

The 2005 I-Net Survey Results



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Mt. Hood Cable Regulatory Commission
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Executive Summary

In the fall of 2005 the Mt. Hood Cable Regulatory Commission (MHCRC) conducted a confidential survey to determine how the Institutional Network (I-Net) can best be managed, configured, maintained and updated to meet the current and future data, voice and video communications needs for the community. Planning to direct further development of the I-Net, including expenditures from the I-Net Fund to support that development, depends in part on the results of the 2005 survey.

The overall response rate to the survey was 60% (15 of 25 agencies), and among current users the response rate was 90%. In general, respondents expressed appreciation for having the I-Net and its services at lower cost than otherwise would be available to them. The most notable results of the survey centered around three areas, network operations, network maintenance, and network development.

Network Operations

Most of the current users of the I-Net experienced the startup of the I-Net and have views influenced by that perspective. They have generally noticed improvements in the operations of the network, whether in Comcast's/ComNet's response to outages or in billing. While areas that might need improvement were relatively few, those responses were often more detailed and longer than other, more positive responses.

- **Users want status updates and coordination during outages:** Respondents generally say ComNet employees have been available when called, and responders generally find that service has improved over the last year. Any complaint about operations tends to be a complaint about reliability, as in the following:

“Network performance during normal conditions is good. Cost in relation to bandwidth is good. Our primary concern is that the reliability of I-Net and the response to I-Net problems has not seemed to improve much over the last 24 months. Network events and the time it takes for resolution are a big concern, and they limit our confidence in using I-Net for critical services like VoIP without building extensive network redundancy.”

- **Spanning tree problems have been observed:** The nature of at least some outages has caused widespread impacts, such as the case where an entire hub was taken out of service, affecting a large number of sites. Although the number of such events seems to be declining, it is still a cause for concern:

“Overall planning and implementation have been acceptable. There have been instances of network problems that apparently resulted from new sites being connected which created spanning tree issues. Not sure if this is a ComNet or Comcast problem.”

- **Growing reliance on the I-Net has contributed to perceptions about outages:** Because 71% of the respondents have at least one site (one has up to 60 sites) that requires 24/7 reliable network performance, prior coordination of maintenance is becoming a bigger concern than might have been anticipated by Comcast , ComNet, or MHCRC. Consider the following comment:

“Network performance has nominally improved over the last 12 months, but the network continues to be plagued by unannounced outages, unplanned intrusive maintenance, and a lack of understanding of the effect of maintenance on [our] network.”

- **The I-Net has made increased numbers of phones available to the staff and students in schools:** Consider this comment from a school district with almost 1,000 phones in operation as a result of having the I-Net in operation:

“VoIP didn’t work so good on T1s. We couldn’t have done it without the I-Net.”

Network Maintenance

The nature of the network maintenance issues discovered through the survey indicates that users are learning to use the I-Net to their advantage and are making more robust use of the network than might have been anticipated. The answers to questions about VoIP reveal just that:

- **VoIP use is growing, so quality of service (QoS) is growing as a concern too.** Half of those responding to the survey (8 of 15 respondents) currently are using at least one kind of VoIP application, but 7 respondents would require central management for VoIP use to be attractive. The following comment indicates the concerns users have about using the I-Net for voice communications:

“To date, [it's] our opinion that I-Net has not proven to be reliable enough for use as a standalone network for enterprise wide VoIP applications without building significant redundancy.”

However, other users have proceeded with deployment of VoIP. Those appear to be ones accustomed to managing their own phone systems in the past, who have simply moved ahead with a migration to VoIP. The majority of users who have deployed VoIP are happy with the performance and with the resulting cost savings.

Network Development

Network development possibilities are revealed in the answers to some of the survey's questions:

- **A fair number of users would like 1 to 10 Mbit service available for roughly \$200/month.** More than half of the respondents (53%) are interested in a reduced bandwidth WAN service. Some respondents say such service would have to be competitive with DSL and cable broadband; others see incremental bandwidth service packages as a possibility.

In addition, it's clear that the I-Net's users already have a vested interest in its continuation:

- **Users are concerned about the potential legislative impacts on the I-Net of SB 1504.** Since the stakeholders of the I-Net are primarily public, education, or government entities, it is not surprising that they are concerned about efforts in the U.S. Senate and House to entitle telephone companies with rights to the video marketplace that do not include allowances for public, education, and government uses:

“We are very concerned about legislation, such as SB 1504, that may have a negative impact on the I-Net.”

The following table shows which agencies that were surveyed are I-Net users, which returned surveys, and which were interviewed.

Agency	I-Net User	Survey Returned	Interviewed
City of Fairview	◆	◆	
City of Gresham	◆	◆	
City of Portland	◆	◆	
City of Troutdale	◆	◆	
City of Wood Village	◆	◆	
Concordia University			
Housing Authority of Portland			
Lewis & Clark College			
MCTV			
MESD	◆	◆	◆ ¹
Metro		◆	
Mt. Hood Community College	◆		
Multnomah County	◆	◆	◆
NW Film Center			
OHSU			◆
OMSI			
OPB			
Oregon Film & Video/ Hollywood Theatre		◆	
Port of Portland	◆	◆	
Portland Community College			
Portland Community Media		◆	
Portland Public Schools	◆	◆	◆ ²
PSU		◆	
Reed College		◆	
University of Portland			

¹ Representatives from 4 districts served by MESD were also interviewed.

² Two representatives from PPS were interviewed.

Background

In the early fall of 2005 surveys were sent to 25 different agencies in Multnomah County who are eligible users of the Institutional Network (I-Net) provided by Comcast as part of that company's franchise through the Mt. Hood Cable Regulatory Commission (MHCRC) (see Attachment A for a copy of the survey). Surveys were e-mailed to recipients in late August, and 11 of the 15 responses were received within the first two months. An additional four surveys were received by mid January 2006 after telephone calls were made to remind participants of the survey. Collected results can be found in Attachment B.

Results

The 2005 I-Net Survey garnered an overall 60% response rate and a 90% response rate from current I-Net users. The information gleaned from the survey is useful: the current and future needs of the stakeholders are clearly apparent in the survey results.

It is notable that not all stakeholders answered all questions. It is difficult to know the cause for such response behavior. Sometimes responders clearly indicated they didn't think the question applied to them when they responded with *not applicable* or *NA*. Also, telephone follow-up conversations indicated that some responders simply did not have enough technical information within their grasp to answer some questions. In any event, such responding behavior means that some questions have much lower response rates than 60%. In addition, one responder did not submit a completed survey but was personally interviewed late in the fall. That responder's input is counted as one of the 15 responses to the survey, but it means that in general, the information in Attachment B will show 14 responses as a maximum.

I-Net Connectivity

Information collected regarding current and future connectivity plans of the I-Net stakeholders shows that stakeholders have plans to connect additional outside locations, both near-term and long-term. The I-Net has continued and will continue to grow. Some information collected was meant for updating MHCRC records, and that information has been sent to MHCRC offices.

Network Redundancy

Somewhere between one quarter and one-third of those responding to the survey (depending on which question's responses are considered) have no redundancy for their I-Net connection. However, 8 of 11 responding to one question indicate they have a need for such redundancy. Some have already acquired the redundancy they need, some are just now investigating what redundancy will cost, and others are just now beginning to imagine redundancy becoming important to their organizations. Not surprisingly, the cost of redundancy (for both initial build out and recurring monthly cost) is cited more than once as an impediment to acquiring the redundancy agencies might want.

Network Monitoring

The more sophisticated I-Net users with many nodes appear to be monitoring their network with a diverse range of tools:

2000 Server Monitoring Tools	LANDesk Network Manager
Diagnostic tools of engineering staff	HP OpenView
Nagios	Cacti
Solarwinds Orion	Kiwi Syslog
SNMP monitoring	Internet provider's website

In addition, the users suggested a number of information products when asked about what they would like to have available:

- Outage alerts and statistics
- Daily error reports
- Internal I-Net infrastructure
- Port-level monitoring information
- Historical statistics

On the other hand, having usage statistics, service availability, and other related data available on a secure web site interests only half of those responding to one question (question 5 [b]).

