Massachusetts Electronic Business Transaction Working Group

Report On:

Internet Transmission Protocols

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Special thanks are also extended to Mr. James Buccigross for participating in the MAEBT Technical Sub-Group discussions and utilizing his expertise to validate the Sub-Group's findings. Mr. Buccigross serves as the Vice President of Energy Practice, Group 8760 and as Chairman of the North American Energy Standards Board.

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1.0 Executive Summary

Electronic Data Interchange

Electronic Data Interchange (EDI) has become a core Local Distribution Company (LDC) mode of business operations. EDI is the operational cornerstone of the automated supply chain management, finance, and human resource systems; now it has moved into the Customer Choice arena.

Since restructuring, business transactions require the ability for multiple corporate entities to have access to billing, accounts receivable, supplier enrollment, and usage transactions. Within the New England energy market, these entities have cooperated in developing a set of Electronic Business Transactions (EBT) standards for handling these "shared" transactions and processes.

Each of these energy business transactions must work within a rapid, highly reliable, and secure network so Local Distribution Companies have depended upon EDI providers – commercial Value Added Networks, known as VANs – to do so.

VANs have provided Local Distribution Companies (LDC) and other market participants with a stable and robust enabler for EBT and EDI. VAN benefits include, among other things: guaranteed delivery, interactive administration, functionality between participants and systems, and extensive reporting capabilities. One drawback presented by the traditional VAN model is the cost related to each transaction.

Using the Internet

For the Massachusetts Electronic Business Transaction (MAEBT) Working Group, the safe, reliable and cost-effective transmission of data over the Internet, compared to the traditional VAN, has been a key topic of discussion. While there are costs related to developing and administrating necessary systems, the Internet provides transmission capabilities in which there are no message-based fees. This is especially attractive from a cost perspective; however, the examination of such a tool must focus upon security, performance and reliability.

The Massachusetts Department of Telecommunications and Energy has also considered these issues, demonstrated by their July 29, 2002 issuance of Order 01-54-B, which directs Massachusetts Local Distribution Companies to work with the MAEBT Working Group to investigate the potential of the Internet as a reliable and economic alternative to the VAN. The Department's Order asks that the Local Distribution Companies prepare and submit a report on this subject within two months following the Order's issuance.

MAEBT Technical Sub-Group

At the August 14, 2002 meeting of the MAEBT Working Group, the Technical Sub-Group was directed to do a technical evaluation of Internet protocols. An extension was filed with the Department to allow comprehensive research on this topic by the Local Distribution Companies, Suppliers, and third-party representatives/agents.

The purpose of this report is to provide an overview of the MAEBT Working Group's findings and determinations regarding viable Internet EDI solutions. Various approaches are analyzed, and findings and recommendations are presented.

Core Requirements

For the examination and rating of a variety of internet-based EDI solutions, there are key industry requirements that must be used as core criteria; these include:

- Transaction integrity

  While the Internet is free, transactions must be transmitted within a public network that assures privacy, authentication, integrity, and non-repudiation.

- Transaction system availability and reliability

  The system must provide daily and around-the-clock, unattended EDI processing coupled with full transaction error recovery and audit capabilities.

- Enable Customer Supplier Choice

  The solution must encourage supplier participation and customer supplier choice within New England. The solution should represent an interoperable standard for all market participants as well as provide low start-up and on-going costs. Additionally, the operation must be flexible to deal with small to very large participants and choices.

- Performance

  The solution must be capable of handling substantial monthly EBT transactions, especially crucial post-March 2005 with the Standard Offer cessation.

- Support current and future EDI initiatives

  An adopted solution must easily integrate with Local Distribution Companies' systems and processes, but also provide the ability to extend its support for future initiatives (e.g., Internet-based supply chain, financial transactions, bulk data transfers, web-based bill presentment and payment, etc.).

Analysis and Recommendations

Three focal layers of the EDI transmission model were analyzed with the preferred solutions outlined. These are:

1. **Security**

   To ensure the transaction integrity through powerful data encryption techniques, Secure Socket Layers (SSL) or Pretty Good Privacy (PGP, version 7.1 or later) is the preferred and recommended solution.

Key data security requirements for Internet-based EDI are achieved through: a.) message privacy through text encryption and public/private key infrastructure; b.) message integrity is reinforced with digital signatures; and c.) authentication and non-repudiation is accomplished through digital signatures as well as X.509 digital certificates.

2. Data Transport

The preferred and recommend solution is HTTP/S. This fully interoperable approach supports preferred security solutions while meeting thorough output and performance requirements for high-volume EDI. Real-time message acknowledgment, flexible implementation and development tools are available with the HTTP/S protocol.

Historic Synopsis, Internet Transport and the Electrical Industry

Interest in Internet-based transmission arose as many electrical industry participants first prepared for market restructuring. During these early years, shortcomings were easily identified with many of the available Internet protocols, as they existed at that time. This was particularly true of the prevalent AS1 (Applicability Statement 1) draft of the Electronic Data Interchange-Internet Integration (EDIINT) Workgroup, which relied upon email technology. The Gas Industry Standards Board (GISB), in conjunction with the Group 8760 Corporation, then pioneered a new level of secure Internet transmission for the natural gas industry with the development and adoption of their Electronic Delivery Mechanism (EDM) product. Several of the first states to embrace customer choice in the electric industry came to mandate the use of GISB or a similar EDIINT solution; these states are Pennsylvania, Texas, New York, and New Jersey. As the first readily available product in this environment, many of the suppliers and third-party agents who conduct business in these states opted to purchase and implement the Group 8760 GISB EDM solution. In this fashion, GISB became an early de facto standard and exists today under the new name of the North American Energy Standards Board (NAESB). More recently, the EDIINT AS2 draft standard has provided the opportunity to achieve a secure and efficient Internet transfer mechanism with enhanced capabilities.

3. Standardization and Inter-operability Application

Every consideration was given to the issues revolving around communication among the multiple industries pertinent to the electricity market. It was determined that the current EDIINT AS2 draft best incorporates the technological components for secure Internet transactions.

Two leaders emerged clearly in the EDIINT AS2 arena: 1.) The North American Energy Standards Board (NAESB) with its specific AS2 profile with a limited number of software vendors developing energy industry applications; and 2.) The non-profit Uniform Code Council and its subsidiary, UCCnet, with a standard AS2 guideline used globally.

The Uniform Code Council has created an AS2 guideline, known as UCCnet, that has become a standard among global industries. Unique between the two guidelines, UCCnet has been embraced by all the leading EDI software developers (See Appendix E). These developers have created a myriad of products with diverse scalability of function and cost ($1,500 to $75,000) to meet the AS2 requirements of corporations large and small. As of

August 2002, over fifteen software products have completed certification and interoperability testing by the vendor-neutral consultancy, the Drummond Group. This list includes the EDI software providers of all the Massachusetts Local Distribution Companies. Conversely, to date, there is only one NAESB-certified product solution; this is problematic as this results in a model where both parties must have this same product in order to be able to communicate. It is therefore apparent that UCCnet surpasses NAESB solutions.

Inherent risk exists today with the NAESB standard due to the limited number of certified solutions provided by software vendors. Such restricted options, and dependency upon the viability of one solution provider, could potentially create fiscal and technological hardship for all industry participants.

The members of the MAEBT Working Group agree that it is desirable to have a standard EDIINT AS2 profile with a selection of product solutions that integrate with their existing systems and processes. With very little difference between the two standards, it would be ideal for NAESB to obtain UCCnet certification. During the research and analysis conducted by the Technical Subgroup, the representative of NAESB and Group 8760 stated that they would indeed consider doing so and further efforts should be dedicated to this end. Such a convergence would protect the existing investments of those who have implemented a GISB solution while these parties would also receive benefit from the global and cross-industry support provided by the UCCNet profile.

The preferred application solution does not eliminate nor exclude LDCs from negotiating with Suppliers or others to use any or all of the options described within this document that insure security in the transport of data via the Internet.

Based upon this information, EDIINT AS2/UCCnet – and the variety of products certified by the Drummond Group – is the preferred and recommended Internet transport solution for participants in the Massachusetts electric industry. Furthermore, this resolution exemplifies the vision of open systems design and architecture of the Federal Energy Regulatory Commission's (FERC) Standard Market Design.*****

**** Docket No. RM01-12-000, Paragraph 357***
The Commission's goal is to assure that the best software is available for use in the nation's wholesale markets. This can best be attained by promoting competition among vendors, in a way that assures that no vendor comes to "own" a market niche or impose barriers to entry by new software companies with innovative analytical approaches.

2.0 Terms & Definitions

AS	Acronym for Applicability Statement
Authentication	The process of identifying a user or process by something unique that user or process has (such as a password or certificate) or the location (such as a secured terminal).
Certificate	A credential that is tamper-proof and forgery-proof enough to be used for authentication.
Digital Signature	Extra data appended to a message that identifies and authenticates the sender and message data using public-key encryption.
EBT	Acronym for Electronic Business Transaction(s).
EDI	Acronym for Electronic Data Interchange
EDIINT AS1	Acronym used to identify reference the Internet standards promoted by IETF – "Electronic Data Interchange-Internet Integration Applicability Statement 1". These standards are based upon SMTP.
EDIINT AS2	Acronym used to identify reference the Internet standards promoted by IETF "Electronic Data Interchange-Internet Integration Applicability Statement 2". These standards are based upon HTTP.
Encryption	An algorithm-based process that turns a plain text ("clear") message into a scrambled string ("ciphertext") that is intelligible only to a user or process with an encryption key.
FTP	File Transfer Protocol, one of several core protocols used in transmitting data over the Internet. The traditional data transfer mechanism.
GISB	Gas Industry Standards Board, now known as NAESB.
HTML	Hypertext Markup Language. A computer programming language, the first, used to create Internet Web pages.
HTTP	Hypertext Transfer Protocol, one of several core protocols used in transmitting data over the Internet. Provides the basis for web pages.
IETF	Internet Engineering Task Force. An international non-profit voluntary group who sets standards for the Internet.
KC	Kilo Character

MDN	Message Disposition Notification. Process used by a receiver to notify a sending party that a transmission was received.
MIME	Multipart Internet Message Extensions.
NAESB	North American Energy Standards Board, formerly known as GISB.
Non-repudiation	Term meaning that a party to a transaction cannot reasonably deny its participation in a particular transaction.
P.A.I.N.	Acronym that has become the benchmark reference to factors that comprise a viable Internet transmission methodology. (**P**rivacy, **A**uthenticity, **I**ntegrity, **N**on-repudiation.)
PGP	Pretty Good Privacy
PGPMIME	Digital envelope security based upon the Pretty Good Privacy (PGP) standard, integrated with MIME Security Multiparts.
PKI	Public Key Infrastructure. Method to manage the creation, revocation, and management of public keys used in encrypted applications.
Public and Private Keys	An encryption scheme, first introduced in 1976 by Diffie and Hellman, where the sender and receiver in a transmission relationship both create a pair of keys, called the public key and the private key. Each party's public key is published while the private key is kept secret. Messages are encrypted using the intended recipient's public key and can only be decrypted using his private key. The need for sender and receiver to share secret information (i.e.-secret keys) via an additional secure channel is eliminated. All communications involve only public keys, and no private key is ever transmitted or shared.
Receipt	The functional message that is sent from a receiver to a sender to acknowledge receipt of an EDI/EC interchange. A "signed receipt" is a receipt to which a digital signature has been applied.
RFC	Request For Comments is a series of documents published by the Internet Society covering a wide range of Internet issues, especially Internet protocols and standards.
S/MIME	A format and protocol for adding Cryptographic signature and/or encryption services to Internet MIME messages.
SMTP	Simple Mail Transfer Protocol, one of several core protocols used in transmitting data over the Internet. Provides the basis for email systems.
SSL	Secure Sockets Layer is an encryption protocol, developed by Netscape, for transmitting documents securely over the Internet. It allows for authenticated and encrypted communication between browsers and servers, or between different servers.

