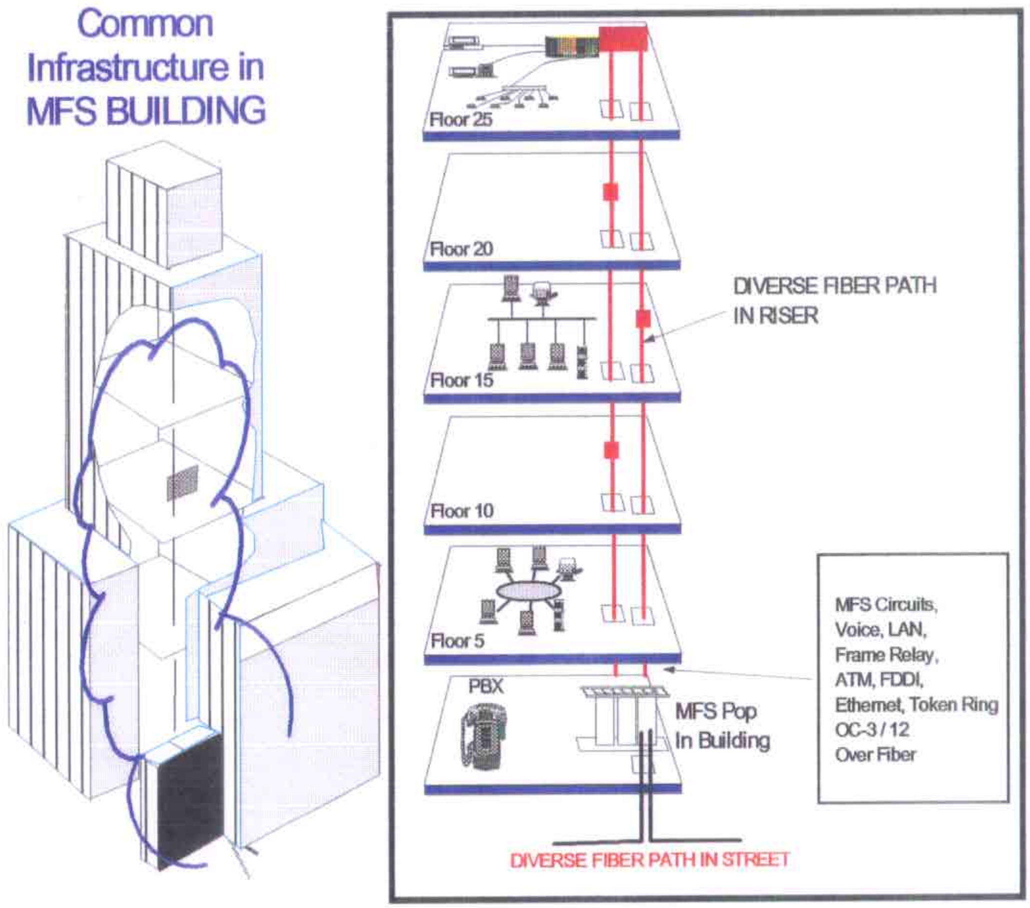
Spectrum Infrastructure

Inside Wiring Cost Study



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Background

MFS is pulling cable into on-net buildings on an "as needed" basis. These incremental costs have never been looked at by any one group within MFS because they are hidden in the budgets of individual cities and operating companies.

Risers are swelling and costs are quietly growing as legacy Telecom, Data, and Switched Voice services are being sold. This method of deployment does nothing to prepare the building for future needs and neglects the fact that riser availability is in peril. This cost report answers several questions:

- How much capital is invested in the inside wiring of MFS on-net buildings today?
- At this rate of investment, how much inside wiring will MFS own in 10 years?

Answers to these questions raise more burning questions, such as:

- Could these capital expenditures be reduced in the future by implementing a more optimal riser distribution system?
- Could the building infrastructure that is optimized to reduce costs position MFS to offer additional high margin services to ***all tenants*** in the building such as: High-Speed Internet connections and Multi-Media content connections?

For this study, three separate cost evaluation methods (see appendix) are used to arrive at an average cost figure for inside wiring. Future inside wiring expenditures have been calculated as a function of the average cost figures and the growth projected in the strategic plan. The question of a more optimal solution for the future will require a separate study.