The Network

Basic Architecture

Just over half of the respondents employ a Wide Area Network architecture for their locations, and that same portion of respondents finds that the architecture is meeting their immediate or near-term needs. In addition, just over half of the respondents have dedicated connections to other agencies' locations:

- PPS hosts many local, state and federal agencies at school and department locations. These organizations are connected to the INET via the district's in-building network connections.
- Police to BOEC
- IRNE connections to several local governmental agencies.
- Dedicated 100 Mbps Ethernet to Clackamas ESD via Comcast
- We have a public safety LEDES connection, but it is a VPN, not a WAN.
- 256k frame relay connection to [a city]
- WAN connections to the City of Portland (IRNE)

-
- Portland Police Bureau (IRNE)
 - Oregon Dept. of Corrections (T1)
 - Oregon Judicial Network (T1)
 - Multnomah Public Defenders (T1)
 - PPDS, BOAC, PFD, LEDS & Regional ITS connectivity

Envisioning changes to their WAN requirements, respondents offered plenty of details. Note the frequency with which they make mention of VoIP, video, reliability, and redundancy.

“Continue to build fiber where needed.”

“Continuous increase in utilization and expectations of reliability.”

“We’d like to do [VoIP] to multiple sites, and to provide video streaming from the Oregon Zoo to local educational facilities.”

“We expect some deployment of VoIP and Video over IP. There will be a need to increase circuit redundancy to support critical services and accommodate further IT centralization and thin client services.”

“We might eventually like to send video information to PCM in this way.”

“More connections to other agencies & business partners - more redundancy and greater bandwidth driven by VoIP and video of all types.”

“As more video and data services are provided online and as data quality and reliability become a higher priority, increasing bandwidth will be required to satisfy business and education requirements. It is anticipated that the current 100Mbps network will need to be upgraded to a 1Gbps network within 5 years in order to meet demand.”

“Growth as we expand in the region.”

“The I-Net and VoIP are the best thing that’s happened to the schools in a long time.”

Despite envisioning bandwidth-intensive uses of their WAN, just over half of the respondents also see the need for reduced bandwidth WAN service. Desired cost for such reduced service ranges from “competitive with DSL” to \$500, and the reduced bandwidth ranges from 1 to 10 Mb.

Current Voice Services

Just over half of the respondents currently have an organization-wide PBX system for voice applications with phones ranging in number from 25 to 10,000. Seven responders detailed their voice traffic:

Inside Facilities	Inside Organization but Inter-office	Outside Organization
Unknown	Unknown	Unknown
Unknown	Unknown	Unknown
5%	5%	10%
15%	10%	20%
50%	25%	50%
50%	30%	65%
80%		90%

Half of those responding to the survey (8 respondents) currently are using at least one kind of VoIP application, and nearly all the rest (7 respondents) would be interested in using VoIP only if it were centrally managed. The voice platforms currently in use include the following:

Avaya	Mitel
Shoreline	Tadiran
3Com	Asterisk
Cisco	Nec

As for performance of the I-Net for VoIP applications, the following two comments give some hint as to general concerns with QoS:

“To date, [it's] our opinion that I-Net has not proven to be reliable enough for use as a standalone network for enterprise wide VoIP applications without building significant redundancy.”

“While we have not yet experienced issues with call quality, we expect that, without the implementation of QoS on INET, we will begin to experience call quality degradation over the next 12-24 months.”

On the other hand, some school districts have enthusiastically embraced the use of VoIP. One district with 1200 to 1400 such phones is very pleased and has found the impact on the network to be negligible.

Current Video Services

Current stakeholder use of video service transport methods are varied, as shown in the following:

Transport Method	WAN	I-Net	Internet	Other
H.323 Video Conferencing	3	4	4	
Other Video Conferencing	3	3	4	
Live Video Streaming	6	3	7	
Video Server/VOD				No: 3 Yes: 2

While 4 of the respondents are currently using the I-Net for video transport, an additional 7 respondents foresee future requirements that might be met by the I-Net. The basic connectivity/bandwidth requirements foreseen for those requirements include the following:

“Video streaming to schools for the Zoo.”

“There are no specific requirements at this time but we assume there will be in the future.”

“We are also interested in streaming video and a video server.”

“Video from I-net sites – never been demo’d or tested.”

“Video teleconferencing [particular locations listed].”

“As video requirements increase, we will see an increase in bandwidth utilization due to video streams and video conferencing.”

“Unknown but likely to need I-Net for local video.”

24 x 7 Performance

Including the questions about the I-Net’s performance 24 x 7 shows MHCRC’s concerns about the increasing importance of network reliability. Stakeholders are also concerned, particularly in light of VoIP applications for voice and increasing agency dependencies on the I-Net.

It is notable that 71% of the respondents have at least one site that requires 24 x 7 performance. Three respondents say that all of their sites require 24 x 7 performance (and *all* means over 60 sites for one respondent). In addition, when asked about near- and far-term network requirements, respondents offered the following:

“Currently all services are expected to be 100% available from 6am to 11pm. Disruptions during off-hours are expected to be minimized.”

“Possible enterprise-wide VoIP plus current requirements.”

“Remote operation of video system.”

“Schools and other PPS sites are increasingly in use throughout the day and evening, and scheduled data transfers and other scheduled activities require 24/7 availability of the network. Additionally, the implementation of Voice over IP requires that telephone service be available continuously and without interruption.”

“Expectations for availability continue to grow. By 3-5 years, 100% uptime will be expected.”

“Remote robotic cameras.”

“It is anticipated that all sites will require high levels of availability and reliability within 5 years as sites are migrated to Voice over IP and data services become ubiquitous and available remotely.”

Customer Service

If I-Net users have complaints, the complaints are about customer service, the coordination between ComNet and Comcast, and the updating of status reports when the network has an outage. It is also important to note that on any given question about customer service, no more than 6 or 7 of 15 agencies responded to the question, and generally, half of the responses indicated satisfaction with service. The dissatisfied were quite specific, as can be seen in the following comments, and that specificity can be useful as planning proceeds for the I-Net. Note that these 15 comments were culled from the responses to eight different customer service questions, so they do not represent the majority of I-Net users on any given question.

“Billing is fine, although site identification by address would be helpful. Network performance during normal conditions is good. Cost in relation to bandwidth is good. Our primary concern is that the reliability of I-Net and the response to I-Net problems has not seemed to improve much over the last 24 months. Network events and the time it takes for resolution are a big concern, and they limit our confidence in using I-Net for critical services like VoIP without building extensive network redundancy.”

“Reliability: The INET network suffers from a lack of reliability and configuration management. After a series of serious and unexplained outages, improvements have been made in Comcast’s willingness to provide advance outage notification, schedule maintenance periods and provide information on RFO for unscheduled outages. Significant additional improvement is required in order to make the INET a reliable network provider in the medium term. “

“Historically there have been issues with the initial calls not being handled expeditiously. Stability has been much better over the last year.”

“Response time especially after normal business hours has been unpredictable. There are still instances of unscheduled downtime and network outages due to Comcast’s apparent reluctance to view I-Net as a mission critical 24/7 service.”

“There are often coordination issues between ComNet and Comcast that aggravate outages and increase outage times.”

“Every instance of downtime seems to be accompanied by slow response and the necessity for ComNet or the customer to spend considerable time and effort convincing Comcast that the problem is not related to customer premise equipment (that’s the first thing we check). This results in extending the duration of the outages. Also, Comcast and ComNet are often unaware that there is a problem until the customer notifies them. although some outages may be apparent to the customer first, there doesn’t seem to be proactive edge/core I-Net network management/monitoring using NMS email or paging alerts.”

“Technical resolution time and status update frequency has been minimally acceptable, and has shown improvement over the last 12 months.”

“Overall business hour availability has been acceptable but there have been times when coverage seems inadequate. Non-business hour availability and communication has been poor. I understand that ComNet is revising their procedures so we are hoping for improvement.”

“The ComNet help desk has been ineffective in providing effective escalation and notification, and we have found that directly contacting the individuals involved in troubleshooting is the only effective method of reporting, status and resolution.”

“The impact of I-Net maintenance is significant. Although there is a monthly window reserved for maintenance, several days’ advanced notice that this window will be used is needed for proper County WAN customer notification. There have been instances of Comcast doing unscheduled maintenance resulting in a site outage because Comcast assumed the site was not a 24/7 location.”