TCP/IP	Transmission Control Protocol/Internet Protocol. The de facto standard developed for internetworking of heterogeneous computer environments and entails both network layer and transport layer protocols.
UCC	The Uniform Code Council, Inc. is a not-for-profit standards organization and one of the most respected leaders in global commerce. The UCC administers the Universal Product Code (UPC) and provides a full range of integrated standards and business solutions for over 251,000 member companies doing business in 23 major industries. These worldwide standards apply to such areas as identification codes, data carriers, and electronic commerce.
UCCnet	UCCnet is the not-for-profit, tax-exempt subsidiary of the UCC global standards organization and is an industry leader responsible for providing a universal foundation for global electronic commerce. UCCnet delivers an open platform for collaborative commerce services, including compliance verification, synchronization of product information, registry and lifecycle management of synchronized products, user trade capabilities, and industry Internet standards and practices.
URI	Uniform Resource Identifier. Typically, URIs have been known as WWW addresses, Universal Document Identifiers, URLs, and a combination of URLs and Names (URN). In relation to HTTP, Uniform Resource Identifiers are simply formatted strings that identify a resource via name, location, or any other characteristic.
URL	Uniform Resource Locator, which is the standard naming convention on the Internet.
VAN	Value Added Network, a third party entity which provides
X12	Acronym used to refer to the Accredited Standards Committee (ASC) X12, Electronic Data Interchange or its published standards. The ASC is a chartered committee of the American National Standards Institute (ANSI) responsible to develop uniform standards for electronic interchange of business transactions.

3.0 EDI Communication Alternatives – Comparative Matrix, Summary

Category	EDIINT AS2 (UCCnet)	GISB (NAESB)	FTP/SSL	FTP/PGP	Traditional VAN	Internet VAN
Cross-Industry interoperability With Other Certified AS2 Vendor Products?	Y	N	Y	Y	Y	Y
Low Operating Costs?	Y	Y	Y	Y	N	N
Outsource Providers?	Y	Y	Y	N	Y	Y
Published Standard?	Y	Y	Y	Y	N/A	N/A
Certification Process?	Y	Y	N	N	N/A	N/A
Automated Turnaround Transfer Confirmation?	Y	Y	N	N	N	N
Transaction Costs?	N	N	N	N	Y	Y
Low Startup Costs for Suppliers	Y	N	Y	N	Y	Y
Security?	Y	Y	Y	Y	Y	Y
Upgrade Capabilities – New Technologies?	Y	Y	Y	Y	Y	Y
Number of Vendor products certified to be interoperable with?	15	0	1	1	N/A	N/A

4.0 EDI Communication Alternatives – Financial Summary

OPTION	ESTIMATED SETUP COSTS	ESTIMATED ANNUAL OPERATIONAL COSTS	ESP TRANSACTION COSTS
EDIINT AS2	**LDC $ 115,000 - $ 153,700** **ESP $ 17,520 - $ 71,200**	**LDC $ 105,000 - $ 123,100** **ESP $ 75,150 - $ 82,800**	• None
GISB	**LDC $ 115,000 - $ 153,700** **ESP $ 60,900 - $ 110,900**	**LDC $ 105,000 - $ 121,900** **ESP $ 80,000 - $ 84,300**	• None
FTP SSL	**LDC $ 80,000 - $ 96,200** **ESP $ 11,000 - $ 12,200**	**LDC $ 104,000 - $ 118,900** **ESP $ 75,100 - $ 76,900**	• None
FTP PGP	**LDC $ 101,200 - $ 102,400** **ESP $ 26,000 - $ 27,200**	**LDC $ 108,200 - $ 122,600** **ESP $ 83,200 - $ 85,000**	• None
TRADITIONALVALUE ADDED NETWORK (VAN)	**LDC $ 7,300** **ESP $ 1,150**	**LDC $ 151,600** **ESP $ 75,000 - $ 76,200**	*Prime Time: 8am - 8pm* • Per Envelope = $.37 • Per 1000k\ characters = $.089 • Interconnect Per 1000k = $ .178 Average Cost Per Document: $ .637 X 2 = $1.27 using an interconnect VAN or $.459 * 2 = $.92 using the same VAN **Example: Using 100 enrollments where each enrollment has 250 characters. 100 * 250 = 25,000 / 1000 = 25K.** **Prime Time:** **Envelope Charge $ .37** **Per K change = 25 * .089 = $2.23** **Per K charge interconnect = 25 * .178 = $4.45** **Total = $7.05 * 2 = $14.10 or .14 cents per enrollment.** **Without the interconnect $5.20 or .05 cents per enrollment.** *Non-Prime Time 8pm - 8am* • Per Envelope = $.18 • Per 1000k = $ .044 • Interconnect Per 1000k = $.088 Average Cost Per Document: $ .312 X 2 = $ .62 **Example: Using 100 enrollments where each enrollment has 250 characters. 100 * 250 = 25,000 / 1000 = 25K.** **Non-Prime Time:** **Envelope Charge $ .18** **Per K change = 25 * .044 = $1.10** **Per K charge interconnect = 25 * .088 = $2.20** **Total = $3.48 * 2 = $6.96 or .07 cents per enrollment.** **Without the interconnect $2.56 or .03 cents per enrollment.** • Dial-up Connection Fee: $5.65/hour **NOTE:** ESPs pay both sides of a transmission

OPTION	ESTIMATED SETUP COSTS	ESTIMATED ANNUAL OPERATIONAL COSTS	ESP TRANSACTION COSTS
			relationship.
INTERNET VALUE ADDED NETWORK (VAN)	**LDC $ 100,500 - $ 116,700** **ESP $ 550** *Hardware Note:* This assumes that the ESP creates their own EDI transactions or has an in-house translator.	**LDC $ 106,000 - $ 120,400** **ESP $ 81,000 - $ 82,800**	**Average Cost Per Document: $ .10 X 2 = $ .20** Example: Using 100 enrollments were each enrollment has 250 characters. 100 * 250 = 25,000 / 1000 = 25K. **25K * .20 = $5.00 or .05 cents per enrollment.** **NOTE:** ESPs pay both sides of a transmission relationship.

