# ATM vs. TDM

## Overall Comparison

<table>
<thead>
<tr>
<th>Issue</th>
<th>TDM</th>
<th>ATM</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of ownership</td>
<td>⭐️⭐️</td>
<td>⭐⭐⭐⭐</td>
<td>ATM lowers recurring bandwidth and operation costs</td>
</tr>
<tr>
<td>Bandwidth efficiency</td>
<td>⭐️</td>
<td>⭐⭐⭐⭐</td>
<td>ATM enables different applications to share bandwidth while preserving QoS</td>
</tr>
<tr>
<td>Multiservice</td>
<td>⭐⭐⭐⭐</td>
<td>⭐⭐⭐⭐</td>
<td>ATM delivers multiservice capability without affecting bandwidth efficiency; TDM provides multiservice capability at the expense of bandwidth efficiency</td>
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<tr>
<td>Quality of service (QoS)</td>
<td>⭐⭐⭐⭐</td>
<td>⭐⭐⭐⭐</td>
<td>ATM enables QoS without affecting bandwidth efficiency; TDM enables QoS at the expense of bandwidth efficiency</td>
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<tr>
<td>Scalability</td>
<td>⭐️⭐️</td>
<td>⭐⭐⭐⭐</td>
<td>ATM networks can evolve to support emerging bandwidth-intensive applications</td>
</tr>
</tbody>
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* = very poor  
** = weak  
*** = fair  
**** = good  
***** = excellent

## Limitations of TDM

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<thead>
<tr>
<th>Limitation</th>
<th>Why</th>
<th>Detail</th>
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</thead>
</table>
| High recurring bandwidth cost           | Bandwidth inefficiency                   | • Bandwidth is wasted with statically mapped CBR-like connections (M CR = SCR = PCR)  
• During periods of no traffic, bandwidth is not reallocated to other applications  
• Inability to efficiently accommodate bursty data applications  
• When all available bandwidth is allocated, additional bandwidth must be procured |
| Limited application performance        | QoS is delivered at the expense of bandwidth; limited bursting capability | • Cannot support bursty data, even during periods of voice silence, because bandwidth is statically allocated |
| Limited scalability to support traffic growth and new applications | Bandwidth generally limited to T3/E3; no trunking over public ATM services | • Increasing traffic and new applications require a migration path to broadband connectivity  
• Architecture is not optimal for broadband services, especially for New World IP-based applications  
• Public ATM services cannot be used for trunking |

## Advantages of ATM

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<tr>
<th>Advantage</th>
<th>Why</th>
<th>Detail</th>
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</table>
| Savings in recurring bandwidth cost      | Bandwidth efficiency gained with statistical multiplexing | • Bandwidth is dynamically shared among all applications  
• Multiservice integration saves bandwidth  
• Silence suppression for voice and repetitive pattern suppression for circuit data save bandwidth  
• Use of public ATM services for trunking provides a cost-effective alternative to leased lines |
| Enhanced application performance        | Efficient traffic management optimizes application throughput | • ABR with VSVD enables monitoring and adjusting of the cell rate of connections, avoiding congestion  
• Large dynamically assigned buffers |
| Guaranteed QoS levels for different applications | User applications firewalled and fair allocation of excess bandwidth provided | QoS is guaranteed with:  
• Per-virtual circuit queuing  
• Per-virtual circuit rate scheduling  
• Multiple classes of services (CoSs), including CBR, RT-VBR, NRT-VBR, UBR, ABR |
| Scalable architecture to support new applications | Evolution enabled to broadband connectivity | Traffic growth is accommodated by offering a migration path to broadband networking  
• Architectured specifically for multiservice networks—enabling New World applications |
| Smooth migration path from TDM          | Seamless integration into existing environments | • TDM CoSs and native ATM CoSs are supported  
• Legacy interfaces (X.25, circuit data, voice) and native Frame Relay or ATM are supported |
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