Evaluation

Today MFS has over $115 million ($60,000 per building) invested in the inside wiring of 1931 buildings on-net. This figure will range from $800 Million to well over $1.1 Billion in the next 10 years as MFS cables 10,000 additional buildings.

The $60,000 per building number is conservative because:

- Methods One and Three lack conduit costs and the cabling costs only reflect traditional CAP services.
- Method Two shows that a high density building expended $134,000 in just 10 months
- Existing cabling costs do not reflect the cabling required to deliver Dial Tone, Long Distance, Internet/Intranet, and Multi-Media Content to ***all tenants*** in the same building
- Over time buildings will evolve from low density to high density which increases cost

Where buildings today have an investment of $60,000; after 10 years they might have an average of $100,000 or more invested. At this level of investment MFS will exceed the $1.1 Billion figure shown above. (See attached Spread Sheet to perform sensitivity analysis)

Recommendation

The immediate solution to this mushrooming money pit is a new MFS cabling policy and specification that pulls fiber to the customer premise. Labor and conduit accounts for over 90% of the total installed costs, cable accounts for less than 10%. Pulling fiber with copper will reduce the total installed cost over time. Today MFS could be adding valuable fiber to its risers while selling legacy services incrementally. MFS will be building an infrastructure that will not only accommodate existing services, but will meet unpredictable needs and offerings of the future.

New buildings and high density buildings should have a more robust design. These buildings may need a smart fiber optic riser distribution system. This design allows easy deployment of new services and applications while minimizing new cable pulls and maximizing the efficiency and bandwidth capabilities of fiber optic cable. This infrastructure will have more reliability and redundancy while being the catalyst of new business and services.

The Spectrum of services that could be offered by the new infrastructure could generate Billions in new net revenues per year. Done properly this architecture will allow thousands of Internet/Intranet, Packetized voice, Private SNA and IPX Data network, and Multi-Media Content connections to be provided to ***all enterprises*** in the MFS buildings.

Additional research should be conducted to develop a business plan that would incorporate the concept of a intelligent building infrastructure with the delivery of existing and new services at a lower unit cost while maintaining high margins. A new approach is essential to maximizing the newly stated MFS objectives of selling Internet/Intranet and packetized voice services to ***all customers*** since MFS sells CAP services to only a few tenants in the building today.

Appendix

Method One

Method One samples 50 on net buildings in Atlanta, Chicago, Houston, New York, and Washington DC. Buildings in these cities were randomly chosen by the MFS City Operations Manager who supplied an indiscriminate list of low, medium, and high density buildings. After the buildings were identified, T-Comm DS-0, DS-1, and DS-3 circuit reports were generated. They listed every circuit installed in the 50 buildings from 1987 to 1996. These circuits only offer existing services and reach a small percentage possible customers. Formula's and ratio's were used to calculate the cost of pulling cable to each floor. For example, the cost of pulling a 12 pair cable to the 35th floor from the POP in the basement of a building in Atlanta would be:

Cable Run = 15'(vertical distance between floors) **X** Number of floors + 150' (horizontal distance on premise) **X** *City Cost Factor (installed cost of cable or conduit)

or

$2760.00 = ((15 X 36) + 150) X (*$4)

* Higher City Cost Factors were used in New York and Chicago than in Atlanta, Houston, and DC. See table 1.

Table 1

City	Cabling Cost Factor per Ft.	Conduit Cost factor per Ft.
Atlanta	$4.00	$30.00
Chicago	$6.00	$40.00
Houston	$4.00	$30.00
New York	$6.00	$40.00
Washington DC	$4.00	$30.00

The formula above was applied to over 25,000 separate cable runs. It was cross checked against actual invoices and found to be quite accurate. Conduit runs can be estimated as well using this formula. However, there is no report tracking conduit installation like the circuit report used to calculate cable runs .

Determining the POP location in all 50 buildings was necessary to accurately tabulate this report. These findings were interesting because many buildings have multiple POP's. "55W" in New York has 4 POP's located throughout the building. It can hand-off a connection to the customer who is located conveniently to the nearest POP which reduces installation costs due to shorter runs.