“Network performance has nominally improved over the last 12 months, but the network continues to be plagued by unannounced outages, unplanned intrusive maintenance, and a lack of understanding of the effect of maintenance on the network.”

“The impact of I-Net outages does not seem to be fully appreciated by Comcast. Recent outages have revealed the communication between Comcast and ComNet is still poor. Communication with customers during I-Net outages is poor with very little in the way of information concerning the cause of the problem or resolution unless explicitly requested.”

“There appears to be a lack of effective escalation procedures and coordination of repair efforts. There have been several instances of widespread outages that lasted

several hours. Out status inquiries to ComNet during these outages consistently point to a lack of coordination/communication between the two agencies.”

“Comcast does NOT provide service to the Portland Airport; ComNet DOES !! The Port of Portland desires a commercial network provider for its tenants at the Portland Airport.”

“It is not clear that Comcast and ComNet have effective and rapid communications methods and status reporting and update requirements. We have often noticed that updates from Comcast via ComNet are vague and do not provide information needed to identify reasons for outage (RFO) and expected outage durations.”

I-Net Compared to Other Providers

Fewer than half of the responding agencies answered any one of the questions asking how the I-Net compares to other services and service providers. This may be because the agencies have no basis for making comparisons or because previous service providers offered services that could not be reasonably compared (dial-up Internet, for example). In general, however, responses indicate that I-Net provides increased reliability for less cost to the agencies who responded to these questions. In addition, billings are judged to be fine though one responder expressed a desire to have site addresses included on the invoices.

Past Planning and Implementation

Only five agencies responded to a question about ComNet’s planning and implementation of (or changes to) new circuits. One instance of a spanning tree issue was cited, though planning and implementation were otherwise judged by that respondent as acceptable. Other respondents were satisfied with ComNet’s process of managing new/different circuits.

Future Possibilities

Stakeholders were asked to envision the future of their telecommunications service and found suggestions made in the survey attractive. For example, nearly three-quarters of the respondents are interested in interconnecting with a City or area-wide wireless network.

Video and multi-media content, course work, VPN connections to school networks, and remotely sourced public programming are seen as the kinds of applications agencies might deploy if fiber were provided to all homes and businesses in Multnomah County. Also envisioned for such infrastructure are improvements to web functionality and increased inter-agency data sharing.

Other services/capabilities the respondents are interested in include the following:

“Outage notification system that would generate emails to specified people so they are aware of outages prior to the Bureau calls.”

“Expanded connectivity options. More bandwidth, lower costs, greater access.”

“VLAN among counties and cities for data sharing, such as GIS.”

“More Dark Fiber - increasingly we need to light DWDM multi-gigabit links.’

“Interactive web training on demand”

“Broadcast Metro Council meetings over the Internet, multiple location v/IP, video streaming, employee telecommuting, wireless access at facilities”

“We would like ALL government and public programming to be on the internet.”

“(1) VoIP in 2 to 3 years. (2) 4.9 GHz public safety WLAN in 1 to 2 years at PDX. (3) ITS data & video feeds to regional transportation partners in 1 to 2 years. (4) Video teleconferencing in 2 to 3 years.”

“We plan to continue to develop and improve our network reliability and capacity so that we are able to provide a wide range of video, curriculum and remote access services to our staff and student users.”

“Too many to list, our main goal now is to lift all university bandwidth from here to Seattle where we connect to advanced networks - dark fiber is key.”

Other Thoughts

Other thoughts offered by survey respondents varied widely, from expressing concern about U.S. Senate Bill 1305 to expressing hope that technology will provide a solution to existing physical obstructions to connecting to the I-Net for small agencies. One responder called for finalizing live-remote capabilities for net-casting of video programs. Other responders expressed interest in having MHCRC provide a presentation/marketing effort about current and future I-Net capabilities. Another respondent expressed frustration about learning the nuts and bolts necessary to get a site up and running and wanting a sort of on-call technical expert for trouble shooting assistance. Other expressed their appreciation to Comcast and ComNet for assistance on large projects and in grant funding efforts.

Conclusion

The survey reveals that MHCRC and its I-Net stakeholders look forward to working together to improve the I-Net. While some complaints may be sharply detailed, the low number of negative responses reflects a general satisfaction with the service.

Most important, the survey results point the direction for I-Net planning efforts:

1. How best can MHCRC provide users the kind of network monitoring information they want:

Outage alerts and statistics

Daily error reports

Internal I-Net infrastructure
Port-level monitoring information
Historical statistics

Would making this information available on a secure web site be the best way of keeping users informed? Or do individual agency WAN administrators need more targeted information and targeted delivery?

2. Given users' increasing reliance on the I-Net and their growing 24/7 needs, what quality of service (QoS) enhancements can be provided?
3. Is a centrally managed VoIP service for users a realistic growth path for the I-Net, and if it is, how quickly can it be implemented and for what cost?
4. How can reduced bandwidth services be offered over the I-Net with attractive pricing for users?
5. What, if anything, should be done to prepare for the increasing use of bandwidth intensive video on the I-Net?

Attachment A: The 2005 Survey

Community Institutional Network (I-Net) Survey For the Mt. Hood Cable Regulatory Commission

Please return this survey by September 2, 2005.

Introduction

The Mt. Hood Cable Regulatory Commission (MHCRC) is conducting this confidential survey to determine how the I-Net can best be managed, configured, updated and maintained to meet your current and future data, voice and video communications needs. Planning is taking place to direct further development of the I-Net, including expenditures from the I-Net Fund to support that development. This survey will assist the MHCRC in its planning effort so that the network can more precisely meet the needs of our community I-Net stakeholders.

The I-Net serves public and non-profit agencies in Multnomah County. You have received this survey because your organization is either currently using the I-Net or qualifies to use it in the future.

Some of the questions asked in this survey may be requesting information that is of a sensitive or confidential nature to your organization. Therefore, please complete the survey and return it to Brian Nordlund at bnordlund@sparling.com. As the contractor working for MHCRC, Sparling will collect the survey data and present it in a summary format to the MHCRC, Comcast and ComNet, without including any identifying information, for network planning purposes. Should you have any doubts about responding to the survey freely, please feel free to sign the attached Non-Disclosure Agreement (NDA) and send it to Sparling before sending your survey response to Sparling.

We hope to obtain information of a technical nature, as well as visionary projections of future plans. We encourage you to involve multiple representatives from your organization, especially if it would help this objective. If you have any questions while you complete this survey, please contact Brian Nordlund, Sparling, (503) 273-0086, or Julie Omelchuck, MHCRC, (503) 823-4188, julieo@ci.portland.or.us.

After you have returned your survey responses to us, we will conduct an interview with you to clarify information or answer questions that may arise in reviewing your completed survey.

We appreciate your time and effort in providing your response and request that you return your completed survey to us no later than September 2, 2005.

Please provide the following information for the primary person responding to the survey:

Organization/Institution: _____

Agency/Department: _____

Contact Person: _____

Title: _____

Phone _____ Fax: _____ E-Mail: _____

Address: _____

1. Review of I-Net Site List

If you are a current I-Net user, a list of your existing activated and inactive I-Net sites is attached for your review. Please review the list to ensure that it is complete and accurate. You are also encouraged to use copies of this list to note answers for some of the remaining questions.

2. Current or Near-Term Outside Location Connectivity:

Please indicate all sites outside your organization (sites that do not appear on the attached site list) with which you are, or soon will be, connected (0 to 2 years). Please add a page if necessary.

Site Name	Address	Connection Type (speed, I-Net/Leased)
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

3. Future Connectivity Plans:

Please indicate all sites that do not appear on the attached site list with which you may need telecommunications links in the future (3 to 10 years). Please add a page if necessary.

Site Name	Address	Connection Type (speed, I-Net/Leased)
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

4. Network Redundancy

Please provide a list of redundant circuits or other redundant elements in your network used to improve reliability:

Please briefly describe any future plans, desires or issues for implementing redundancy in your network, whether by duplicate facilities or through hardware diversity:

Do you have a need for redundancy with your Internet connection? If yes, please describe the barriers (i.e. cost, etc.) to developing a secondary Internet connection.

