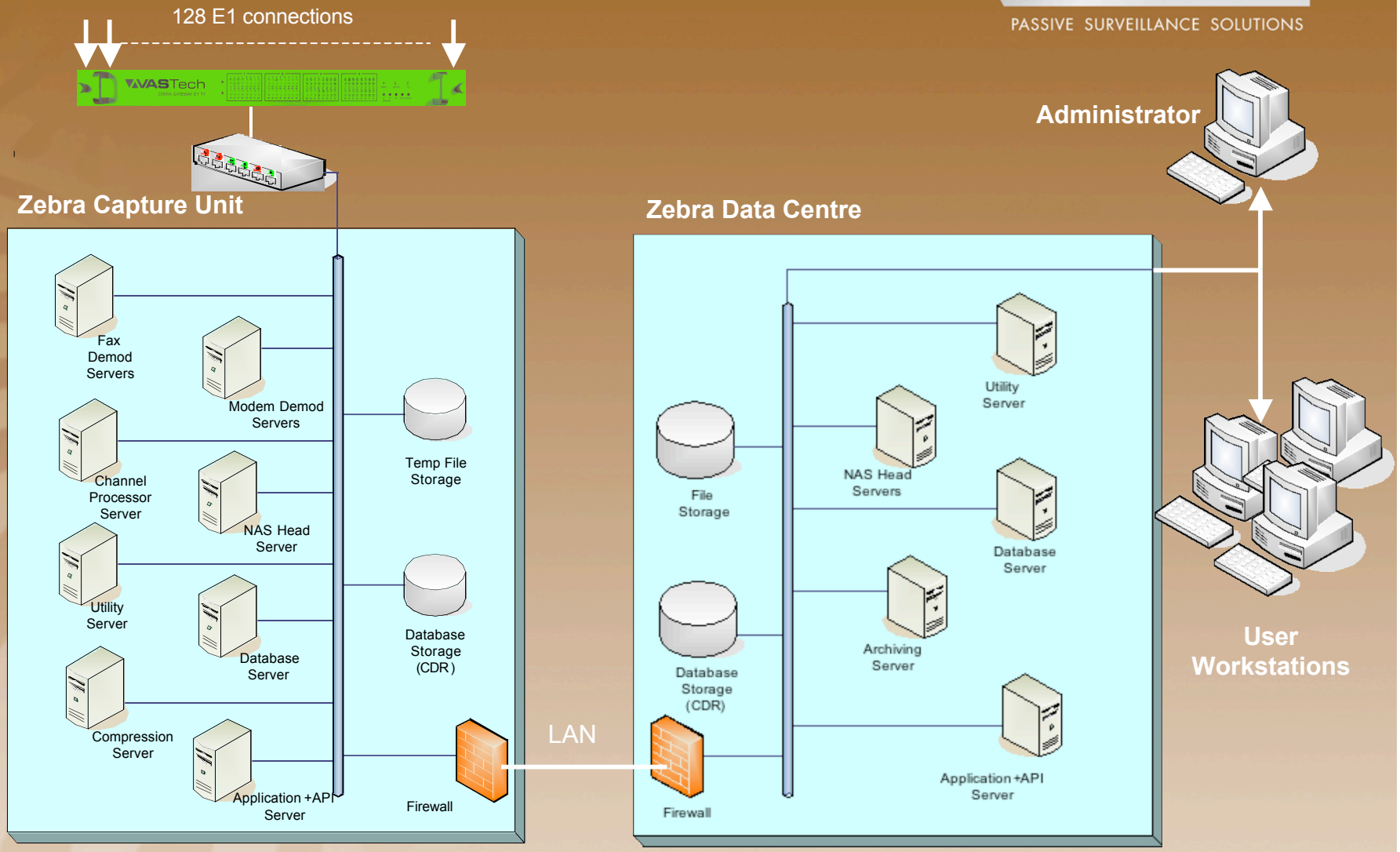
Record all and filter



A new approach



Zebra Architecture



Acquisition criteria

Flexibility

- Record ALL and filter
- Analysis after the fact
- Density and scalable
- Proven
- Linux and Windows

- Intelligence value
- Protection of investment
- Supportability

- IP and TDM networks
- Open API and analytical tools
- Modern third-generation architecture
- Software-centric
- COTS hardware

What have we shown you today?

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- New technology and architecture that should be good for the next 10-15 years
- Ultra-high capacity capturing and storage system
- Software centric and small footprint
- Easy integration with post processing applications

Questions?

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- http://www.littletechshoppe.com/ns1625/winchest.html
- http://www.research.ibm.com/journal/sj/422/grochowski.html until 2002....
- National Strategy for Combating Terrorism