Technical Plan for OHN

Prior to OHN, health facilities had two basic choices for data network connectivity. They could lease dedicated lines between pairs of locations or they could use the public Internet.

Leased line solutions for data are similar to the earliest days of voice - telephony before the advent of central office telephone switches, when conversations were possible only between two points on the opposite ends of a line. Once central office switches were introduced, customers needed only one line to the central office and could be connected from there to any other customer; without being required to arrange for lines to any other location. OHN provides a similar solution for data networking in Oregon by requiring a high quality link from each end user location to a common data switching location. That single broadband connection then permits reliable connectivity with every other end user location connected to the switch.

This high quality broadband connectivity is quite different from that of the public Internet. Because the Internet is not a single network, but is the result of interconnecting a large number of independent networks throughout the world, no Internet Service Provider (ISP) can control the quality of service except on its own portion of the complex network. Consequently, all ISP contracts are "best efforts" contracts with no guarantees for the amount or quality of data transport provided. Since all of the major Internet connection points on the west coast of the United States are in California or Washington, almost all Oregon Internet traffic is routed out of state before getting from one Oregon destination to another.

The lack of quality guarantees has made the public Internet unsuitable for real-time medical applications, including telemedicine consults and real-time medical education applications. While there are health facilities using the Internet for some of these applications, complaints persists that lack of quality have limited usage. OHN makes it possible to obtain the economic advantages of Internet-like data transmission and the availability of connections to a vast number of sites, while retaining the quality of service previously available only on dedi-

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cated leased lines.

The OHN technical plan is simple: OHN arranges for its participants to contract with telecommunications vendors to provide a guaranteed amount of reliable data capacity from their location to an Oregon data switching facility in Portland, the Northwest Access Exchange (NWAX). NWAX permits each end user site to connect with many other sites throughout Oregon, including all OHN participant sites. Thus, one connection from a clinic would be sufficient for it to reach any medical facility in Oregon with high quality service. Even though different telecommunications vendors provide service to different facilities in different parts of the state, the guaranteed availability and quality of service on each link to the central switch is sufficient to ensure that the connection between any two locations will permit reliable real-time medical consultations and procedures.

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The OHN Network Operations Center (NOC) monitors the network to ensure that each telecommunications vendor meets the contractually committed quality of service on its portion of the network. OHN participants may contact the NOC for help whenever they have technical network problems. NOC staff will work with the telecom vendors to identify and resolve any problems.

The OHN technical plan also includes regional exchanges in Medford and in Redmond. These regional exchanges will interconnect OHN traffic in their respective regions so that data traffic between two points in the region can be connected locally, without having to be transported to Portland and back. This is quite different from Internet connections, which largely occur out of state, even when the two parties being connected are in the same community.

The connections at the OHN exchanges in Portland, Medford and Redmond are not restricted to OHN -only traffic. The value of any network increases with the number of sites that can be reached through the network. Connections at OHN exchanges can be to any point on the public Internet in addition to OHN sites, even though quality service cannot be guaranteed on the public Internet portion of the link. This broad connectivity will permit medical facilities to use remote patient home monitoring devices and applications, will permit physicians to make emergency consults from their homes after hours, permit connections to other Oregon government and education networks, and permit connections to other sites anywhere in the world. The latter feature is of critical importance to rural hospitals that use a service called "Night Hawk" to have radiologists elsewhere in the world, Australia for example, review digital radiology images during the Oregon night shift when no radiologists are available locally. The "Night Hawk" service is just one of endless possibilities and opportunities enabled through OHN.

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