5. Network Monitoring and Information

Please provide a brief description of your current network monitoring approach and its capabilities:

Are you interested in having usage statistics, service availability, and other related data about your I-Net circuits/services available to you on a secure web page?

Yes No

If you are a current I-Net data services user, do you use a website (for example, <http://www.irnet.net> or some other web site) for network monitoring and other I-Net information?

Yes No

What other network monitoring information would you like to have available?

6. Wide Area Network, Basic Architecture

Do you have a Wide Area Network among your own locations? Yes No

Do you have dedicated Wide Area Network connections to locations owned or shared by other agencies? Yes No

If yes, please briefly describe:

Is your WAN architecture meeting your immediate or near term needs? Yes No

If not, is there a cost issue? Please describe:

Please describe how you see your WAN requirements changing over the next several years.

For some of your locations, do you have a need for a reduced bandwidth WAN service, at a lower cost? Yes No

If yes, please briefly describe the desired bandwidth, the number of potential sites, and cost point necessary to make it attractive:

Would you be interested in having the ability to manage your own VLANs across the I-Net (such as an encapsulated VLAN scheme)? Yes No

7. Internet Usage

Do you have Internet service? Yes No

If yes, please briefly describe the provider, connection speed, etc. (leased connection to ISP, service provided via another agency, dial-up, DSL, cable modem, IRNE access, etc.):

Is your Internet service meeting your immediate or near term needs? Yes No

If not, is there a cost issue? Please describe:

Will your current Internet service meet your future needs? Yes No

Do you have a need for a reduced bandwidth Internet service, at a lower cost?
Yes No

If yes, please briefly describe the desired bandwidth, and cost point necessary to make it attractive:

8. Voice Applications, Basic Architecture

Do you have an organization-wide PBX system for your voice applications? Yes No

Please list your sites, the number of telephones, and outside trunks utilized:

Site Name	No. of Phones	No. of PSTN Trunks
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Please provide data on the routing of your voice traffic. We are interested in how much traffic stays within a facility, how much leaves facilities but stays *intra*-organizational, and how much traffic requires use of the public switched telephone network. Please express this balance as a percentage:

Percent Inside Facilities: _____%
Percent Inside Organization But Inter-Office: _____%
Percent Outside Organization: _____%

9. Voice over Internet Protocol (VoIP) Services:

Do you currently use a Voice over IP system (VoIP)? Yes No

If yes, is it TDM over IP? YES

or is it a native VoIP platform ?

If yes, are you currently using VoIP over the I-Net? Yes No

Please provide a brief description of your approach to VoIP (managed internally / externally, LAN-based or WAN, Cisco / Avaya / other platform, future plans & time frames, etc.):

If you are not currently using VoIP, would you require VoIP to be centrally managed in order for it to be attractive to your organization? Yes No

If you are currently running a VoIP application, have you been satisfied with the performance of the I-Net for those applications? Yes No Please explain.

10. Video Services

Do you currently use your wide area network for digital video transport?

H.323 Video Conferencing: On WAN
To Other Agencies on I-Net
Over Internet

Other Video Conferencing: On WAN
To Other Agencies on I-Net
Over Internet

Live Video Streaming: On WAN
To Other Agencies on I-Net
Over Internet

Video Server / VOD: Yes No

If yes to any of the above, are you currently using the I-Net for this transport?
Yes No

Please provide a brief description of your existing video applications:

If you are not currently using the I-Net for video transport, do you have future requirements that might be met by the I-Net? Yes No

If yes, please describe the basic connectivity / bandwidth requirements and sites involved:

11. 24 x 7 Network Performance

How many sites do you have that require 24 x 7 uptime? _____

Do you have future plan that would require 24 x 7 uptime? Yes No

If so, please describe the nature of those requirements:

0 to 3 years: _____

3 to 5 years: _____

12. Customer Service and Network Performance

If you are a current ComNet client using the I-Net, please answer the following questions. If not, please skip to question group 12.

Please provide a brief description of your satisfaction with existing I-Net services, including reliability, network performance, costs, response from ComNet or Comcast, billing, etc.:

If you are a current ComNet client using the I-Net, when you have had a connectivity technical problem:

Has the initial response time been acceptable? Yes No

Please explain: _____

Has the technical resolution time been acceptable?

Please explain: _____

Have ComNet employees been available, within a reasonable amount of time, when you have called?

Please explain: _____

Have you contacted Comcast directly to address a network connectivity issue?

Yes No

If yes, please describe the approximate date and nature of your call to Comcast:

Have you been satisfied with the pre-notification process for scheduled network outages?

Yes No

If not, please explain. _____

If you have been a customer for more than a year, have you experienced an improvement in network performance over time?

Please explain: _____

If you have been a customer for more than a year, have you experienced increasing satisfaction with the I-Net over time?

Please explain: _____

Is it your impression that ComNet and Comcast have clear and effective protocols in place to resolve network issues? If no, please describe your concerns or observations.

If you previously contracted with another telecommunications provider before using the I-Net:

In comparison to your previous service provider, have you experienced an increase, decrease or the same network reliability.

Please explain: _____

In comparison to your previous service provider, have your monthly costs changed?

Please explain: _____

Have your ComNet bills been accurate, easy to understand and timely?

Please explain: _____

Have you been satisfied with ComNet's planning and implementation of new circuits or changes to circuits?

Please explain: _____

13. High-Level Projections for the Future

Have you any interest in interconnecting with a City or area-wide wireless (Wi-Fi) network to increase your coverage, services, mobility, or to save you the expense of wiring?

Please explain: _____

If a network were to be built that provided fiber to all the homes and business in Multnomah County, what kinds of applications and services do you envision that your organization might deploy to take advantage of such a network?

Please explain: _____

What other services and/or capabilities are you interested in that are not currently offered over the I-Net?

Assuming the technology is to be available and affordable, please provide some organizational goals that may benefit from telecommunications services. This should be a non-technical description of goals, such as one of the following:

"We plan to deploy Voice over IP in _____ years."

"We would like to broadcast city council meetings over the internet."

“We would like to provide video taped training courses to remote offices on desktop computers using our WAN (Internet).”

14. Other Thoughts, Concerns, and Insights

Your turn:

Any other questions, comments and information you would like to share with the Mt. Hood Cable Regulatory Commission and Comcast for consideration in this stakeholder needs assessment:

Please complete the survey and return it to Brian Nordlund at

bnordlund@sparling.com

Thank you for participating in the survey.

NON-DISCLOSURE AGREEMENT

This Non-Disclosure Agreement is made this _____ day of _____, 2005, between Sparling Inc. (hereafter "Sparling") and _____ (hereafter "Recipient"). The parties hereby agree:

1. Recipient may disclose to Sparling certain confidential or proprietary information including information relating to its finances, strategies, operations, systems, software, technologies, products, and services (collectively its "Confidential Information") for mutually beneficial purposes. Disclosure of Confidential Information may be in any audible, visible, or any tangible or intangible form or medium.
2. Sparling shall maintain the confidentiality of Recipient's Confidential Information and not disclose such Confidential Information to any third party without the express written authorization of Recipient.
3. All Confidential Information shall at all times remain the property of Recipient. No use of such Confidential Information is permitted except as authorized by Recipient. No express or implied grant or license of Recipient's intellectual property rights or copyrights is given to Sparling.
4. Recipient does acknowledge and hereby grant Sparling to use the Confidential Information in summary, aggregate form (devoid of identifying particulars) in its work for the Mt. Hood Cable Regulatory Commission.
5. This Agreement is subject to the laws of the State of Oregon.

By:

(Recipient): _____

Name: _____

Signature: _____

Address: _____

Sparling, Inc.

Name: _____

Signature: _____

Attachment B: Compiled Survey Responses

Note that the responses in the following pages have been edited in an attempt to conceal as much as possible the identity of the responding agency.

1. Review of I-Net Site List

Two files transferred to MHCRC via e-mail.

2. Current or Near-Term Outside Location Connectivity: Please indicate all sites outside your organization (sites that do not appear on the attached site list) with which you are, or soon will be, connected (0 to 2 years).