5.0 EDI Communication Alternatives - Graphs

Figure 1.1 - Estimated Setup Costs, ESP

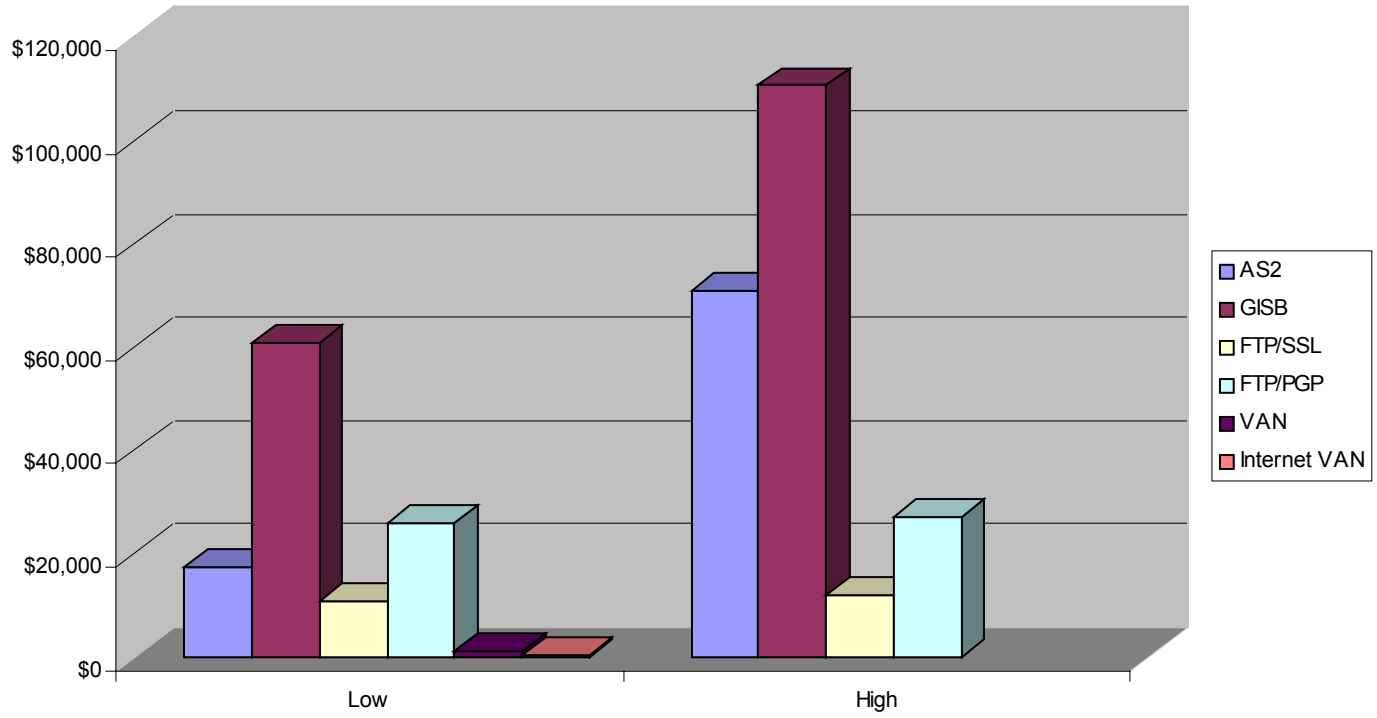


Figure 1.2 - Estimated Setup Costs, LDC

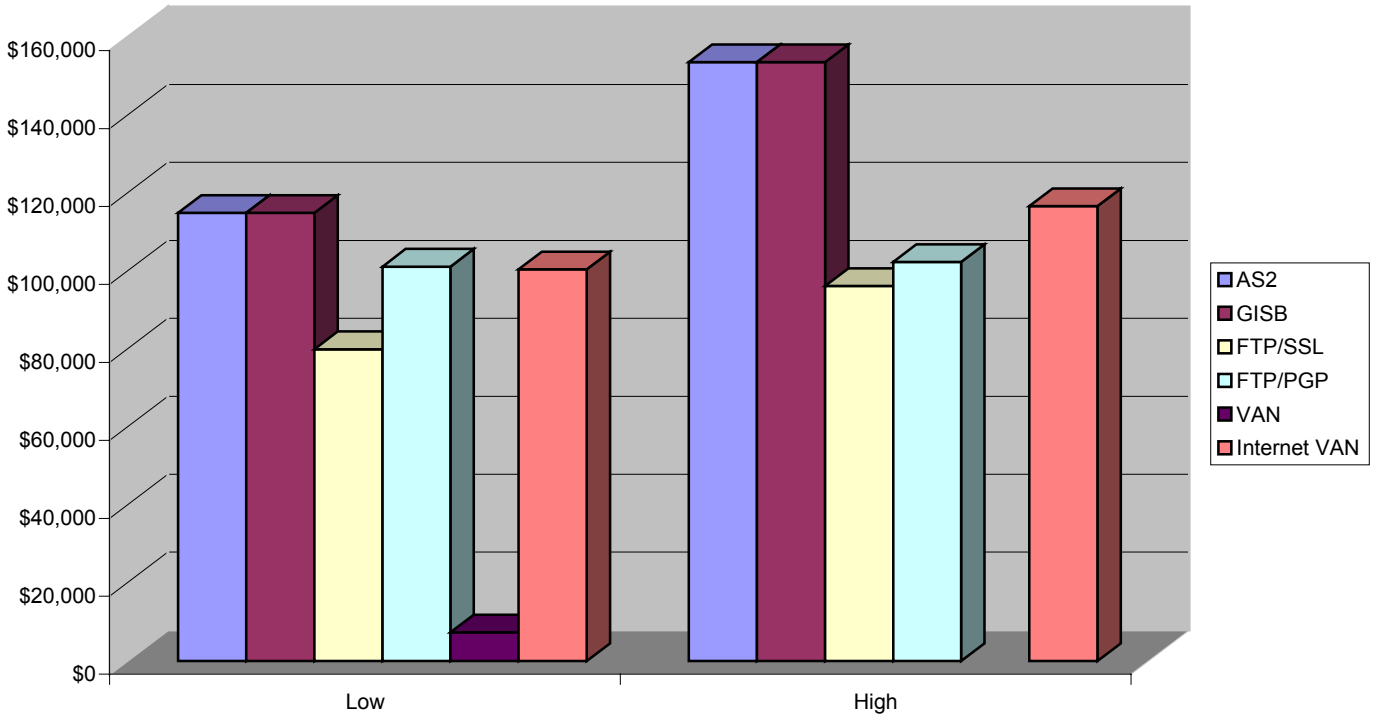


Figure 2.1 - Estimated Annual Operational Costs, ESP

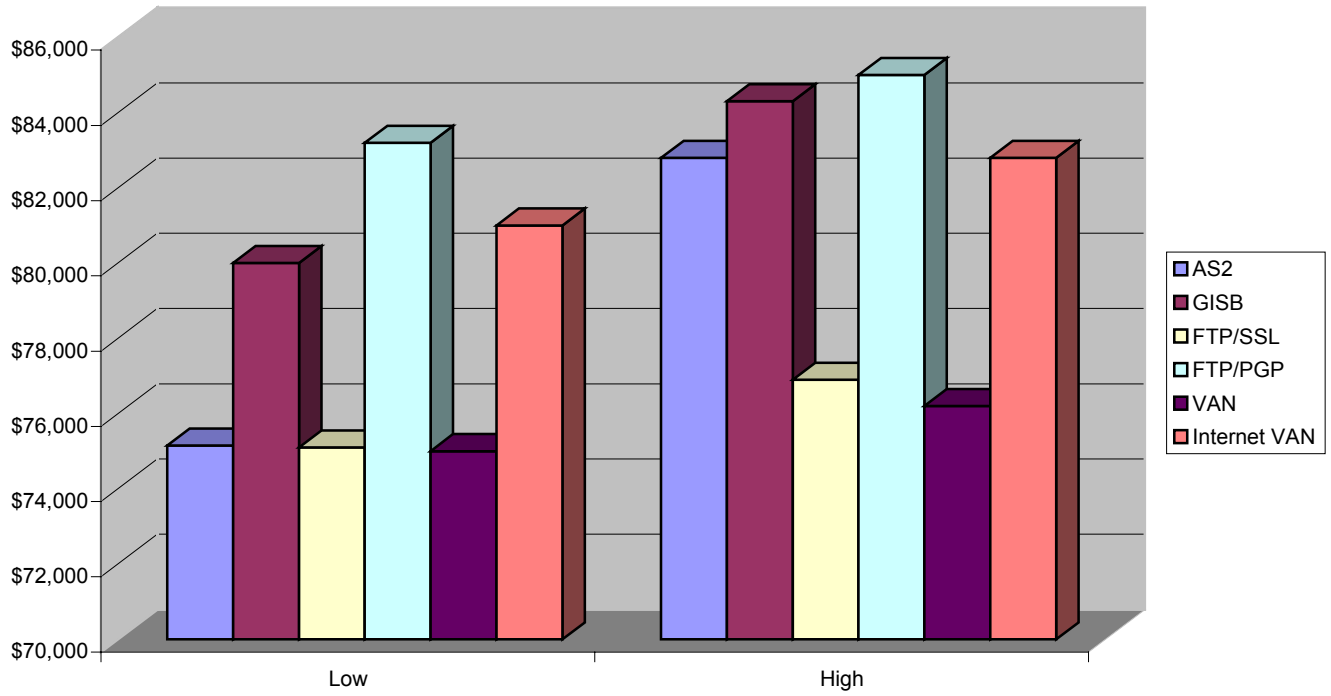


Figure 2.2 - Estimated Annual Operational Cost, LDC

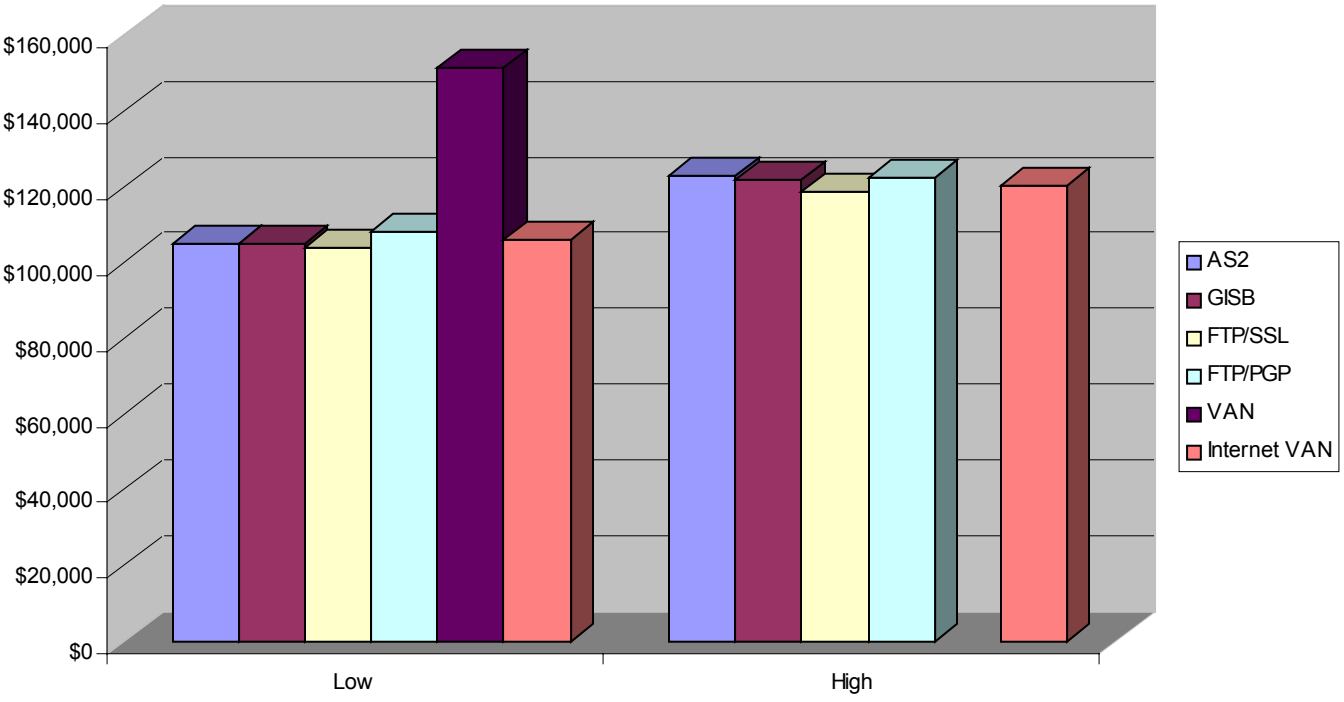
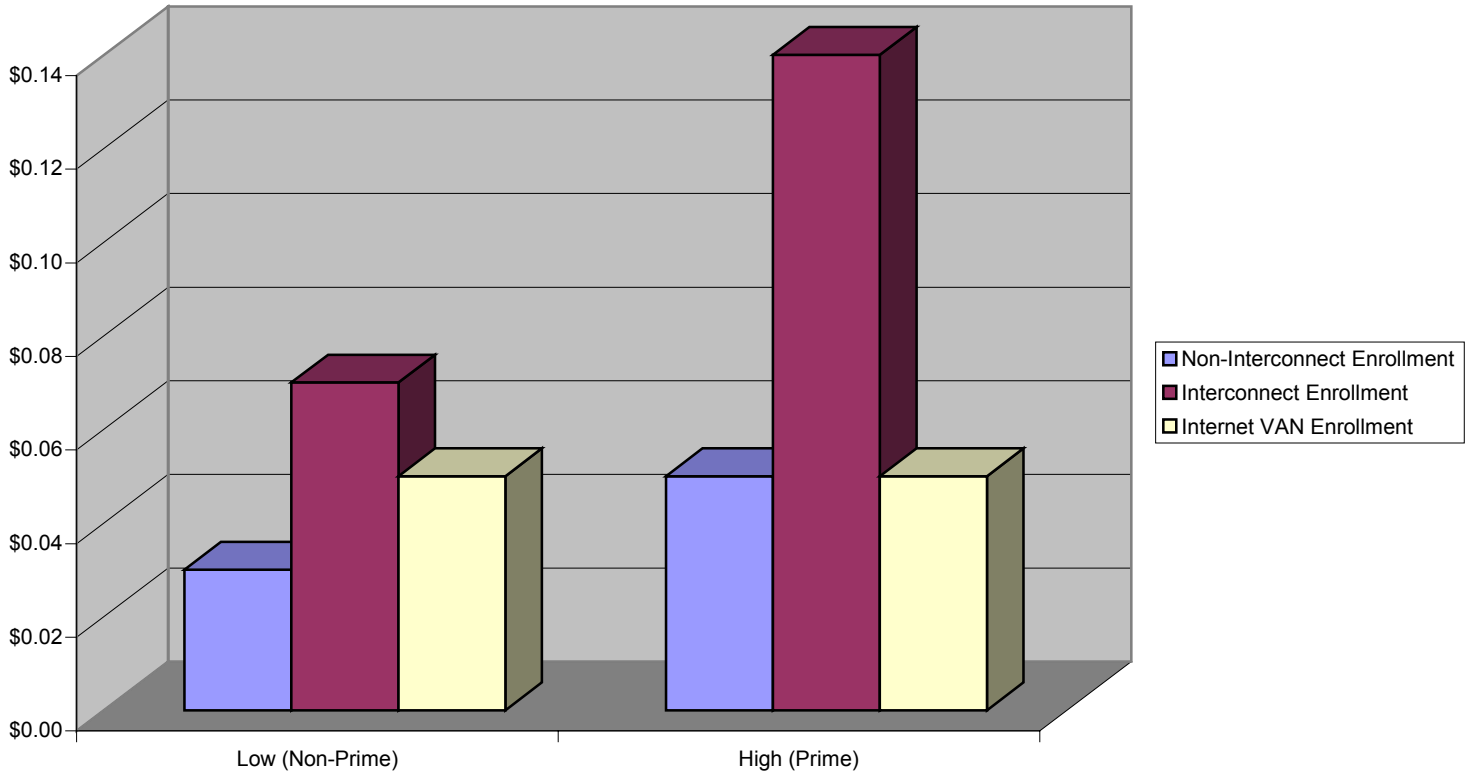