This study found that each building in the sample contained $46,172 in inside wiring. This equates to $89,000,000 if spread over the 1931 buildings on net. While using this number, it is very important to know that *conduit has not been taken into consideration!* Information from other reports suggests that conduit costs could inflate this number substantially. In Atlanta, Houston, and DC, conduit costs could increase inside wiring cost from $46,172 to over $60,000 per building. In Chicago and New York where city code requires vertical and horizontal conduit sleeves, this figure could double from $46,172 to over $92,000 per building, or even triple.

Method Two

Method Two analyzes buildings in nine major metropolitan areas that are mature on MFS' evolutionary timeline. Buildings in this study resemble what today's typical building will be like in 10 years. This is important because the mission of MFS is to turn today's low to medium density buildings into high density, fully serviced buildings as it moves forward.

Actual cable pulls in these specimen buildings were documented and analyzed over a one year period. During this period we know that certain buildings exceeded annual cabling and conduit costs of $100,000. One building in particular, the "XWU" building in New York, installed over $134,000 worth of inside wiring materials and labor in a 10 month period. Actual purchase orders for this material is documented by date. Individual cabling material and placement costs were combined to arrive at the aggregate figures mentioned above.

Formula's used to calculate costs in Method One are demonstrated in the example below and are validated with actual data from Method Two

(METHOD ONE FORMULA): **$73,800** = ((15 X 113) + 150) X (*$40)

During the 10 month period mentioned earlier, **$72,326** (actual) worth of conduit was installed into the "XWU" building which totaled 1700 feet in length (actual). 1700 feet equates to approximately **113** floors. It is amazing how the formula reflects an almost identical number to the actual data.

*This formula was also checked against MFS Houston's inside wiring records.

Method Three

Method Three interprets a series of print-outs which were obtained from the MFS Accounting Department. It listed various inside wiring depreciation accounts. This print-out gives a total, but is inaccurate because it does not distinguish between labor and cable. Further, it does not account for conduit which besides labor is the bulk of cabling expense. The conduit depreciation report was obtained, but it did not distinguish between conduit in the building and conduit in the streets. Therefore, the conduit report was not helpful for estimation purposes. The inside wiring depreciation report estimated that: $57,000,000 has been invested into the 1931 buildings on net since 1989. This equates to: $29,869 per building to install existing MFS services and is incapable of accommodating the desired customer base and services of the future. This figure is low, due to the labor and conduit deficits in question, but is a good indicator of how much is spent in cable.

Conclusion

Methods One, Two and Three produce a known average investment per MFS on-net building of $58,680. This figure is conservative because Method Two tracks only a one year period of installations. However, Method One and Three's data examines thousands of cable pulls dating back to 1987, but fails to account for the cost of conduit. This confirms the average inside wiring cost per building to be at least **$60,000.** Going forward, this figure will continue to inflate as new offerings and services are sold to ***all tenants*** in the building.

MFS Communications
SENSITIVITY ANALYSIS
Inside Wiring Current Practice

Year	Base	1995	1996	1997	1998	1999
Cummulative Years	6					
Total Buildings	1931	3,155	4,441	4,661	5,239	5,533
# of New Buildings		1,224	1,286	220	578	294
# of Square Feet		829,600,000	1,126,400,000	1,159,500,000	1,236,600,000	1,270,800,000
Average SQFT per Building		262,948	253,637	248,766	236,037	229,676
METHOD ONE ($46,161)	$ 46,161					
Average per year per Building	$ 7,694					
Cummulative Cap Ex	$ 89,136,891	$ 113,409,884	$ 147,576,717	$ 183,436,121	$ 223,742,367	$ 266,310,503
Additional M-1 Cap Ex		$ 24,272,993	$ 34,166,834	$ 35,859,404	$ 40,306,247	$ 42,568,136
METHOD THREE ($29,000)	$ 29,869					
Average per year	$ 4,978					
Cummulative Cap Ex	$ 57,677,039	$ 73,383,155	$ 95,491,193	$ 118,694,428	$ 144,775,043	$ 172,319,239
Additional M-2 Cap Ex		$ 15,706,116	$ 22,108,038	$ 23,203,235	$ 26,080,615	$ 27,544,196
Sensitivity analysis:						
M-3 CMLTV per Building	$ 60,000	$ 46,045	$ 42,403	$ 50,189	$ 54,538	$ 61,624
Input Cap ex per Building	$ 9,500	$ 9,595	$ 9,691	$ 9,788	$ 9,886	$ 9,985
Input Growth Rate	1%					
Input Cummulative Cap Ex	$ 115,000,000	$ 145,272,225	$ 188,309,734	$ 233,930,947	$ 285,722,329	$ 340,967,096
Additional M-3 Cap Ex		$ 30,272,225	$ 43,037,509	$ 45,621,213	$ 51,791,382	$ 55,244,767
TOTAL FORECASTED CAPITAL EXPENDITURE		$ 175,544,450	$ 231,347,243	$ 279,552,160	$ 337,513,711	$ 396,211,862