- Clear Creek- -DSL
- Spreadsheet transferred to MHCRC via e-mail.
- New School-TBA-I-Net
- None
- Hollywood Theatre-4122 NE Sandy-fiber-fed video
PCM- -fiber-fed video
- 5 sites:
Marine Facility Maintenance, 10801 N. Lombard Street, Portland. OR.: Leased - 10 mb LSS;
Marine Terminal Two, 3556 N.W. Front Ave. Portland, OR.: Leased - DSL;
Marine Terminal Four, 11040 N. Lombard Street. Portland, Or.: Leased - T1;
Marine Terminal Six, 7201 N. Marine Drive, Portland, OR.: Leased - 10 mb LSS;
Navigation, 6208 N. Ensign Street, Portland, OR.: Leased - T1 (Qty=2).
- 5 sites:
New Columbia School , 100Mbps, INET ;
PPS Data Center , 1Gb, IRNE/INET ;
Multnomah ESD , 100Mbps ;
Redundant Circuits to HS (3 circuits) , 100Mbps, INET, redundant ckt ;
East Sylvan School , 100Mbps, INET, redundant ckt

3. Future Connectivity Plans: Please indicate all sites that do not appear on the attached site list with which you may need telecommunications links in the future (3 to 10 years)

- None currently known.
- New School-TBA-I-Net
New School-TBA-I-Net
New School-TBA-I-Net
- File transferred to MHCRC via e-mail
- PDX Economy Parking Lot, Airport Way: Multiple T1 speeds for video; Hillsboro Airport, 3355 N.E. Cornell Road, Hillsboro: T1 to T3; Troutdale Airport, 999 N.W. Frontage Road, Troutdale: DSL or T1; PDX Employee Parking Lot, Alderwood Rd Extension: Multiple T1 speeds for video.
- None

4. Network Redundancy:

Please provide a list of redundant circuits or other redundant elements in your network used to improve reliability: 10/14 responded

No redundancy - 4

Redundant circuits reported:

- 1 DSL line
- 1 cable connection (Comcast)
- IRNE network is used as entrance at two locations -Portland Bldg and the 911 COMM building
- T1 frame relay circuits to several sites to provide circuit redundancy
- IRNE T1 lines duplicated by Qwest between PDX and BOAC and redundant Qwest T1s from PDX to separate Qwest central offices for credit card verification lines.
- [We are] currently designing a secondary circuit to provide for a minimum level of service and redundancy in the event of a hub outage affecting [our] data center. Near term plans include secondary circuits to two additional sites to improve reliability and minimize the effect of INET hub outages.
- Multiple paths from campus, internet exchange, Free Space Optic failover

Please briefly describe any future plans, desires or issues for implementing redundancy in your network, whether by duplicate facilities or through hardware diversity: 7/14 responded

- None - 2
- Redundancy to internet and remote facilities would be desirable, but cost/budget constraints are insurmountable
- Secondary wireless connection between Metro and MERC
- In addition to the redundancy we have today at certain locations, we plan to do a wireless bridge pilot test, and where available utilize County fiber between buildings to provide backup paths to the WAN core
- Add IRNE Sonet at 121 NW Everett Street to PDX
- [We are] currently designing INET circuit redundancy to mitigate the effects of INET hub outages on the enterprise. Current planning indicates that secondary INET circuits to divergent hub locations as well as secondary backhaul circuits will improve overall reliability. [We are] also designing a fully redundant IRNE connection to provide uninterrupted ISP service to the Pittock building.
- Plan to add one more fiber path to Pittock

Do you have a need for redundancy with your Internet connection? If yes, please describe the barriers (i.e. cost, etc.) to developing a secondary Internet connection. 11/14 responded (No, 3; Yes, 8)

No answers:

- Not for [our] individual INET locations.
- No
- We have no need now because our provider has been extremely reliable. We would have considered I-Net for a redundant pathway if it had been available at installation time. Cost is a consideration

Yes answers:

- Currently in place
- Yes; cost/budget
- Yes. Negotiating Internet redundancy with PPS and CESD.
- Yes. Cost.
- Yes, already have and adding more
- Yes. We will be investigating cost and design options during the next 12-18 months. Cost is a consideration but not necessarily a barrier.
- Future need exists - Would like redundancy at PDX; however, Qwest is the only local loop provider.
- As more services are utilized remotely and additional internet-based research and learning comes online, ISP connectivity reliability becomes a primary concern. The primary barriers to developing full redundancy for the ISP connection at the Pittock building are the cost of the build-out and the monthly recurring cost.

5. Network Monitoring and Information:

Please provide a brief description of your current network monitoring approach and its capabilities: 10/14 responded

- 2000 Server Monitoring Tools
- LANDesk Network Manager/limited capabilities
- Engineering can look at the active and non active sites on INET as a part of their diagnostic tools.
- HP OpenView, Nagios, and Cacti
- On Internet connection, our provider gives us traffic reports on usage. On our internal WAN, we monitor it with Nagios.
- We use Solarwinds Orion (SNMP) and Kiwi syslog to monitor the County and Library WASN. We are notified via email in the event of a circuit or network device outage. Orion provides current and historical network statistics.
- SNMP monitoring with status paging to IT staff
- [We] currently employ a 2-tiered network monitoring approach. The first tier monitors the network core, [our] data center, all associated active equipment across the WAN that is accessible. . . , and the border router at each location. The second tier monitors in-building down-line routers and switches at the active device and port level.
- Extensive, all node monitoring across 7000+ node infrastructure
- We can monitor onsite and at a website at our Internet provider

Are you interested in having usage statistics, service availability, and other related data about your I-Net circuits/services available to you on a secure web page? 12/15 responded

No: 6

Yes: 6

If you are a current I-Net data services user, do you use a website (for example, <http://www.irnenet.net> or some other web site) for network monitoring and other I-Net information? 12/15 responded

No: 11
Yes: 1

What other network monitoring information would you like to have available? 9/14 responded

None - 2

The following monitoring information products were suggested:

- Outage alerts and statistics
- Error reports generated daily on INET locations and or specific City of Portland sites. This could be auto-emailed to ComNet.
- A view into the internal INET infrastructure would be nice, permitting us to do more throughout problem isolation before opening a trouble ticket with Comnet.
- We would be very interested in having access to I-Net network monitoring information. To date, this information has not been available or the data provided has been of little use.
- Network reports.
- The current PDX INET monitoring site contains high-level information only. Additional definition, granularity and port-level monitoring is required in order to be effective. Also, reports and downloadable statistics history would be useful for annual reporting.
- Minimal, just need coordination with engineers

6. Wide Area Network, Basic Architecture:

Do you have a Wide Area Network among your own locations? 13/15 responded

No: 5
Yes: 8

Do you have dedicated Wide Area Network connections to locations owned or shared by other agencies? 12/15 responded

No: 4
Yes: 8

If yes, please briefly describe:

- Police - BOEC
- IRNE connections to several local governmental agencies.
- Dedicated 100 Mbps Ethernet to Clackamas ESD via Comcast.
- We have a public safety LEDS connection, but it is a VPN, not a WAN.
- 256k frame relay connection to [a city]

-
- WAN connections to the City of Portland (IRNE), Portland Police Bureau (IRNE), Oregon Dept. of Corrections (T1), Oregon Judicial Network (T1), and the Multnomah Public Defenders (T1).
 - PPDS, BOAC, PFD, LEDS & Regional ITS connectivity
 - [We host] many local, state and federal agencies at school and department locations. These organizations are connected to the INET via the district's in-building network connections.

Is your WAN architecture meeting your immediate or near term needs?