Figure 3.0 - ESP Transaction Costs, VAN Options



6.0 EDI Communication Alternatives –

Comparative Matrix, Detail

OPTION	PROS	CONS	SETUP COSTS	OPERATIONAL COSTS	TRANSACTION COSTS	FUNCTIONALITY
EDIINT AS2 **AS2 Profile Defined by:** Uniform Code Council, Inc.'s UCCnet - Global Standards Organization. **Compliance Validation and Interoperability Testing for Certification by:** The Drummond Group, Inc., a vendor-neutral interoperability conformance consultancy contracted by the UCC. (Different EDIINT-AS2 Profile Than NAESB)	• Interoperability across multiple industries • Internet advantages[1] • Meets transmission delivery considerations as defined by P.A.I.N (**P**rivacy, **A**uthenticity, **I**nteroperability, **N**on-repudiation)[2] • Meets MDTE Order 01-54-B requirements[3] • Low operating costs • Out-source providers available • Payload independent (can transmit any data) • All Mass. LDC's EDI Software providers have Internet Protocol solutions available as modular components to existing infrastructure. These products have been certified to be compliant and interoperable with the UCCnet's	• Requires technology specific to this solution • Not currently used in Energy Industry • Relatively high initial investment cost • Not interoperable with the NAESB EDIINT AS2 profile. • Increased system development and administration. • Scheduled down time of web server due to system maintenance and upgrade • LDC's now have to provide all services and functionality previously provided by the VAN. • Multiple administration points due to disparate system infrastructure. • Regardless of all efforts to provide reasonable security, the LDC's infrastructure is rendered more vulnerable than	• ISP investment with dedicated communications connection • Investment in web server • Investment in software or development of custom solution • Integration with backend or EDI applications • Investment in contingency / redundancy planning and infrastructure • Integration testing **Estimated LDC <u>Setup Cost:</u>** • Legacy System Software Gateway - $ 50,000 - $75,000 • Implementation Consultancy Services - $20,000 • Legacy System Software Gateway Maint. and Support - $5,000 - $7,500 • Servers Prod/Test - 2 @ $20,000 - $25,000 ea = $40,000 - $50,000 • Internet phone line $0 - $1,200 per	• ISP costs • Communication line costs • Software license fees **Estimated LDC Annual Maintenance <u>Cost:</u>** • Legacy System Software Gateway Maint and Support - $5,000 - $7,500 • Internet phone line - $0 - $1,200 mo * 12 = $0 -$14,400 • EDI Administrator - $ 100,000 • **Total:** $105,000 - $ 123,100 **Estimated ESP Annual Maintenance <u>Cost:</u>** • Thick client maintenance and support = $ 150.00 yr • More robust server software maint & support - $6,000 • Internet Service Provider $ 0 - $ 150 * 12 = $ 0 – 1,800 • EDI	• None	• HTTP 1.0 point-to-point • POST method • S/MIME followed by PGP data encryption • Encapsulated and detached digital signatures • Formal support for X12, EDIFACT, EDI-consent and XML message standards • Provides 17 transport header data elements to assist identification and routing

OPTION	PROS	CONS	SETUP COSTS	OPERATIONAL COSTS	TRANSACTION COSTS	FUNCTIONALITY
	EDIINT AS2 Draft Standard profile. • There is a growing list, currently including approximately 20 software vendors, with UCCnet certified solutions. • Published standard with certification requirements, governed by the UCC, Inc. • No transaction costs, no charges per character sent or received • Confirms receipt of transfer while connection is still open with sender and receiver	when utilizing current point-to-point connectivity to a VAN.	month • Application Integration - $ (Site Specific) • **Total:** $115,000 - $ 153,700 + **Estimated ESP <u>Setup Cost:</u>** • Thick Client Software - $ 1,500 • More robust server software - $60,000 • Implementation Consultancy Services - $6,000 • Server = $ 10,000 • Internet phone line $20.00 - $ 1,200 • **Total**: $17,520 - $ 71,200 + *Hardware Note:* This assumes that the ESP creates their own EDI transactions or has an in-house translator.	Administrator - $ 75,000 • **Total:** $75,150 - $82,800		

OPTION	PROS	CONS	SETUP COSTS	OPERATIONAL COSTS	TRANSACTION COSTS	FUNCTIONALITY
	•	•	•	•	•	•
GISB **AS2 Profile Defined by:** NAESB - North American Energy Standards Board. Often referred to as GISB- Gas Industry Standards Board, the organization's previous designation. **Compliance Validation and Interoperability Testing for Certification by:** NAESB (Different EDIINT-AS2 Profile Than UCCnet)	• Internet advantages[1] • Meets transmission delivery considerations as defined by P.A.I.N (**P**rivacy, **A**uthenticity, **I**ntegrity, **N**on-repudiation)[2] • Meets MDTE Order 01-54-B requirements[3] • Low operating costs • Published standard with certification requirements, governed by NAESB • Used in Energy Industry and has been adopted by several states • Payload independent (can transmit any data) • No transaction costs, no charges per character sent or received • Confirms receipt of transfer while connection is still open with sender and receiver	• Industry specific interoperability • Difficult to cost justify substantial investment as the technology only applies to Customer Choice transmissions. • Requires technology specific to this solution • Limited overall availability software vendors and/or third party service providers • Relatively high initial investment cost • Not fully AS2 compliant, only GISB-AS2 • Mass. LDC's EDI Software providers do not have NAESB certified Internet Protocol solutions available as modular components to existing infrastructure. • Increased system development and administration. • Scheduled down time of web server due to system	• ISP investment with dedicated communications connection • Investment in web server • Investment in software or development of custom solution • Integration with backend or EDI applications • Investment in contingency / redundancy planning and infrastructure • Integration testing **Estimated LDC Setup Cost:** • Legacy System Software Gateway - $ 50,000 - $75,000 • Implementation Consultancy Services - $20,000 • Legacy System Software Gateway Maint and Support - $5,000 - $7,500 • Servers Prod/Test - 2 @ $20,000 - $25,000 ea = $40,000 - $50,000 • Internet phone line - $0 - $1,200	• ISP costs • Communication line costs • Software license fees • Operational support costs • Software: 10% to 20% of software purchase price per year • Labor: 1 person to administer (not full time, just as needed) **Estimated LDC Annual Maintenance Cost:** • Software Upgrades and Service = $5,000 - $7,500 yr • Internet Line - $0 - $1,200 X 12 mos. = $0 - $14,400 • EDI Administrator - $ 100,000 • **Total:** $105,000 - $ 121,900 **Estimated ESP Annual Maintenance Cost:** • Software Upgrades and Service = $5,000 -	• None	• HTTP 1.0 point-to-point • POST method • Basic user authentication • PGP 2.6 - 128 bit data encryption • Encapsulated digital signatures • Formal support for X12 and EDIFACT, XML message standards • Provides 7 transport header data elements to assist identification and routing GISB v1.5 ---------- • PGP/MIME RFC2015 • EDI MIME types per RFC1767 • Multipart Form RFC1867 • EDIINT AS2 compliant GISB 1.6 (draft) ---------- • HTTP 1.1, • OpenPGP • SSL V3 • HTTP post, response, time stamp, common code IDs, PGP encryption, digital signature, PAIN (privacy, authentication,

OPTION	PROS	CONS	SETUP COSTS	OPERATIONAL COSTS	TRANSACTION COSTS	FUNCTIONALITY
		maintenance and upgrade. • LDC's now have to provide all services and functionality previously provided by the VAN. • Regardless of all efforts to provide reasonable security, the LDC's infrastructure is rendered more vulnerable than when utilizing current point-to-point connectivity to a VAN.	month • Application Integration - $ (Site Specific) • **Total:** $ 115,000 - $153,700 + **Estimated ESP <u>Setup Cost:</u>** **<u>Software:</u>** • Installed, tested, implemented with trading partner $50,000 - $100,000 • Web server: Apache 1.3.14 freeware • DBMS: Oracle 8.1.5 3 persons X $300.00 per named license = $900.00. **<u>Hardware:</u>** • Server = $ 10,000 • **Total**: $ 60,900 - $110, 900 *Hardware Note:* This assumes that the ESP creates their own EDI transactions or has an in-house translator.	$7,500 yr • Internet Service Provider $ 0 - $150 * 12 = $0 - $1,800 yr • - EDI Administrator - $ 75,000 • **Total:** $80,000 - $ 84,300		integrity, non-repudiation), error detection and messaging.

OPTION	PROS	CONS	SETUP COSTS	OPERATIONAL COSTS	TRANSACTION COSTS	FUNCTIONALITY
FTP SSL File Transfer Protocol using Secure Socket Layering (SSL)	• Internet advantages[1] • Low initial investment cost, depending upon platform. • Low operating costs • Widely available technology – already bundled with many operating systems • Proven technology / track record • Interoperable-one global standard • Meets transmission delivery considerations as defined by P.A.I.N (**P**rivacy, **A**uthenticity, **I**ntegrity, **N**on-repudiation • Meets MDTE Order 01-54-B requirements[3] • Payload independent (can transmit any data) • No transaction costs, no charges per character sent or received	• No automated return receipt notification. • Web Server Maintenance Schedule of down time. • Increased system development and administration. • Scheduled down time of web server due to system maintenance and upgrade. • LDC's now have to provide all services and functionality previously provided by the VAN. • Regardless of all efforts to provide reasonable security, the LDC's infrastructure is rendered more vulnerable than when utilizing current point-to-point connectivity to a VAN.	• ISP investment with dedicated communications connection (depending on implementation solution) • Investment in web server (depending on security policy) • Purchase of SSL certificates • Integration with backend or EDI applications • Integration testing **Estimated LDC Setup Cost:** • Legacy System Software Gateway - $ 40,000 - $45,000 • Implementation Consultancy Services - $20,000 • Servers Prod/Test - 2 @ $20,000 - $25,000 ea = $40,000 - $50,000 • Internet phone line - $0 - $1,200 month • Application Integration - $ (Site Specific) • **Total:** $ 80,000 – 96,200 + **Estimated ESP Setup Cost:**	• ISP costs • Communication line costs • Software license fees ongoing testing and operational support costs **Estimated LDC Annual Maintenance Cost:** • Software Upgrades and Service = $4,000 - $4,500 yr • Internet Line - $0 - $1,200 X 12 mos. = $0 - $14,400 • EDI Administrator - $ 100,000 • **Total:** $ 104,000 - $118,900 **Estimated ESP Annual Maintenance Cost:** • Software Upgrades and Service = $100 yr • Internet Service Provider $0 - $150 * 12 =$0 – $1,800 • EDI Administrator - $ 75,000 **Total:** $ 75,100 - $76,900	• None	• FTP point-to-point • POST or PULL method (depending on implementation) • Basic user authentication • SSL (unspecified)

OPTION	PROS	CONS	SETUP COSTS	OPERATIONAL COSTS	TRANSACTION COSTS	FUNCTIONALITY
			• Enhanced FTP Client or Server Software - $ 1,000 • Server = $ 10,000 • Internet phone line $ 0 - $ 1,200 • **Total**: $11,000 - $ 12,200 + *Hardware Note:* This assumes that the ESP creates their own EDI transactions or has an in-house translator.			