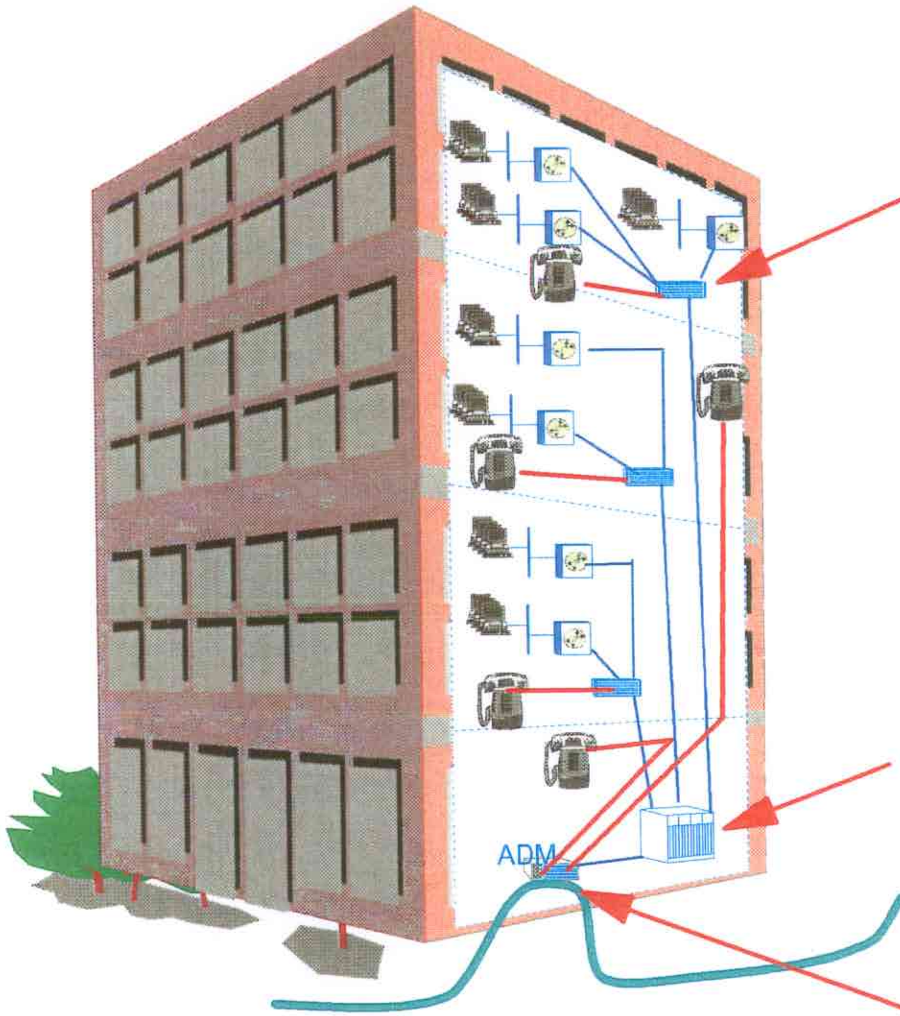
MFS Communications
SENSITIVITY ANALYSIS
Inside Wiring Current Practice