No: 2

Yes: 8

If not, is there a cost issue? Please describe: 4/14 responded

- Not applicable: 2
- Yes, cost is an issue. Will install IRNE for redundancy & to increase bandwidth where possible.
- We may add connections to research networks such [as] I2

Please describe how you see your WAN requirements changing over the next several years. 8/14 responded

- Continue to build fiber where needed
- Continuous increase in utilization and expectations of reliability.
- We'd like to do V/IP to multiple sites, and to provide video streaming from the Oregon Zoo to local educational facilities.
- We expect some deployment of VoIP and Video over IP. There will be a need to increase circuit redundancy to support critical services and accommodate further IT centralization and thin client services.
- We might eventually like to send video information to [agency] in this way
- More connections to other agencies & business partners - more redundancy and greater bandwidth driven by VoIP and video of all types.
- As more video and data services are provided online and as data quality and reliability become a higher priority, increasing bandwidth will be required to satisfy business and education requirements. It is anticipated that the current 100Mbps network will need to be upgraded to a 1Gbps network within 5 years in order to meet demand.
- Growth as we expand in the region

For some of your locations, do you have a need for a reduced bandwidth WAN service, at a lower cost? 13/15 responded

No: 5

Yes: 8

If yes, please briefly describe the desired bandwidth, the number of potential sites, and cost point necessary to make it attractive: 8/15 responded

- 3 mbps, 5 sites, below \$500.00
- Provide half the bandwidth at half the cost for smaller locations 10 MG, 100 MG, etc.
- We have about 20 sites that 100mbps is excessive. A \$250/Month 10mbps option would be nice.
- Would have to be competitive with DSL
- An incremental bandwidth/cost structure (10 Mb increments) would allow a more granular approach to providing needed bandwidth while minimizing cost. A 10 Mb option with a cost point of \$200 or less would be attractive for small sites. There are 12-15 [of our] sites currently not on INet that would be candidates. There are 10-20 existing I-Net sites for which less than 100 Mb would be adequate.
- We are currently a broadband cable data subscriber at lower rates
- Up to 15 [of our] locations use less than average bandwidth. A reduced bandwidth level (10Mbps, 1.5Mbps) may be acceptable at these sites for up to 2 years. This is strictly a short-term measure as the bandwidth requirement is anticipated to increase at lower-bandwidth sites within 3 years.
- We may have a need as we acquire buildings in Portland

Would you be interested in having the ability to manage your own VLANs across the I-Net (such as an encapsulated VLAN scheme)? 11/15 responded

No: 7

Yes: 4

7. Internet Usage:

Do you have Internet service? 14/15 responded

No: 0

Yes: 14

If yes, please briefly describe the provider, connection speed, etc. (leased connection to ISP, service provided via another agency, dial-up, DSL, cable modem, IRNE access, etc.):

- Integra/768/Email at Quick.com/Comcast cable for ???lover
- T1
- Cogent communications, 1.5 mbps
- Two separate links to two separate ISPs..
- Easy Street web page hosting - \$205.20 annually; DSL from Verizon supported by ISP East Street - we run Exchange Server 1.5 M download, 384K upload for \$49/mo.
- Cogent: 175Mbps, Time-Warner: 175Mbps. Shared with PPS, CESD, and NWESD
- ELI, floor of 3 Mbs up to 10 (variable), connection by IRNE to Pittock

- [Our] WAN uses the State of Oregon DAS as its ISP (DAS uses Cogent). The connection speed is 20 Mb. The first segment of this connection is an IRNE circuit to the PSOB. The [department] WAN uses Cogent as its ISP. The WAN connection to Cogent is via fiber from the Central Library to the Pittock Building. The connection speed is 100 Mb.
- We utilize the Comcast broadband service at lower costs
- Fractional T-1, w/ phone service- Integra is our current provider
- Leased connections - A total of four T1 lines to Qwest and one T1 to XO Communications. DSL connections from Verizon & Earthlink.
- PPS belongs to the Metro Partnership, a consortium of K12 service providers. The primary Metro Partnership stakeholders are Portland Public Schools, Clackamas Education Service District (ESD), Multnomah ESD and Northwest Regional ESD. The Metro Partnership's presence at the Pittock building provides for primary and backup ISP access for stakeholders and subscribed members. PPS connects to the Metro Partnership architecture at the Pittock building via a SONET connection at the Water Interstate building with subsequent IRNE routing to the Pittock meet-me room. PPS currently subscribes to 622Mbps service to the Pittock building and subscribes to 60Mbps ISP service from the Metro Partnership.
- Very complex, multi-provider
- 100mb Ethernet throttled to 35mb over redundant fiber paths

Is your Internet service meeting your immediate or near term needs?

No: 2
Yes: 12

If not, is there a cost issue? Please describe:

- We could [use] expanded capability and redundancy, but money is an issue.
- Qwest will not provide DSL service to Portland Airport. Comcast will not provide cable service to Portland Airport.
- A critical lack of redundancy has reduced reliability. Funding constraints prohibit effective implementation of physically redundant circuits and transport methods. This is increasingly important as [we] increase the ability for staff and students to access services remotely, and produces a requirement for 99.999% reliability that is difficult to attain in a single-threaded circuit configuration.

Will your current Internet service meet your future needs? 14/15

No: 5
Yes: 9

Do you have a need for a reduced bandwidth Internet service, at a lower cost?

No: 11
Yes: 1

If yes, please briefly describe the desired bandwidth, and cost point necessary to make it attractive:

8. Voice Applications, Basic Architecture

Do you have an organization-wide PBX system for your voice applications?

No: 4

Yes: 8

Please list your sites, the number of telephones, and outside trunks utilized:

- City Hall - 500 - 80
- Wastewater Plant - 25 - 4
- Operations Center - 50 - 5
- Too many to list. IRNE provides dial tone for City.
- MESD-410-48
 - David Douglas: Almost VoIP 1,000 phones
 - Parkrose: 500 to 600 stations, but IP trunking used for inside calls
 - Centennial: 1200–1300
 - Reynolds: 1200–1400
- PCM-TV-24-6- w/ fractional T-1
- POP, 585, 41 CO, 1ISDN, 5 T1s; PDX, 965, 24 DID, 34 CO , 1 ISDN & 4 T1s; T6, 166, 8 DID, 9 CO & 2 T1s; MFM, 32, 4 DID, 4 CO & 1 T1; ARFF, 30, 8 DID, 5 CO + 1 in-house T1.
- Portland State, 10000; offsite, 300-500
- City Hall, 30, 8; Police Dept., 15, 4; Public Works, 15, 4
- Reed College, 2100, 5 PRIs

Please provide data on the routing of your voice traffic. We are interested in how much traffic stays within a facility, how much leaves facilities but stays *intra-organizational*, and how much traffic requires use of the public switched telephone network. Please express this balance as a percentage:

Percent Inside Facilities: %

80%

Unknown (2)

15%

5%

50%

50%

Percent Inside Organization But Inter-Office: %

10%

Unknown (2)

25%

5%

30%

Percent Outside Organization: %

10%
Unknown (2)
65%
90%
20%
50%

9. Voice over Internet Protocol (VoIP) Services:

Do you currently use a Voice over IP system (VoIP)?

No: 6
Yes: 8

If yes, is it TDM over IP? or is it a native VoIP platform?

TDM over IP: 3
VoIP: 2
No response: 3

If yes, are you currently using VoIP over the I-Net?

No: 4
Yes: 3

Please provide a brief description of your approach to VoIP (managed internally / externally, LAN-based or WAN, Cisco / Avaya / other platform, future plans & time frames, etc.):

- We will be adding an Avaya ACD platform by the end of the year to our 5E switch to support call centers within the City.
- Centennial: Mitel, 1200–1300 phones (Dave Pierce 503-762-3449); David Douglas: Shoreline, almost 1,000 phones (Keith Seher 503-261-8265); Parkrose: Tadiran 500–600 phones (Dan Young 503-408-2734); Reynolds: 3Com, 1200–1400 phones; MESD: Meridian (410)
- One-in our Latex facility on Swan Island. Managed internally, 3 Qwest lines for PSTN, software is Asterisk, 8 phones.
- Managed internally. Limited deployment to date to support specific applications. Enterprise VoIP services are currently under study.
- Avaya
- The district's VoIP infrastructure is centrally managed and maintained by district personnel, and we are reviewing requirements and available vendors for external routine management of the VoIP infrastructure in the future. There are currently approximately 900 VoIP phones installed across the district, and there are plans in place to increase the number of VoIP-installed sites based on the availability of funding. PPS uses the Cisco Call Manager and Cisco VoIP phones.
- Some Avaya trunking, trials of VOIP in new buildings
- NEC system managed internally.

If you are not currently using VoIP, would you require VoIP to be centrally managed in order for it to be attractive to your organization?

No: 2

Yes: 7

Not applicable: 1

If you are currently running a VoIP application, have you been satisfied with the performance of the I-Net for those applications?