OPTION	PROS	CONS	SETUP COSTS	OPERATIONAL COSTS	TRANSACTION COSTS	FUNCTIONALITY
FTP PGP File Transfer Protocol using Pretty Good Privacy (PGP) encryption Software	• Internet advantages[1] • Low initial investment cost, depending upon platform. • Low operating costs • Widely available technology suited to various platforms and deployments. • Proven technology / track record • Interoperable-one global standard • Sender may script a directory list command after sending to verify receipt. • Meets transmission delivery considerations as defined by P.A.I.N (**P**rivacy, **A**uthenticity, **I**ntegrity, **N**on-repudiation • Meets MDTE Order 01-54-B requirements[3] Payload independent (can transmit any data) • No transaction costs, no charges	• Increased system development and administration--particularly in relation to key generation, validation, and management. • No automated return receipt notification. • Web Server Maintenance Schedule of down time. • Scheduled down time of web server due to system maintenance and upgrade. • LDC's now have to provide all services and functionality previously provided by the VAN. • Regardless of all efforts to provide reasonable security, the LDC's infrastructure is rendered more vulnerable than when utilizing current point-to-point connectivity to a VAN.	• ISP investment with dedicated communications connection (depending on implementation solution) • Investment in web server (depending on security policy) • Integration with backend or EDI applications • Integration testing **Estimated LDC Setup Cost:** *Component Costs:* • PGP Server 7.1.1 Software - $ 12,500 (per processor) • PGP Upgrades and Svc - $ 2,500 yr • Discount available for multiple purchases 18% • Servers, Prod/Test, with dual processors 2 X $6,000 ea = $12,000 • Two FTP Servers with appropriate software $20,000 ea = $ 40,000 • Internet phone line - $0 - $1,200 month *Combined Costs:*	• ISP costs • Communication line costs • Software license fees • Operational support costs **Estimated LDC Annual Maintenance Cost:** *Component Costs* • PGP Upgrades and Service = $2,500 yr • Discount available for multiple purchases 18% • Internet Line - $0 - $1,200 X 12 mos. = $0 - $14,400 • EDI Administrator - $ 100,000 *Combined Costs:* • 4 PGP Svc Contracts = $8,200 yr • **Total:** $108,200 - $ 122,600 **Estimated ESP Annual Maintenance Cost:** *Component Costs* • PGP Upgrades and Service = $2,500 yr • Discount available for multiple	• None	• FTP point-to-point • POST or PULL method (depending on implementation) • Basic user authentication • Encryption (unspecified)

OPTION	PROS	CONS	SETUP COSTS	OPERATIONAL COSTS	TRANSACTION COSTS	FUNCTIONALITY
	per character sent or received		• 4 PGP Server Licenses = $41,000 • 4 PGP Service Contracts = $8,200 yr. • Application Integration - $? • **Total**: $ 101,200 - $ 102,400 + **Estimated ESP <u>Setup Cost:</u>** • Enhanced FTP Client or Server Software - $ 1,000 • Server, One Processor = $10,000 • PGP Server 7.1.1 Software - $ 12,500 • PGP Upgrades and Svc - $ 2,500 yr • Internet phone line $0 - $ 1,200 **Total**: $ 26,000 - $ 27,200 + *Hardware Note:* This assumes that the ESP creates their own EDI transactions or has an in-house translator	purchases 18% • Internet Line - $0 - $150 * 12 mos. = $0 - $1,800 • EDI Administrator - $ 75,000 *Combined Costs:* • 4 PGP Svc Contracts = $8,200 yr **Total:** $ 83,200 - $85,000		

OPTION	PROS	CONS	SETUP COSTS	OPERATIONAL COSTS	TRANSACTION COSTS	FUNCTIONALITY
TRADITIONAL VALUE ADDED NETWORK (VAN)	• Proven, reliable solution • Meets transmission delivery considerations as defined by P.A.I.N (**P**rivacy, **A**uthenticity, **I**ntegrity, **N**on-repudiation [2] • Low initial investment cost • Supports readily available technology, including Internet-based transmission. • Eliminates interoperability issues • Good availability of third-party service providers • All variable VAN costs are paid for by the Suppliers • Always available - no down time for maintenance. • Minimal redundant systems and hardware • Store & Forward Data • VAN provides Network Hardware & Software (archiving, etc.) • Document	• High operating costs depending on volume and transmission schedules • If operating in a strictly real-time environment, store-and-forward processing creates potential timing issues	• Communications investment depending on alternative chosen • Integration with backend or EDI applications • Integration testing **Estimated LDC <u>Setup Cost:</u>** • Account Setup Charge: $3,000 • Fixed Monthly Cost: $2,500 • Dedicated Internet phone line: $1,800 • **Total:** $7,300 **Estimated ESP <u>Setup Cost:</u>** • Account Setup Charge: $1,000 • Fixed Monthly Cost: $100 • Dial-up Modem: $50.00 **Total**: $ 1,150 *Hardware Note:* This assumes that the ESP creates their own EDI transactions or has an in-house translator.	• Transaction based costs • Communication line costs • Possible software license costs • Operational support costs • If using a dialup connection - $ 5.65 per hr. **Estimated LDC Annual Maintenance <u>Cost:</u>** • Fixed Monthly Cost: $2,500 * 12 = $30,000 • Dedicated Phone Line = $1,800 * 12 mos. = $21,600 • EDI Administrator - $ 100,000 • **Total:** $ 151,600 **Estimated ESP Annual Maintenance <u>Cost:</u>** • Fixed Monthly Cost: $100 * 12 = $1,200 • EDI Administrator - $ 75,000 **Total:** $ 76,200	• Varies depending on provider • Typically based on bytes transmitted • Can contain number of messages (i.e. Interchanges) surcharge • Can contain time-of-day surcharge • Can contain VAN interconnect surcharge **Estimated LDC Transaction <u>Cost:</u>** • No Transaction Costs **Estimated ESP Transaction <u>Cost:</u>** *Prime Time: 8am - 8pm* • Per Envelope = $.37 • Per 1000k\ characters = $.089 • Interconnect Per 1000k = $ .178 **Average Cost Per Document: $ .637 * 2 = $1.27 using an interconnect VAN or $.459 * 2 = $.92 using the same VAN** **Example: using 100 enrollments where each enrollment has 250 characters.**	• Supports multiple communication alternatives • Store-and-forward method • Basic user authentication • Unencrypted data

OPTION	PROS	CONS	SETUP COSTS	OPERATIONAL COSTS	TRANSACTION COSTS	FUNCTIONALITY
LDC's and ESP's may also use the traditional VAN service but connect using an internet protocol through the XXX Business Exchange Service (See Appendix C for details)	routing & Delivery • Data Management • Security • Availability 24/by7 • Problem detection & resolution • Independent Intermediary • Data Sequentially • Data Type filtering • Optional services such as document translation & tracking • Extensive reporting and administration interface				**100 * 250 = 25000 / 1000 = 25 k** **Prime Time:** **Envelope Chg $.37** **Per K chg 25 * .089 = $2.23** **Per K chg interconnect = 25 * .178 = $4.45** **Total = $7.05 * 2 = $14.10 or .14 cents an enrollment** **Without the interconnect $ 5.20 or .05 cents an enrollment** *Non-Prime Time 8pm - 8am* • Per Envelope = $.18 • Per 1000k = $ .044 • Interconnect Per 1000k = $.088 Average Cost Per Document : $ .312 X 2 = $ .62 **Example: using 100 enrollments where each enrollment has 250 characters.** **100 * 250 = 25000 / 1000 = 25 k** **Prime Time:** **Envelope Chg $.18** **Per K chg 25 * .044 = $1.10** **Per K chg interconnect = 25 * .088 = $2.20**	

OPTION	PROS	CONS	SETUP COSTS	OPERATIONAL COSTS	TRANSACTION COSTS	FUNCTIONALITY
					Total = $3.48 * 2 = $6.96 or .07 cents an enrollment Without the interconnect $ 2.56 or .03 cents an enrollment • Dial-up Connection Fee: $5.65/hour **NOTE:** ESPs pay both sides of a transmission relationship.	

OPTION	PROS	CONS	SETUP COSTS	OPERATIONAL COSTS	TRANSACTION COSTS	FUNCTIONALITY
INTERNET VALUE ADDED NETWORK (VAN)	• Meets transmission delivery considerations as defined by P.A.I.N (**P**rivacy, **A**uthenticity, **I**ntegrity, **N**on-repudiation[2] • Low initial investment cost • Lower operational costs than traditional VAN • Supports readily available technology. • Eliminates interoperability issues • All variable VAN costs are paid for by the Suppliers • Always available - no down time for maintenance. • Minimal redundant systems and hardware • Store & Forward Data • VAN provides Network Hardware & Software (archiving, etc.) • Document routing & Delivery • Data Management	• Doesn't eliminate security and integrity issues with getting transmission to Internet VAN provider • Internet VANs are not always accepted by traditional VANs so interconnects may not be supported • If operating in a strictly real-time environment, store-and-forward processing creates potential timing issues • Limited availability of service providers • Scheduled down time of web server due to system maintenance and upgrade.	• Communications investment depending on alternative chosen • Integration with backend or EDI applications • Integration testing • Initial joining fee **Estimated LDC <u>Setup Cost:</u>** • Legacy System Software Gateway - $ 40,000 - $45,000 • Implementation Consultancy Services - $20,000 • Servers Prod/Test - 2 @ $20,000 - $25,000 ea = $40,000 - $50,000 • Account Setup Charge: $500 • Dedicated Internet phone line: $0 - $1,200 • **Total:** $ 100,500 - $116,700 **Estimated ESP <u>Setup Cost:</u>** • Account Setup Charge: $500 • Dial-up Modem: $50.00 **Total**: $ 550	• Transaction or volume based costs depending on provider and agreement • Communication line costs • Possible software license costs • Operational support costs **Estimated LDC Annual Maintenance <u>Cost:</u>** • Minimal Billing Fee: $500 * 12 mos. = $ 6,000 • Dedicated Internet phone line: $0 - $1,200 * 12 mo. = $0 - $14,400 • EDI Administrator - $ 100,000 • **Total:** $ 106,000 - $ 120,400 **Estimated ESP Annual Maintenance <u>Costs:</u>** • Minimal Billing Fee: $500 * 12 mos. = $ 6,000 • Internet Service Provider: $0 - $150 * 12 months = $0 - $1,800 • EDI Administrator - $	• Varies depending on provider and pricing arrangements • Typically considerably lower that traditional VAN. **Estimated LDC Annual Maintenance <u>Cost:</u>** • No Transaction Costs **Estimated ESP Annual Maintenance <u>Cost:</u>** • Per Envelope = $ 0 • Per 1000k\ characters = $.10 • Interconnect Per 1000k = $ 0 **Average Cost Per Document: $ .10 * 2 = $ .20 (sending and receiving)** **<u>NOTE:</u>** ESPs pay both sides of a transmission relationship. **Example: using 100 enrollments where each enrollment has 250 characters.** **100 * 250 = 25000 / 1000 = 25 k**	• Supports multiple communication alternatives • Store-and-forward method • Authentication and encryption dependent on service provider

OPTION	PROS	CONS	SETUP COSTS	OPERATIONAL COSTS	TRANSACTION COSTS	FUNCTIONALITY
	• Security • Availability 24/by7 • Problem detection & resolution • Independent Intermediary • Data Sequentially • Data Type filtering • Optional services such as document translation & tracking • Extensive reporting and administration interface		*Hardware Note:* This assumes that the ESP creates their own EDI transactions or has an in-house translator.	75,000 **Total:** $ 81,000 - $ 82,800	**25 * .20 = $5.00 or .05 cents per enrollment**.	