	Base	2000	2001	2002	2003	2004
Year	**Base**	**2000**	**2001**	**2002**	**2003**	**2004**
Cummulative Years	**6**					
Total Buildings	**1931**	6,233	7,054	8,061	9,318	10,200
# of New Buildings		700	821	1,007	1,257	882
# of Square Feet		1,340,900,000	1,409,200,000	1,476,400,000	1,539,200,000	1,600,000,000
Average SQFT per Building		215,129	199,773	183,153	165,186	156,863
METHOD ONE ($46,161)	**$ 46,161**					
Average per year per Building	**$ 7,694**					
Cummulative Cap Ex	**$ 89,136,891**	$ 314,264,088	$ 368,534,037	$ 430,551,341	$ 502,239,374	$ 580,713,074
Additional M-1 Cap Ex		$ 47,953,586	$ 54,269,949	$ 62,017,304	$ 71,688,033	$ 78,473,700
METHOD THREE ($29,000)	**$ 29,869**					
Average per year	**$ 4,978**					
Cummulative Cap Ex	**$ 57,677,039**	$ 203,348,152	$ 238,464,140	$ 278,593,141	$ 324,979,698	$ 375,756,998
Additional M-2 Cap Ex		$ 31,028,913	$ 35,115,988	$ 40,129,002	$ 46,386,557	$ 50,777,300
Sensitivity analysis:						
M-3 CMLTV per Building	**$ 60,000**	$ 64,788	$ 67,433	$ 69,296	$ 70,338	$ 74,750
Input Cap ex per Building	**$ 9,500**	$ 10,084	$ 10,185	$ 10,287	$ 10,390	$ 10,494
Input Growth Rate	**1%**					
Input Cummulative Cap Ex	**$ 115,000,000**	$ 403,823,419	$ 475,670,426	$ 558,595,051	$ 655,409,165	$ 762,447,049
Additional M-3 Cap Ex		**$ 62,856,323**	**$ 71,847,006**	**$ 82,924,625**	**$ 96,814,114**	**$ 107,037,884**
TOTAL FORECASTED CAPITAL EXPENDITURE		**$ 466,679,743**	**$ 547,517,432**	**$ 641,519,676**	**$ 752,223,279**	**$ 869,484,933**

MFS Communications
SENSITIVITY ANALYSIS
Inside Wiring Current Practice

	Base	2005	2,006
Year	**Base**	**2005**	**$ 2,006**
Cummulative Years	**6**		
Total Buildings	**1931**	11,000	$ 12,000
# of New Buildings		800	$ 1,000
# of Square Feet		1,650,000,000	$ 1,700,000,000
Average SQFT per Building		150,000	$ 141,667
METHOD ONE ($46,161)	**$ 46,161**		
Average per year per Building	**$ 7,694**		
Cummulative Cap Ex	**$ 89,136,891**	$ 665,341,574	$ 757,663,574
Additional M-1 Cap Ex		$ 84,628,500	$ 92,322,000
METHOD THREE ($29,000)	**$ 29,869**		
Average per year	**$ 4,978**		
Cummulative Cap Ex	**$ 57,677,039**	$ 430,516,832	$ 490,254,832
Additional M-2 Cap Ex		$ 54,759,833	$ 59,738,000
Sensitivity analysis:			
M-3 CMLTV per Building	**$ 60,000**	$ 79,912	$ 83,958
Input Cap ex per Building	**$ 9,500**	$ 10,599	$ 10,705
Input Growth Rate	**1%**		
Input Cummulative Cap Ex	**$ 115,000,000**	$ 879,034,391	$ 1,007,492,444
Additional M-3 Cap Ex		**$ 116,587,342**	**$ 128,458,053**
TOTAL FORECASTED CAPITAL EXPENDITURE		**$ 995,621,733**	**$ 1,135,950,498**

Hundreds to Thousands of Connections per Building, Voice Video or Data Applications