No: 1

Yes: 1

Not applicable: 2

Comments from *no* responses:

- To date, its our opinion that I-Net has not proven to be reliable enough for use as a standalone network for enterprise wide VoIP applications without building significant redundancy.
- While we have not yet experienced issues with call quality, we expect that, without the implementation of QoS on INET, we will begin to experience call quality degradation over the next 12-24 months.

10. Video Services

Do you currently use your wide area network for digital video transport?

No: 1

Yes: 2

H.323 Video Conferencing:

On WAN - 3

To Other Agencies on I-Net - 4

Over Internet - 4

Other Video Conferencing:

On WAN - 3

To Other Agencies on I-Net - 3

Over Internet - 4

Live Video Streaming:

On WAN - 6

To Other Agencies on I-Net - 3

Over Internet - 7

Video Server / VOD:

No: 3
Yes: 2

If yes to any of the above, are you currently using the I-Net for this transport?

No: 5
Yes: 4

Please provide a brief description of your existing video applications:

- The City provides services through their own in-house video techs.
- Tried live video streaming once; will use again when available.
- All of the above
- We bring in streaming video from our Condor facility and transport it to the Zoo.
- Real video for board hearings.
- City/county access prms- gvmt meetings
- Video teleconferencing is a future application. Some security CCTV streams are passed over the WAN to remote DVRs
- The district's video applications are primarily externally provided, and are inbound streaming video services (i.e.: United Streaming).
- Extensive Distance Learning, Global scope

If you are not currently using the I-Net for video transport, do you have future requirements that might be met by the I-Net?

No: 4
Yes: 7

If yes, please describe the basic connectivity / bandwidth requirements and sites involved:

- Video streaming to schools for the Zoo.
- There are no specific requirements at this time but we assume there will be in the future Current bandwidth options most likely are adequate to meet needs.
- We will be up and running within the next two months; we are also interested in streaming video and a video server
- Video from I-net sites-never been demo'd or tested
- Video teleconferencing: 121 Everett, 7000 Airport Way, 10801 N. Lombard, 7201 N. Marine Drive
- As video requirements increase, we will see an increase in bandwidth utilization due to video streams and video conferencing.
- Unknown but likely to need I-net for local video

11. 24 x 7 Network Performance

How many sites do you have that require 24 x 7 uptime?

- 0, for 4 respondents
- 1, for 3 respondents
- 2
- 6
- 9
- 18
- All
- All
- All (over 60)

Do you have future plans that would require 24 x 7 uptime?

No: 7

Yes: 5

If so, please describe the nature of those requirements:

For 0 to 3 years:

- Currently all services are expected to be 100% available from 6am to 11pm. Disruptions during off-hours are expected to be minimized.
- Possible enterprise-wide VoIP plus current requirements.
- Remote operation of video system
- Schools and other sites are increasingly in use throughout the day and evening, and scheduled data transfers and other scheduled activities require 24/7 availability of the network. Additionally, the implementation of Voice over IP requires that telephone service be available continuously and without interruption.

For 3 to 5 years:

- Expectations for availability continue to grow. By 3-5 years, 100% uptime will be expected.
- Remote robotic cameras
- It is anticipated that all sites will require high levels of availability and reliability within 5 years as sites are migrated to Voice over IP and data services become ubiquitous and available remotely.

12. Customer Service and Network Performance

Please provide a brief description of your satisfaction with existing I-Net services, including reliability, network performance, costs, response from ComNet or Comcast, billing, etc.:

-
- N/A
 - Initially, there was some downtime that was not considered as critical to Comcast, but service has gotten better. The cost is expensive to some of our sites (fire stations). Billings have been ok.
 - Our Bureaus appreciate the bandwidth provided and reliability provided.
 - We are very satisfied in all categories.
 - Video transport for Council meetings; works well.
 - Billing is fine, although site identification by address would be helpful. Network performance during normal conditions is good. Cost in relation to bandwidth is good. Our primary concern is that the reliability of I-Net and the response to I-Net problems has not seemed to improve much over the last 24 months. Network events and the time it takes for resolution are a big concern, and they limit our confidence in using I-Net for critical services like VoIP without building extensive network redundancy.
 - Totally satisfied with the network performance and customer service !!!!
 - Reliability: The INET network suffers from a lack of reliability and configuration management. After a series of serious and unexplained outages, improvements have been made in Comcast's willingness to provide advance outage notification, schedule maintenance periods and provide information on RFO for unscheduled outages. Significant additional improvement is required in order to make the INET a reliable network provider in the medium term. Network performance:
 - Been OK. We have leased fiber - it works, occasional troubleshooting needed

If you are a current ComNet client using the I-Net, when you have had a connectivity technical problem:

Has the initial response time been acceptable? 7/14 responded (No, 3; Yes, 4)

- No. Historically there have been issues with the initial calls not being handled expeditiously. Stability has been much better over the last year.
- No. Response time especially after normal business hours has been unpredictable. There are still instances of unscheduled downtime and network outages due to Comcast's apparent reluctance to view I-Net as a mission critical 24/7 service.
- No. There are often coordination issues between ComNet and Comcast that aggravate outages and increase outage times.
- Yes. No outages have affected the 4 sites.
- Yes
- Yes
- Yes In most cases has been good

Has the technical resolution time been acceptable?

- No. Every instance of downtime seems to be accompanied by slow response and the necessity for Comnet or the customer to spend considerable time and effort convincing Comcast that the problem is not related to customer premise equipment (that's the first thing we check). This results in extending the duration of the outages. Also, Comcast and Comnet are often unaware that there is a problem until the customer notifies them. although some outages may be apparent to the customer

-
- first, there doesn't seem to be proactive edge/core I-Net network management/monitoring using NMS email or paging alerts.
- Any down time for the fire and police is bad, but except for an occasion or two (Comcast) it has been acceptable.
 - Technical resolution time and status update frequency has been minimally acceptable, and has shown improvement over the last 12 months.
 - No outages reported
 - Yes
 - Yes

Have ComNet employees been available, within a reasonable amount of time, when you have called? 7/14 responded

- Not applicable
- Yes
- Yes
- Yes
- Usually
- Overall business hour availability has been acceptable but there have been times when coverage seems inadequate. Non-business hour availability and communication has been poor. I understand that Comnet is revising their procedures so we are hoping for improvement.
- The ComNet help desk has been ineffective in providing effective escalation and notification, and we have found that directly contacting the individuals involved in troubleshooting is the only effective method of reporting, status and resolution.

Have you contacted Comcast directly to address a network connectivity issue?

No: 5
Yes: 1

If yes, please describe the approximate date and nature of your call to Comcast:

- Yes.
- Varied

Have you been satisfied with the pre-notification process for scheduled network outages?

No: 1
Yes: 5

Comment from *No* response

- The impact of I-Net maintenance is significant. Although there is a monthly window reserved for maintenance, several days' advanced notice that this window will be used is needed for proper WAN customer notification. There have been instances of

Comcast doing unscheduled maintenance resulting in a site outage because Comcast assumed the site was not a 24/7 location.

If you have been a customer for more than a year, have you experienced an improvement in network performance over time?

- Yes, reliability is better.
- At [two locations] the increase of bandwidth was very noticeable. The other two sites were new locations.
- Yes
- Assuming performance refers to network latency over I-Net, this has always been good when network conditions are normal.
- Network has always been reliable
- Network performance has nominally improved over the last 12 months, but the network continues to be plagued by unannounced outages, unplanned intrusive maintenance, and a lack of understanding of the effect of maintenance on the network.
- Not Sure

If you have been a customer for more than a year, have you experienced increasing satisfaction with the I-Net over time?

- Yes
- The 4 sites are satisfied with performance and overall speed.
- Yes
- No. The impact of I-Net outages does not seem to be fully appreciated by Comcast. Recent outages have revealed the communication between Comcast and Comnet is still poor. Communication with customers during I-Net outages is poor with very little in the way of information concerning the cause of the problem or resolution unless explicitly requested.
- Satisfaction has been consistently high
- Response to outages and network problems has improved over the last 12 months.

Is it your impression that ComNet and Comcast have clear and effective protocols in place to resolve network issues? If no, please describe your concerns or observations.