Notes:

1. Internet Advantages:
   a. Low operating cost. Flat rates that are not volume or time-of-day dependent.
   b. Widely accessible technology and software components.
   c. Redundant network architecture.
   d. Transmission speeds greater than many other processes currently utilized.

2. Transmission Delivery:
   a. Encryption… contents of message cannot be understood.
   b. Integrity… contents of message have not been altered between transmission and receipt.
   c. Non-repudiation of Origin… ability to positively identify sender of transmission.
   d. Non-repudiation of Receipt… ability to positively identify transmission reached the sender's intended destination.
   e. Tracking and Audit-ability… proof positive footprint and timestamp confirming transmission.

3. Order 01-54-B:
   a. Is the Internet reliable?

b. Does the Internet use proven technology?
c. Does the Internet ensure security of the data being transported?
d. Does the Internet provide an audit trail, including proof of transmission and receipt?
e. Is the Internet an economic alternative to the VAN?

Summation:

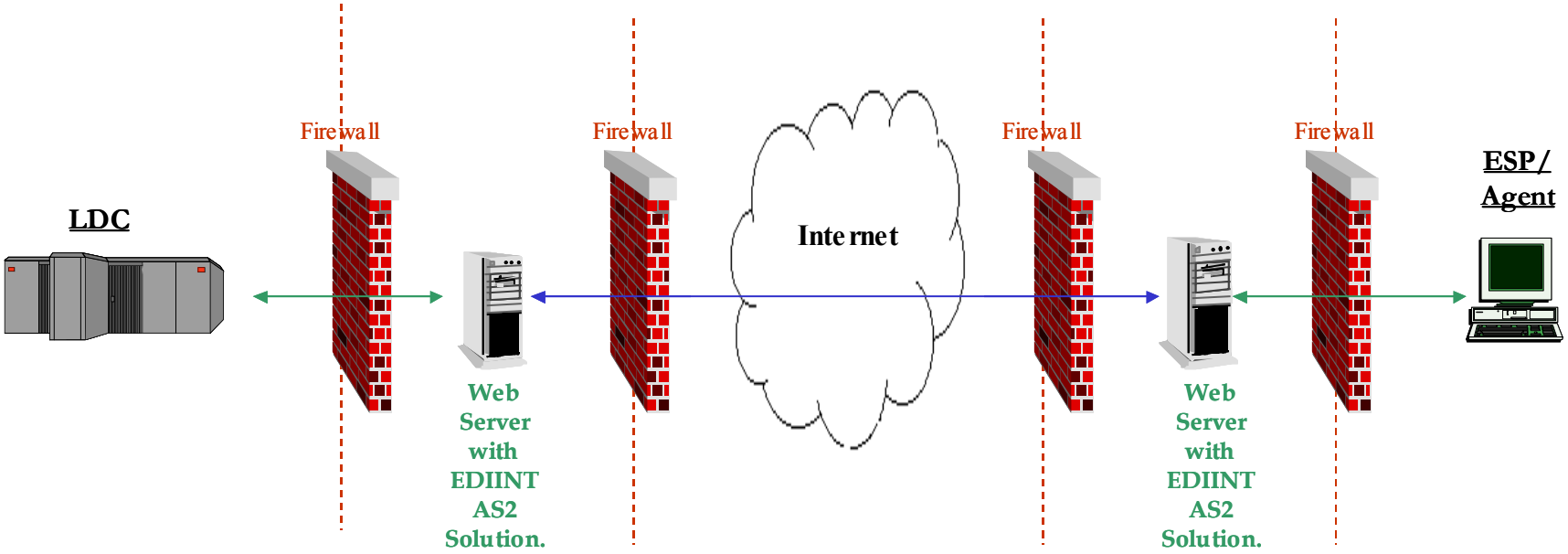
Each of the existing Internet protocols has limitations that must be weighed when determining the appropriate mechanism for the exchange of EDI transactions over the Internet. Transmission protocols that have an established history have been merged with newer technologies to provide streamlined, secure, and readily accessible Internet solutions – such is the case with FTP and SSL or PGP. Furthermore, two standards have arisen that provide an assortment of additional opportunities. NAESB's GISB EDM/EDIINT AS2, with its specific profile, is enrolling customers in the Gas and Electric industries while the UCCnet's EDIINT AS2 guideline is providing standard Internet transmission relationships for a myriad of industries on a global level. Clearly, while the Internet still represents emerging technology lacking an universally accepted protocol, the appropriate solution for the Massachusetts area should entail the greatest interoperability, functionality, and end-to-end security as previously experienced with the traditional VAN. Software vendors are currently considering these factors as they align their products with either the NAESB or UCCnet profile.

7.0 EDI Communication Alternatives - Illustrations

EDIINT AS2 - UCCnet

EDI Over The Internet, Applicability Statement 2

Uniform Code Council, Inc.



LDC Costs:

Setup:	**$ 115,000 - 153,700+**
Operational:	**$ 105,000 – 123,100+**
Transaction:	**$ 0**

ESP/Agent Costs:

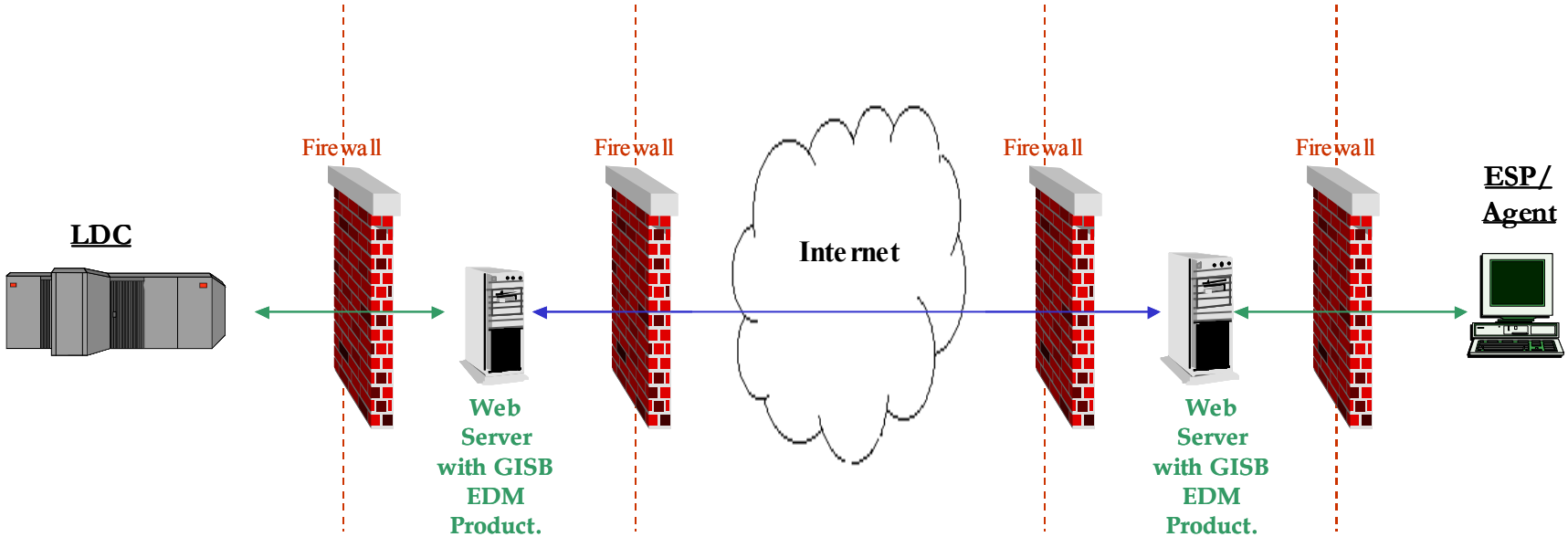
Setup:	**$ 17,520 – 71,200+**
Operational:	**$ 75,150 – 82,800+**
Transaction:	**$ 0**

Note: *This illustration depicts a typical deployment of the subject technology. Actual infrastructure components and related costs may vary.*

EDIINT AS2 – GISB/NAESB

EDI Over The Internet, Applicability Statement 2

Gas Industry Standards Board/North American Energy Standards Board



LDC Costs:

Setup:	**$ 115,000 – 153,700+**
Operational:	**$ 105,000 – 121,900+**
Transaction:	**$ 0**

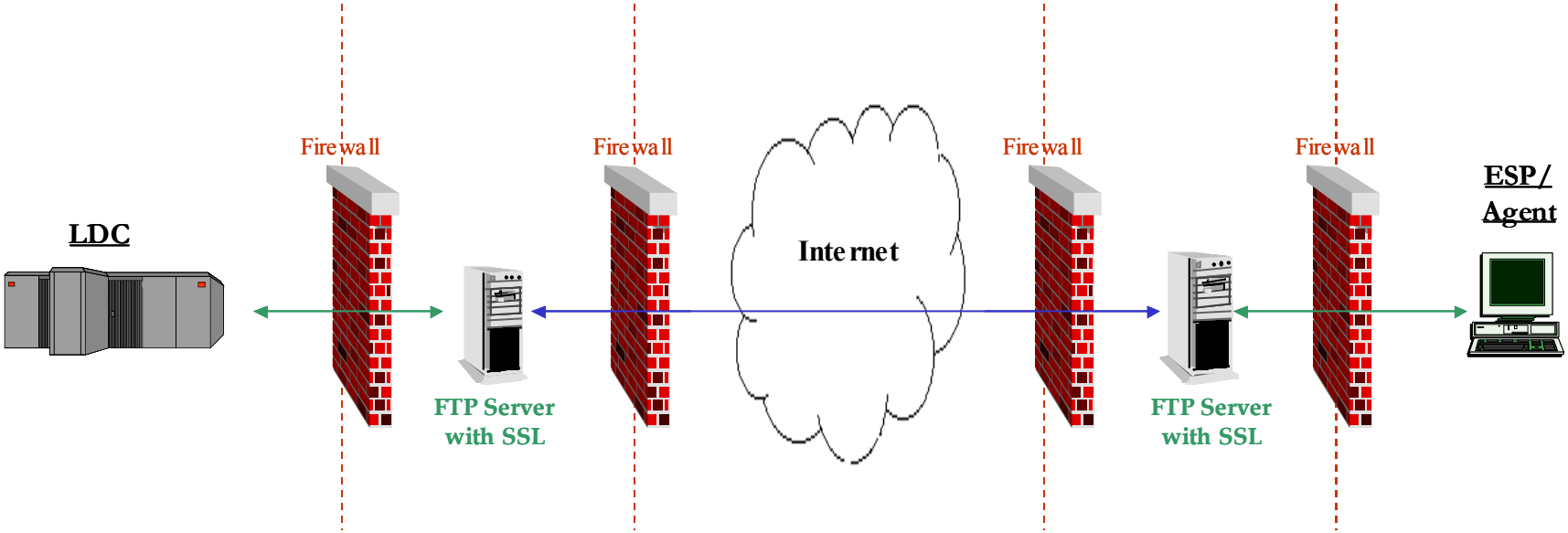
ESP/Agent Costs:

Setup:	**$ 60,900 – 110,900+**
Operational:	**$ 80,000 - 84,300+**
Transaction:	**$ 0**

Note: *This illustration depicts a typical deployment of the subject technology. Actual infrastructure components and related costs may vary.*

FTP With SSL

File Transfer Protocol with Secure Socket Layers



LDC Costs:

Setup:	**$ 80,000 – 96,200+**
Operational:	**$104,000 – 118,900+**
Transaction:	**$ 0**

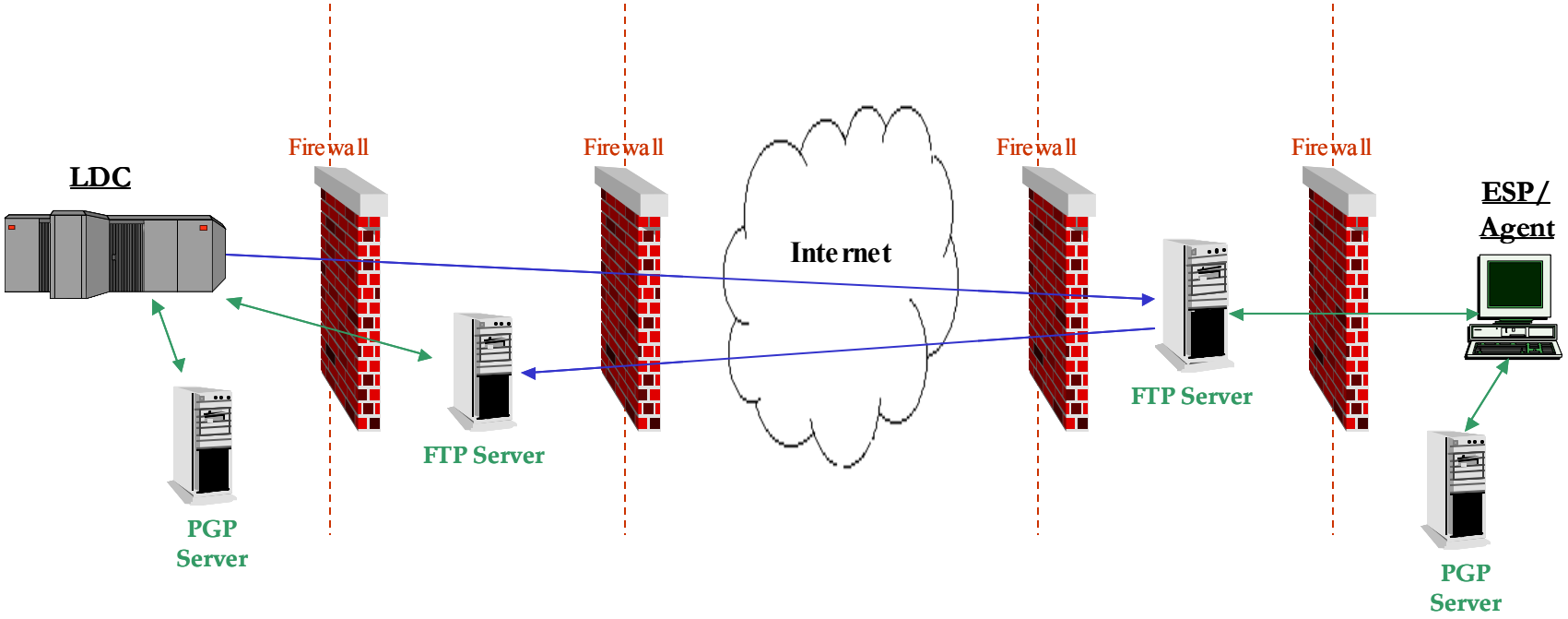
ESP/Agent Costs:

Setup:	**$ 11,000 – 12,200+**
Operational:	**$ 75,100 – 76,900+**
Transaction:	**$ 0**

Note: *This illustration depicts a typical deployment of the subject technology. Actual infrastructure components and related costs may vary.*

FTP With PGP

File Transfer Protocol with Pretty Good Privacy



LDC Costs:

Setup:	**$ 101,200 – 102,400+**
Operational:	**$ 108,200 – 122,600+**
Transaction:	**$ 0**

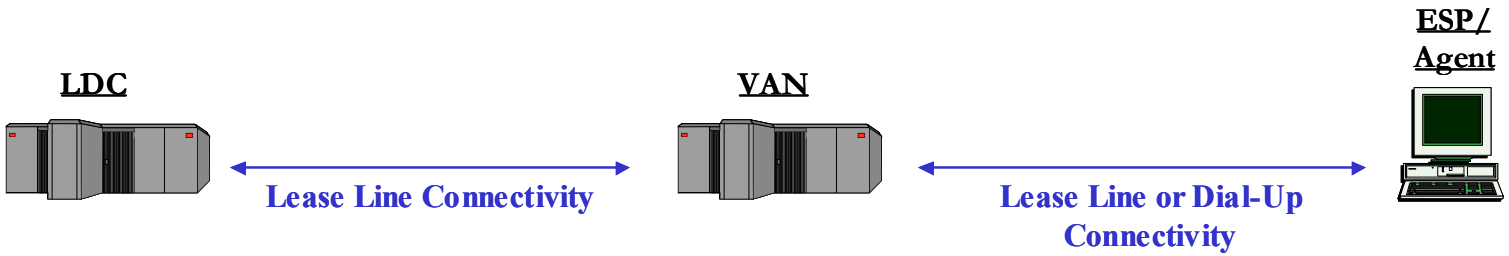
ESP/Agent Costs:

Setup:	**$26,000 - 27,200+**
Operational:	**$ 83,200 – 85,000+**
Transaction:	**$ 0**

Note: *This illustration depicts a typical deployment of the subject technology. Actual infrastructure components and related costs may vary.*

Traditional VAN

Value Added Network, Traditional Connectivity



LDC Costs:

Setup:	**$ 7,300+**
Operationl:	**$ 151,600+**
Transaction:	**$ 0**

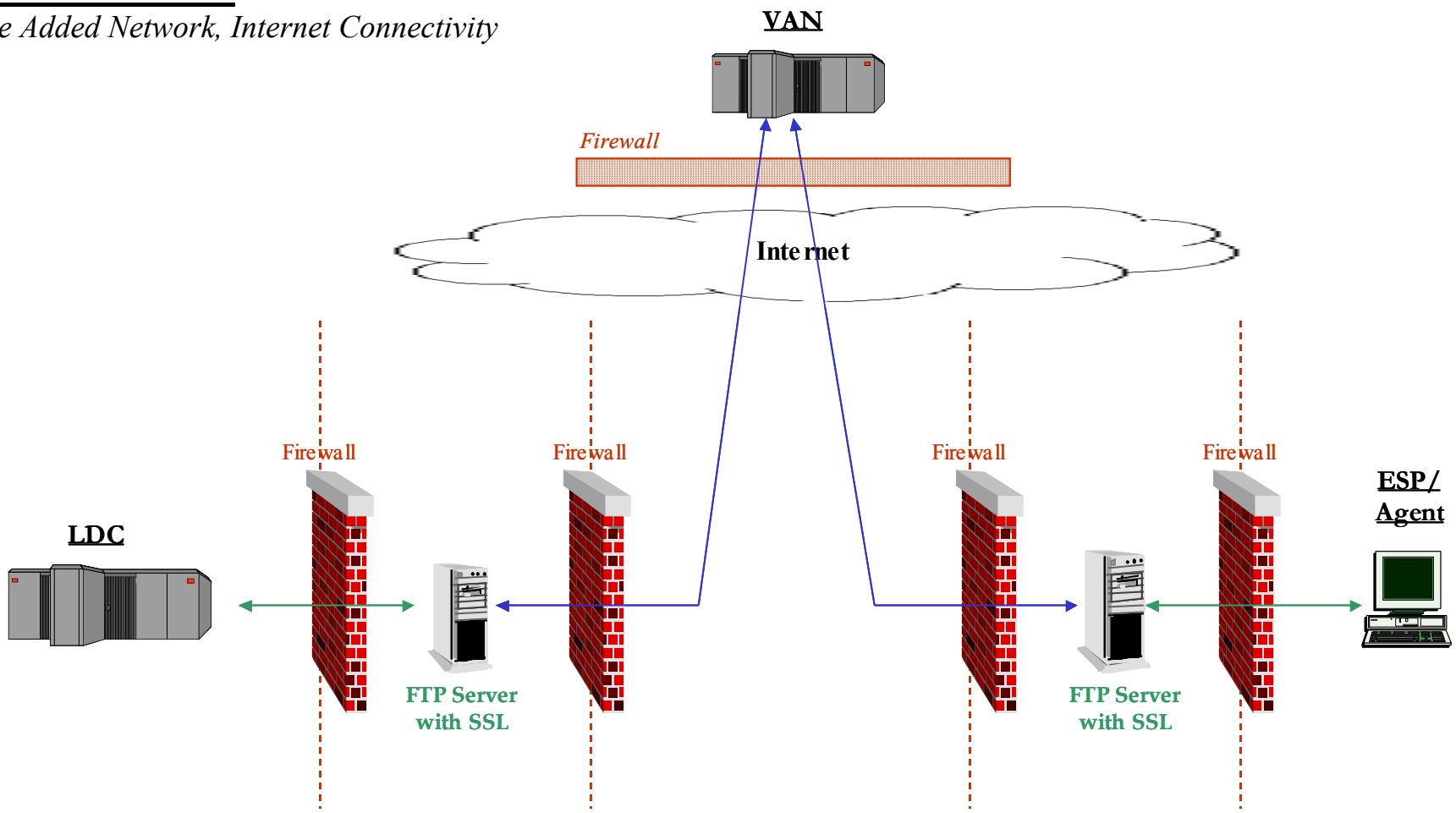
ESP/Agent Costs:

Setup:	**$ 1,150+**
Operationl:	**$ 75,000 – 76,200+**
Transaction, Prime:	**$ 1.27**
Tansaction, Non-Prime:	**$ .062**

Note: *This illustration depicts a typical deployment of the subject technology. Actual infrastructure components and related costs may vary.*

Traditional VAN

Value Added Network, Internet Connectivity



LDC Costs:

Setup:	**$ 197,700+**
Operationl:	**$ 121,900**
Transaction:	**$ 0**

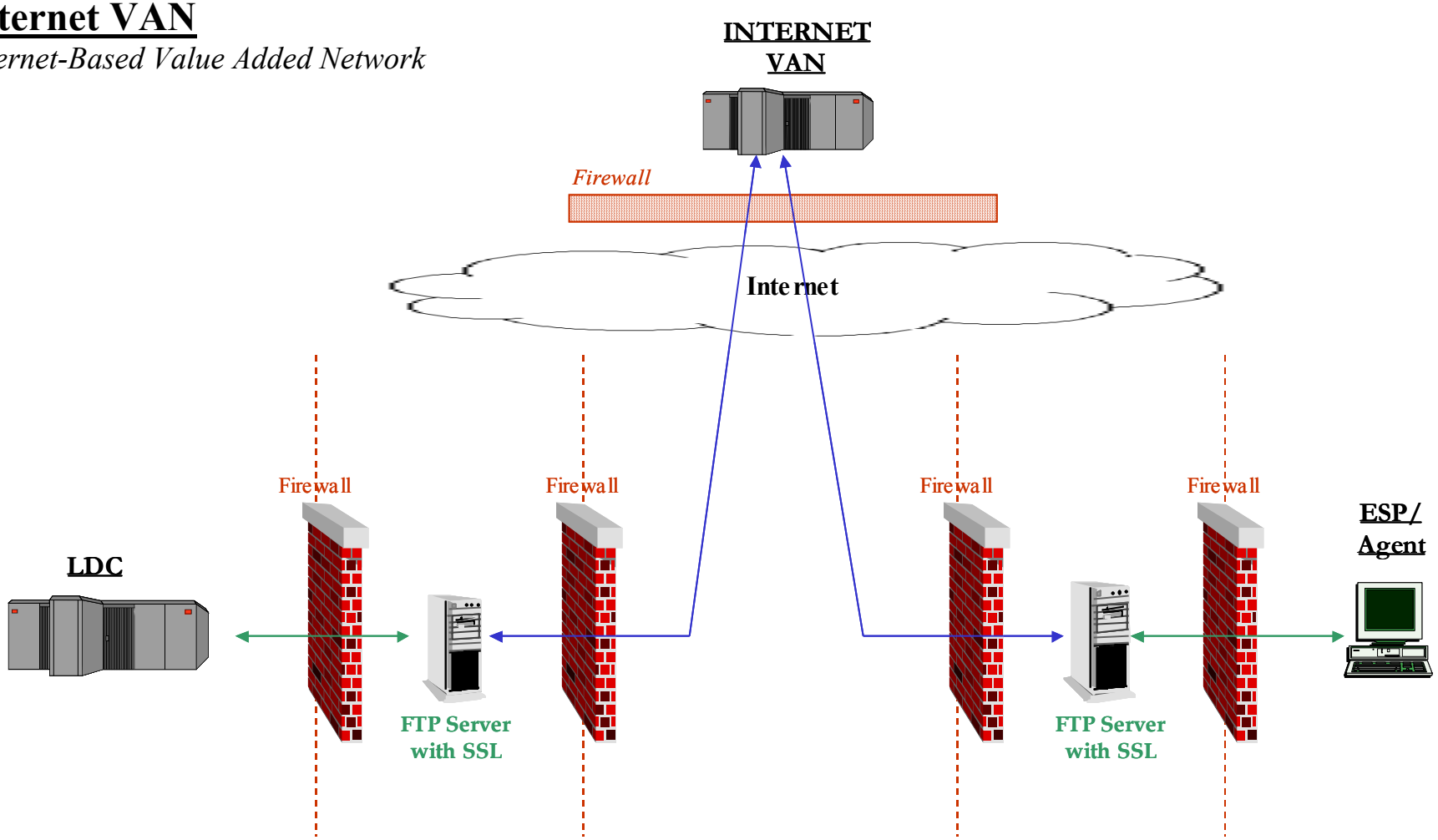
ESP/Agent Costs:

Setup:	**$ 1,000+**
Operationl:	**$ 1,200**
Transaction:	**$ 2,000/mo.**
	Up to 60 Mbs.
	$20.00 per Mb.
	Over 60 Mbs.

N *leployment of the subject technology. Actual infrastructure components and related costs may vary.*

Internet VAN

Internet-Based Value Added Network



LDC Costs:

Setup:	**$ 100,500 – 116,700+**
Operationl:	**$ 106,000 – 120,400+**
Transaction:	**$ 0**

ESP/Agent Costs:

Setup:	**$ 550+**
Operationl:	**$ 81,000 – 82,800+**
Transaction:	**$ .20 per KC**

Note: *This illustration depicts a typical deployment of the subject technology. Actual infrastructure components and related costs may vary.*

8.0 Further Considerations:

The following are several factors that should be considered by the Electronic Business Transactions Working Group:

- ✓ Security - Whatever protocol is chosen to be mandated between the ESP and the LDC or between the ESP and their elected Agent through to the LDC's Agent to the LDC and back to the ESP should be the same to ensure continuity is maintained throughout the entire process end to end.

- ✓ Enrollment first received first processed rule - To be changed to the date and time received in the ISA envelope. Due to the multiple protocols that may be used to receive Enrollments from ESP's or their Agents the LDC's can no longer depend on the VAN mailbox sequentially maintaining first in first out continuity.

9.0 APPENDICES

Appendix A: Websites of Interest

- Uniform Code Council Sponsors Program to Test Interoperability of E-business Software
  http://www.uc-council.com/news/ne_112701.html

- North American Energy Standards Board
  http://www.gisb.org/

- Group 8760, Inc.
  http://www.8760.com/nsindex.html

- Eight Vendors Complete Secure B2B INT AS2 Conformance Validation Test
  http://www.uc-council.com/news/ne_081401.html

- Sterling Commerce Adds Support for AS2 Security Standards Through Service and Software Offerings
  http://www.sterlingcommerce.com/apps/pressreleases/viewrelease.asp?releaseid=432

- IBM Internet Transfer
  http://ieas.services.ibm.com/ide/index.shtml

- UCC Global Solution Interoperability Testing Program
  http://www.drummondgroup.com/html-v2/ucc-program.html

- EDI over the Internet-AS2
  http://www.drummondgroup.com/html-v2/products-as2.html

Appendix B: Business Exchange Service, Description

NOTE: *The services below are offered by the common VAN currently used by members of the EBT Working Group. This corporation's name has been substituted with 'XXX'.*

Business Exchange Service (BES)

Since 1987, XXX* has been the premier provider of electronic business interchange services. Over that period of time, we have installed, implemented and coordinated trading relationships for more than 50,000 companies. About four months ago, XXX announced a new offering to compliment our Value Added Network services. The difference between this new service and our VAN is that BES utilizes completely web-based technologies for the transmission of EDI documents. The significance of this applying data transportation approach is that, by using web technology, XXX can reduce its own service's operating costs. These reductions, in turn, translate into lower usage fees for our customers.

The Internet data and document exchange component of XXX Interchange Services uses open standards to provide a bridge between Values Added Networks and new Internet-based environments. This means that the BES customers can use one Internet entryway to all of the XXX portfolio of Interchange offerings including Information Exchange and EDI VAN Interconnects.

Subscribers of Internet data and document exchange must have access to the Internet and use either HTTPS, FTPS, or SMTP transfer protocols. The Internet data and document exchange commerce engine exchanges files between trading partners in near real-time, operating on a store-and-forward basis. Security is provided through Secure Socket Layers (SSL) and/or Secure Multi-Purpose Internet Mail Extensions (S/MIME). EDI, XML, and proprietary file formats may be exchanged using this service component. Subscribers are responsible for the evaluation, selection and use of all transport protocols, security facilities, and/or security procedures.

Internet data and document exchange customers can use a variety of clients that will work with the service. Supported clients include Cyclone Interchange, S/MIME enabled SMTP email clients and CommerceNet certified SMTP EDIINT clients.

Although there are some operational differences between BES and VANs, the most significant difference can be found in the reduction of EDI transmission charges. Instead of traditional VAN charges,XXX's BES customers pay one flat rate per month for a certain level of total usage (in MB). In the event that a customer exceeds the allocated monthly usage level, there is an overage fee for each 1MB over the monthly clip level.

BES Subscription Pricing Plans

Plan	Base Plan Fee	Plan Volume (MB)	Overage Rate (Per MB)
Lite	$50	0.5	$150
Standard	$500	5	$50
Premium	$1,000	20	$40
Platinum	$2,000	60	$20

Compared to VAN services, BES is very inexpensive. Many VAN networks (including ours) charge their customers per transaction, while others charge monthly fees per trading partner. Without knowing the

frequency and size of the files you are planning to send, it is difficult to determine how much BES can save your organization. If you can provide the number of transmission you expect to send to your trading partners and the size of those documents, I can send you a document that can compare the various charges.

Our managed, shared Internet transport service for data exchange features:

- HTTPS (via Cyclone Interchange Solo or Enterprise)
- FTP/S (via
- SMTP/EDIINT (via any CommerceNet EDIINT AS1 certified client)
- temporary-store and forward, immediate processing
- support for multiple clients, open standards
- security rich, support for accepted trust models
- S/MIME
- SSL
- X.509 digital certificates
- public key cryptography
- multiple data format support for EDI (ANSI X12, EDIFACT), XML (cXML, xCBL, RosettaNet, BizTalk, ICE) or proprietary formats (including other XML formats)
- fixed monthly subscription pricing and lower cost than traditional VAN services
- dual paths to IE and VAN Interconnect servers
- duplicate system on 2nd server
- backup each transaction upon receipt

Other costs associated with BES:

Monthly account maintenance & admin fee= $53.00

- NO Set-up Charges
- NO Trading Partner enablement fees
- NO Technical or Account Support fees
- NO VAN-class charges (i.e. Message, Interconnect, etc.)
- NO Prime vs. Non-Prime pricing elements

FTP/S Clients supported

WS-FTP Pro V7+
http://www.ipswitch.com/Products/file-transfer.html
Windows GUI
Single license as low as $39.95

C-Kermit V8.0
http://www.columbia.edu/kermit/
Unix, etc., command-line
Free source code

Appendix C: Sample Customer Choice Transaction Byte Count

EBT Transaction sizes in bytes (approximate)

- Billing/Usage 810 400
- Envelope – ISA and GS 200
- Functional Acknowledgment 997 40
- Remittance 820 200
- Enrollment 814 250
- Change Customer Data 814 250
- Enrollment Confirm 814 400
- Supplier Drops customer 814 250
- Historical Usage Request 814 200
- Historical Usage Data 867 1000

Appendix D: List of 15 Products that passed the Drummond Group AS2 Testing, August 2002

AS2 PRODUCT LIST

Company Name:	Product-with-Version:
bTrade, inc.	TDAccess/TDPeer/TDNgine/TDBrowser using EDIINT engine, vs. 3.0
Cleo Communications	Cleo LexiCom, vs. 2.0
Hewlett Packard	Compaq ASx Transport Service (CATS), vs. 3
Cyclone Commerce	Cyclone Interchange/Activator, vs. 4.2
Cyclone Commerce	Cyclone Interchange/Activator, vs. 4.1.3
Global eXchange Services	Enterprise System (TM), vs. 7.5
InterTrade Systems Corp.	TradeLinks, vs. 2.5
IPNet Solutions, Inc.	IPNet eBizness Transact (TM), vs. 3.6
IPNet Solutions, Inc.	IPNet BizManager (TM), vs. 2
iSoft	iSoft Peer-to-Peer Agent, vs. 3.1
Sterling Commerce	Sterling Integrator, vs. 2.0
Sterling Commerce	Sterling Information Broker, vs. 3.5
TIBCO Software Inc.	TIBCO BusinessConnect (TM) AS2 Transport, vs. 1.0.0
Vitria	BusinessWare B2Bi Server, vs. 1.4
webMethods	webMethods Integration Platform, vs. 4.6

Appendix E: EDI Services Market Share – North America Only.

Source: GIGA Information Group, Inc. – August 2002

Sterling Commerce	**30%**
GE Global Exchange	**17%**
IBM Global Services	**17%**
Peregrine	**8%**
EDS	**5%**
Easylink	**4%**
QRS	**4%**
SPS Commerce	**3%**
ADX	**3%**
ICC.NET	**2%**
MCI	**2%**
Kleinschmidt	**2%**
All Others	**3%**

The significance of this information is that the top three EDI software vendors, representing 64% of the market, have completed testing of their respective products in August 2002 and have been certified for EDIINT AS2 interoperability and compliance to the global UCCnet standard.