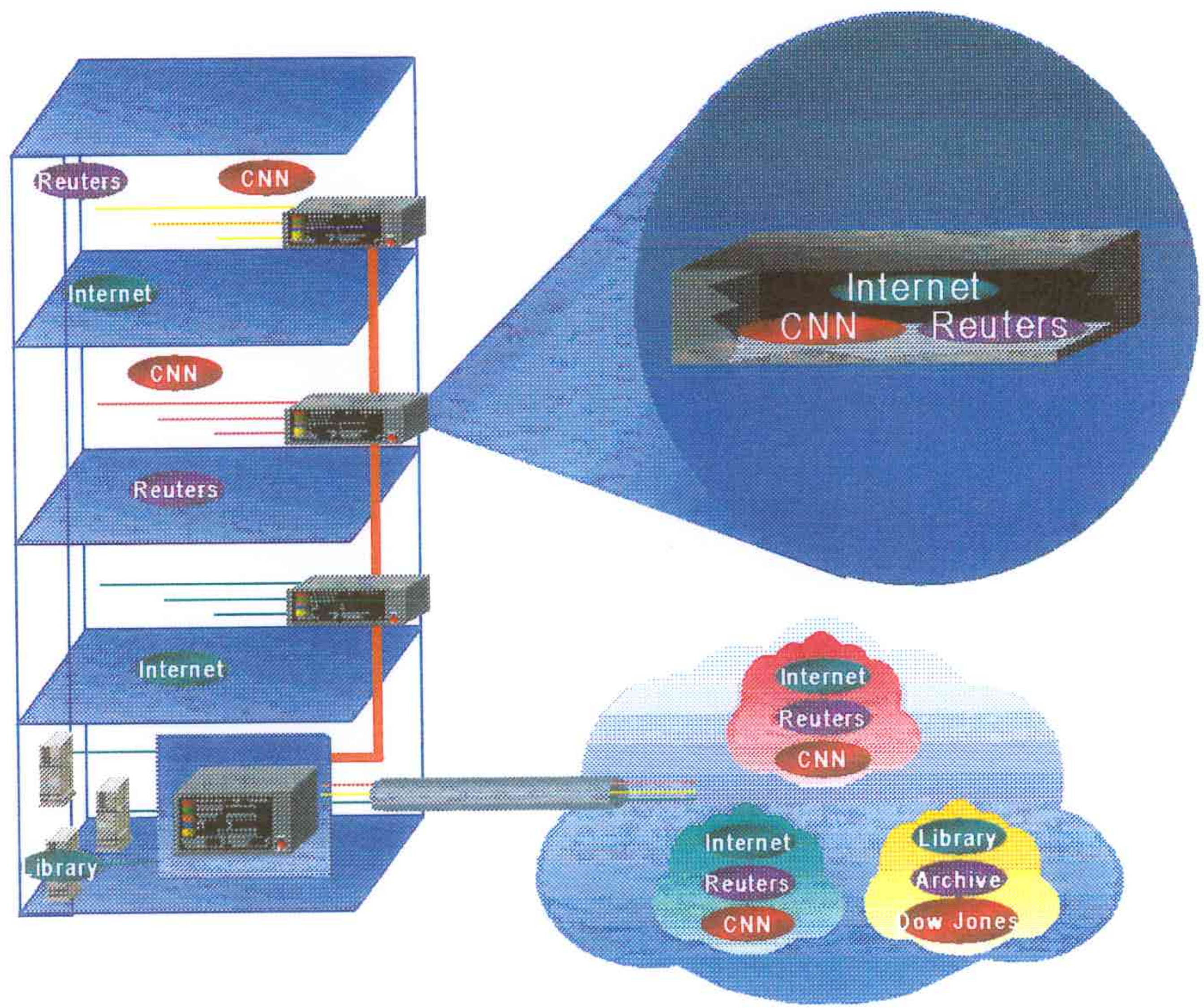


Voice and Data Stat MUX
in Riser and leaving the Building
Transmission Equipment
Still Utilized for legacy Voice

Building Switch for Multiple
Types of Connections,
Multiple Tenants Per Floor
& Multiple Closed User Groups
per Tenant including Private Networks
Internet Connectivity,
Vertical Market Private Internets
and Content Delivery