- Much better now than in the beginning!
- No network issues at our specific sites (outside the scheduled maintenance windows).
- Yes
- No. There appears to be a lack of effective escalation procedures and coordination of repair efforts. There have been several instances of widespread outages that lasted several hours. Out status inquiries to Comnet during these outages consistently point to a lack of coordination/communication between the two agencies.

-
- Comcast does NOT provide service to the Portland Airport; ComNet DOES !! The Port of Portland desires a commercial network provider for its tenants at the Portland Airport.
 - It is not clear that Comcast and ComNet have effective and rapid communications methods and status reporting and update requirements. We have often noticed that updates from Comcast via ComNet are vague and do not provide information needed to identify reasons for outage (RFO) and expected outage durations.
 - I do have the sense that their systems work fine for us

If you previously contracted with another telecommunications provider before using the I-Net:

In comparison to your previous service provider, have you experienced an increase, decrease or the same network reliability.

- Increase
- BHCD service was having performance issues and uptime problems prior to conversion and now is very satisfied with their response time to their applications. The four sites residing on INET have not experienced any notable downtime.
- Significant increase in network reliability
- Overall network reliability has probably been about the same. The primary difference is the scope of the outage. Since multiple sites are on one I-Net hub, problems on a given hub can affect users at several sites. In some instances all [of our] I-Net sites have been down.
- Network reliability compared to our previous provider has nominally improved.
- Increase in provisioning turnaround

In comparison to your previous service provider, have your monthly costs changed?

- Yes; for most of the sites the cost increased.
- The INET connections replaced T1 service , which were approx. \$150.00 to \$200.00 more per month. However, the lack of required bandwidth was a significant hindrance to performance levels.
- Approximately 33% decrease in monthly costs
- Monthly costs have increased somewhat; however, I-Net provides significantly better bandwidth.
- ComNet is lower than Qwest - considerably lower
- Monthly cost per Mb of subscribed service has decreased significantly compared to our previous provider.
- Gone down

Have your ComNet bills been accurate, easy to understand and timely?

- Yes; for most of the sites the cost increased.
- The end users within the City do not receive the INET bills directly, but rather see a monthly debit internally for their collective communications services .
- Yes

-
- The billing process has been fine. More site information (like site addresses) on the bills would be helpful.
 - Accurate & timely but perhaps not easy to understand.
 - Billing and customer service functions have been responsive, easy to understand, and flexible.
 - We have a simple bill for fiber lease

Have you been satisfied with ComNet's planning and implementation of new circuits or changes to circuits?

- No complaints have been voiced to our Division.
- Yes
- Overall planning and implementation have been acceptable. There have been instances of network problems that apparently resulted from new sites being connected which created spanning tree issues. Not sure if this is a Comnet or Comcast problem.
- Yes
- Improvements have been noted in ComNet's circuit planning and costing.

13. High-Level Projections for the Future

Have you any interest in interconnecting with a City or area-wide wireless (Wi-Fi) network to increase your coverage, services, mobility, or to save you the expense of wiring?

- No
- no
- Yes. Our mobile employees need wireless connectivity with better speed than CDMA offers.
- There is an RFP presently out, which is a partnering situation with the City for WIFI services.
- Yes. Ubiquitous wireless and peering agreements.
- Yes
- Yes, depending on the service provided and cost.
- yes, though it's a challenge in our concrete building
- would help w/ data from city depts for prgm information,
- Yes, for some DSL speed connectivity at fixed locations.
- PPS is a key stakeholder in the Portland Wireless Initiative, which seeks to accomplish many of the objectives outlined above.
- No, we will want to peer with the network
- Probably not but our students who live off campus and faculty may be interested/

If a network were to be built that provided fiber to all the homes and business in Multnomah County, what kinds of applications and services do you envision that your organization might deploy to take advantage of such a network?

- None
- Improvements to web functionality; more online systems. Improvements to inter-agency data sharing.
- If very reasonably priced perhaps provide or replace services to small more remote locations that need to access City applications and or Internet services. These kind of services would benefit small non-profits that sometimes are housed in City facilities, ie. after school programs, out reach orgs or shelters.
- Delivery of media-rich educational materials to the home.
- Multi-cast capable video streaming from the Zoo
- None at this time.
- we would definitely be interested in working to provide video content and previews for our films and programs
- REAL remote sources for public programming, as originally promised and envisioned in the franchise negotiated in the late 70's and early 80's, streaming to non-cable subscribers- the only way streaming video works at acceptable quality is the system must be the ISP- like Ashland Oregon .
- This would open a huge opportunity for us to deliver course work!
- VPN connections to our campus network/

What other services and/or capabilities are you interested in that are not currently offered over the I-Net?

- None
- Outage notification system that would generate emails to specified people so they are aware of outages prior to the Bureau calls.
- Expanded connectivity options. More bandwidth, lower costs, greater access.
- VLAN among counties and cities for data sharing, such as GIS
- Dot1.q tunneling
- More Dark Fiber - increasingly we need to light DWDM multi-gigabit links

Assuming the technology is to be available and affordable, please provide some organizational goals that may benefit from telecommunications services.

- None
- Interactive web training on demand
- Broadcast Metro Council meetings over the Internet, multiple location v/IP, video streaming, employee telecommuting, wireless access at facilities
- We would like ALL government and public programming to be on the internet
- VoIP in 2 to 3 years. (2) 4.9 GHz public safety WLAN in 1 to 2 years at PDX. (3) ITS data & video feeds to regional transportation partners in 1 to 2 years. (4) Video teleconferencing in 2 to 3 years.
- We plan to continue to develop and improve our network reliability and capacity so that we are able to provide a wide range of video, curriculum and remote access services to our staff and student users.
- Too many to list, our main goal now is to lift all university bandwidth from here to Seattle where we connect to advanced networks - dark fiber is key.

14. Other Thoughts, Concerns, and Insights

- None
- Comcast has worked very diligently over this past summer to insure that connections were activated for all the Phase 3.5 requests. Many of these were school locations, which open for business Sept. 7th. Comcast successfully completed their activations in order to meet the timeframes provided. Many thanks to Matt and Mike for their coordination with the City staff. In addition, we have appreciated the participation of the MHCRC in developing new relationships with HAP and PCC. They have been more than helpful when assistance in larger projects is needed.
- We could probably benefit by someone coming out and giving us a presentation on potential I-Net services we could use in the future in order to make better estimates.
- We are very concerned about legislation, such as SB1504, that may have a negative impact on the I-Net.
- Re question #3. We are unable to connect the Oregon Zoo directly to either IRNE or I-Net, due to physical connection obstacles. Other sites, like a very small facility in Oregon City and Oxbow Park, are too far out to be connected.

In the larger context of other small units like the boat launches, pioneer cemeteries and small parks, we may want to connect to them as technology makes it more feasible to provide service to very small units.

Re question 5: other than broadcasting Council meetings, we don't use I-Net services, and hence don't require any monitoring ability.

Re Question 8. We operate multiple PBX's (upwards of 9), so if this information is critical, please advise--it will take some time to pull it together.

- I-Net has provided the ability to have high speed WAN connections to many [of our] locations. We have been able to accommodate the ever increasing need for network bandwidth at a reasonable cost and appreciate the grant funding efforts by MHCRC and Comnet to make the I-Net a reality. However, for I-Net to reach its full potential, we feel that there needs to be significant improvement in the areas of network reliability and network monitoring, and more effective troubleshooting and problem resolution processes.
- We have been frustrated and embarrassed by our inability to move our project forward quickly due to the specific challenges that we have faced with our site. Although it may be a lot to ask, perhaps a "think tank" of open-minded technical engineers and others might be available as a resource for grantees from MHCRC. These folks might be useful both in the review process and in the process of implementation when issues arise. Our project has been aided tremendously by the contacts that the MHCRC staff provided. Perhaps a group of "outside" individuals willing and able to troubleshoot would provide the necessary momentum that other organizations need as the move through the implementation of their grants.
- Finalize the live remote capabilities for program sources
- Airport tenants would like DSL or cable modem speeds at the Portland Airport. This service is not provided by either Comcast or Qwest at this time. The Port of Portland would like cable TV service available at PDX for its tenants and its own use. Some alternative to using Qwest at PDX is highly desirable for redundancy.
- We appreciate the support of the MHCRC and look forward to a continuing to work together to improve the ability of our staff and students to communicate effectively.