

**PERANCANGAN DAN ANALISIS TIGA LAPISAN *OPEN SYSTEM INTERCONNECTION* (OSI) PADA JARINGAN *FIBER TO THE BUILDING* (FTTB) BERBASIS TEKNOLOGI *GIGABIT PASSIVE OPTICAL NETWORK* (GPON) DI BANGUNAN HOTEL**

**TESIS**

Karya Ilmiah sebagai salah satu syarat untuk menyelesaikan jenjang magister di Departemen Teknik Elektro, Fakultas Teknik, Universitas Andalas



**Program Studi Magister  
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Judul	Perancangan, dan Analisis Tiga Lapisan <i>Open System Interconnection</i> (OSI) Pada Jaringan <i>Fiber To The Building</i> (FTTB) Berbasis Teknologi <i>Gigabit Passive Optical Network</i> (GPON) di Bangunan Hotel	Yoppi Lisyadi Oktavianus
Program Studi	Magister Teknik Elektro	2120952004
Fakultas Teknik Universitas Andalas		
<b>Abstrak</b>		
<p>Tesis ini menyajikan perancangan, implementasi dan analisis infrastruktur jaringan <i>Fiber To The Building</i> (FTTB) berbasis teknologi <i>Gigabit Passive Optical Network</i> (GPON) pada kompleks bangunan hotel yang berlokasi di provinsi Sumatera Barat, Indonesia. Teknologi GPON dipilih karena hemat biaya dan efisien pada area distribusi, terutama jika <i>bandwidth</i> yang diatur pada terminal bernilai <math>\leq 500</math> Mbps. Metode <i>waterfall</i> digunakan dalam perancangan jaringan FTTB Hotel. Hasil rancangan FTTB ini diuji dan dianalisis pada tiga lapisan <i>open System Interconnection</i> (OSI) yaitu lapisan fisik, lapisan <i>datalink</i>, dan lapisan <i>network</i>. Lapisan fisik diwakilkan oleh <i>link power budget</i>, lapisan <i>datalink</i> diwakilkan oleh <i>Traffic Container</i> (T-CONT), dan lapisan <i>network</i> diwakilkan oleh performansi jaringan. Hasil pengukuran aktual <i>link power budget</i> menunjukkan penerimaan daya terkecil senilai -12.097 dBm pada saluran <i>downlink</i> dan -16,579 dBm pada saluran <i>uplink</i>, serta margin daya bernilai diatas nol. T-CONT telah diterapkan dan nilai <i>fixed bandwidth</i> yang ditetapkan telah memberikan jaminan <i>bandwidth</i> sesuai dengan kebutuhan minimal yang telah ditetapkan. Sedangkan performansi jaringan FTTB GPON menunjukkan kinerja dengan kategori sangat bagus berdasarkan standar <i>Internet Protocol Harmonization Over Network</i> (TIPHON) dengan latensi 0,59 ms, <i>jitter</i> 0,09 ms, dan <i>packet loss</i> 0%.</p> <p><b>Kata Kunci</b> - FTTB, GPON, <i>waterfall</i>, <i>Open System Interconnection</i> (OSI), TIPHON.</p>		

<i>Title</i>	<i>Design and Analysis of Three Layers of Open System Interconnection (OSI) on a fiber to the building (FTTB) network based on Gigabit Passive Optical Network (GPON) Technology in Hotel Buildings</i>	<i>Yoppi Lisyadi Oktapianus</i>
<i>Major</i>	<i>Master Of Electrical Engineering</i>	<i>2120952004</i>
<i>Faculty of Engineering Andalas University</i>		

***Abstract***

*This thesis presents the design, implementation and analysis of fiber-to-the-building (FTTB) network infrastructure based on Gigabit Passive Optical Network (GPON) technology in a hotel building complex located in West Sumatra province, Indonesia. GPON technology was chosen because it is cost-effective and efficient in the distribution area, especially if the bandwidth set at the terminal is  $\leq 500$  Mbps. The waterfall method is used in designing the FTTB Hotel network. The results of this FTTB design were tested and analyzed at three Open System Interconnection (OSI) layers, namely the physical layer, datalink layer, and network layer. The physical layer is represented by the link power budget, the datalink layer is represented by Traffic Container (T-CONT), and the network layer is represented by network performance. The actual measurement results of the link power budget show the lowest power reception of -12,097 dBm on the downlink and -16,579 dBm on the uplink, and the power margin is above zero. T-CONT has been implemented, and the fixed bandwidth value determined provides a guarantee of bandwidth in accordance with the minimum requirements that have been determined. Meanwhile, the performance of the FTTB GPON network shows performance in the very good category based on the Internet Protocol Harmonization Over Network (TIPHON) standard, with a latency of 0.59 ms, jitter of 0.09 ms, and packet loss of 0%.*

***Keywords*** - *FTTB, GPON, waterfall, Open System Interconnection (OSI), TIPHON.*