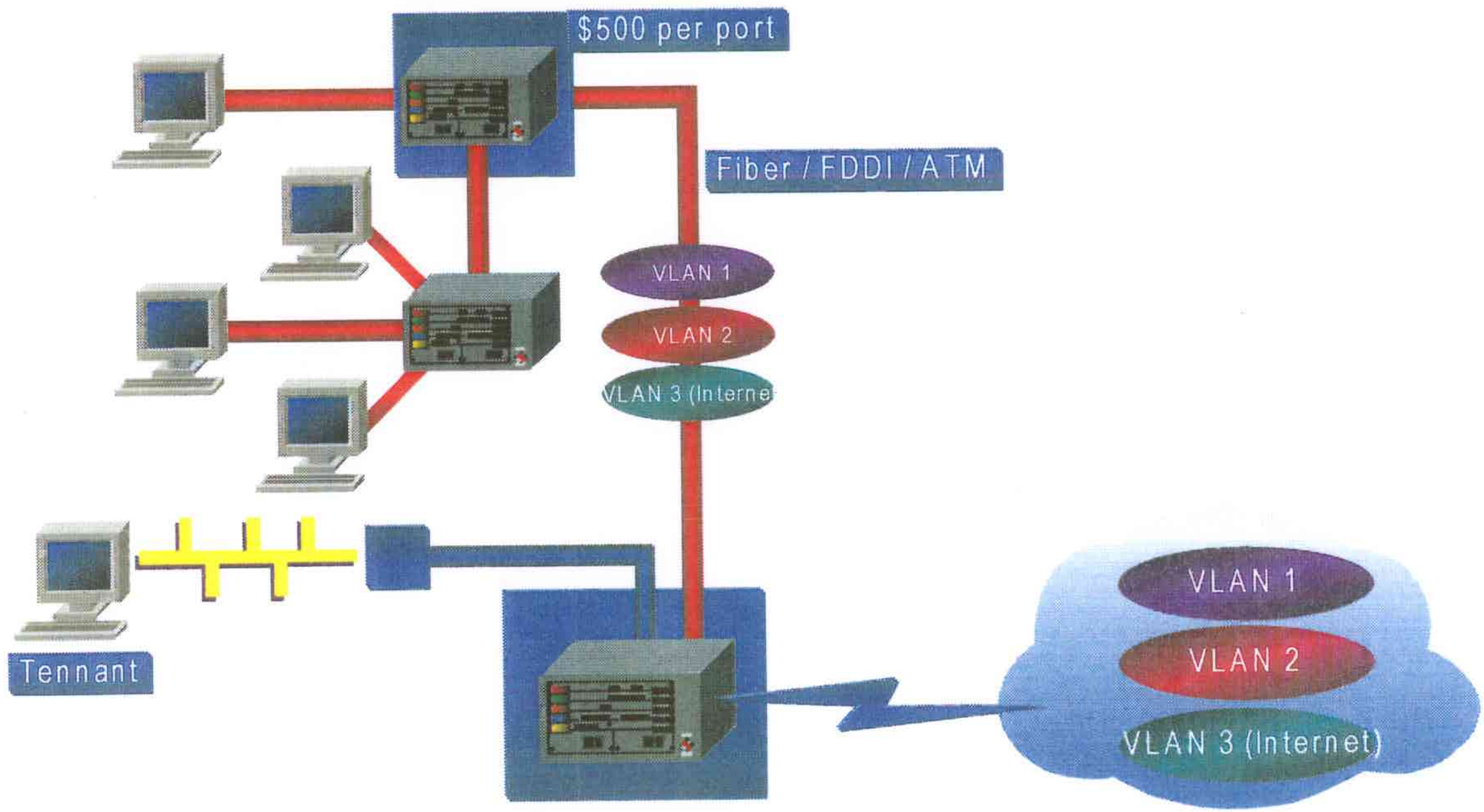
Transmission Equipment

Full Swtiched VPN & VLAN Services to Each Floor



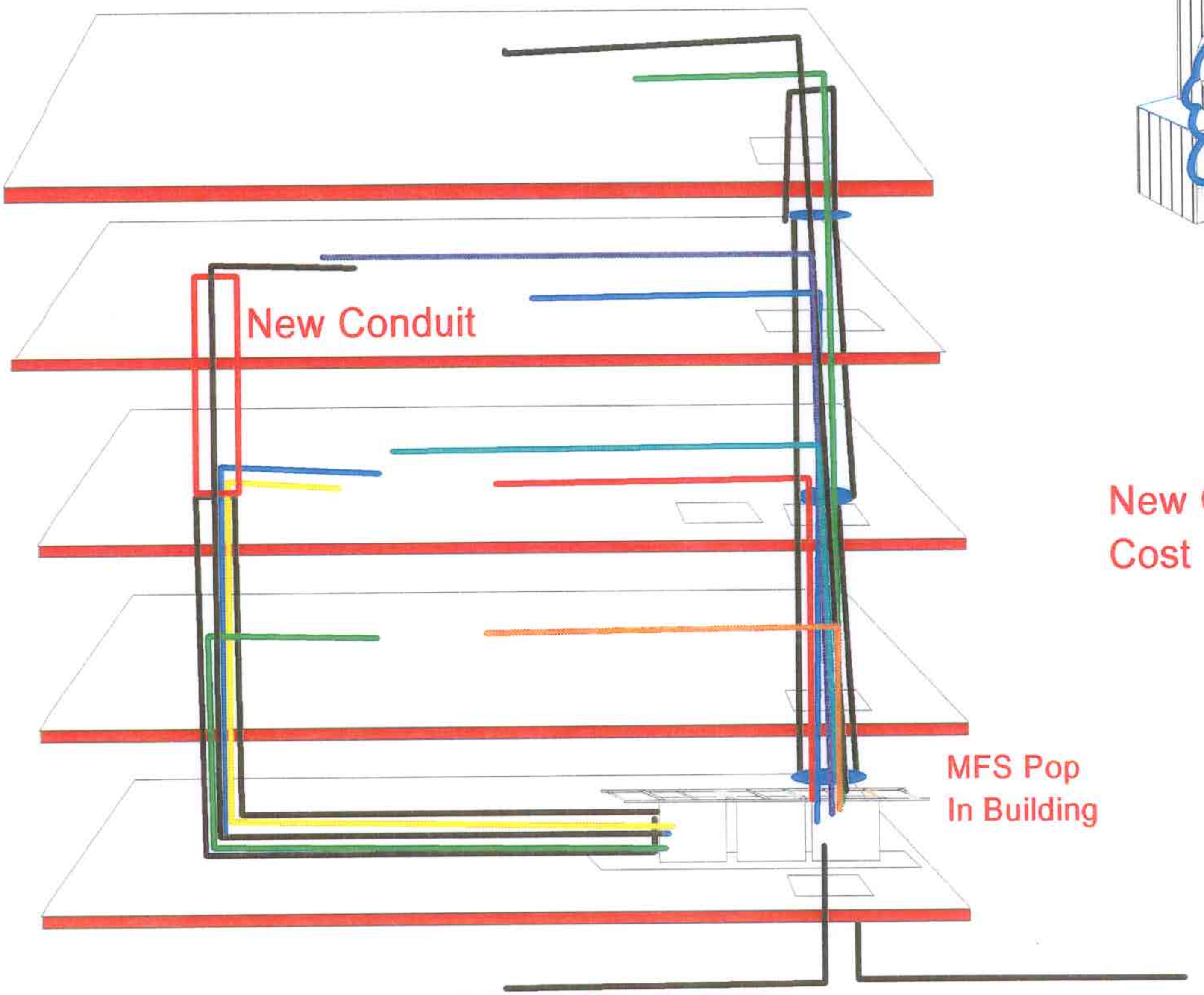
MFS™

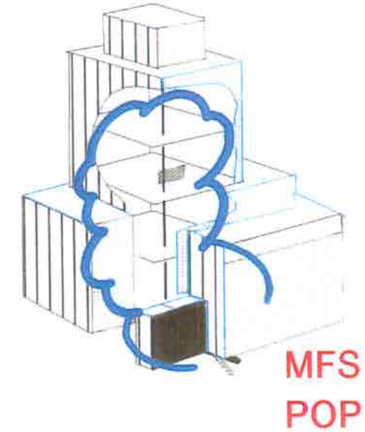
Switched Virtual Services to the Enterprise then to the Floor for each Enterprise & then to the Desktop



MFS installs New Conduit & New Cable for the next order

$99k + 19K = $128k





New Cable & Conduit
Cost = $19k