

Retail Telecommunications Networks: Conversion from Dial-Up To Dedicated

A discussion about the financial impact of storewide Retailer Telecommunications Network upgrades and the associated return on investment (ROI).

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Overview

Although there are numerous ways to evaluate the impact of a new project, this paper describes the Net Present Value (NPV) method and the closely-associated economic Return on Investment analysis. Other methods out there may include Adjusted Present Value (APV), Internal Rate of Return (IRR), Break Even or Payback. Each used alone or in unison with other methods and with varying levels of complexity and accuracy, attempt to answer the same simple question: Should we invest in this project?

When pressed, managers usually concede that, if followed literally, the payback rule doesn't make sense. But they may point out that payback is the simplest way to communicate an idea of project profitability. Capital budgeting is a process of discussion and negotiation involving people from all parts of the firm, and therefore it is important to have a measure that everyone can understand. Insisting that everyone commenting on a project do so in terms of NPV may cut out those who don't understand NPV but who can still contribute useful information.

Other managers will check on the project's payback because they know that in a competitive world high profits do not last forever, and therefore they may distrust the more distant cash flow forecasts. Looking at payback it would be better to do a careful analysis of when competition will intensify and what effect that will have on cash flows. In any event, amidst today's economic conditions, it is more and more important for a CIO to cost-justify proposed network upgrades. This is especially true in the retail market because of its hypersensitivity to changes in inflation, unemployment and other consumer-related economic phenomena.

This paper provides possible methods of calculating the impact of the conversion from a dial-up to a dedicated network on the company's bottom line. We will focus on this core project facing most of the retailers in the US. The paper attempts to furnish a qualified answer to the question posed above and specifically; Does it make sense to move to a dedicated network?

As mentioned, this is one possible approach and its outcome, when applied to your specific circumstances, can be compared to other such methods to make an educated decision on the future of the network. There are two basic rules that we suggest you consider in the course of evaluating the new project. Both rules should be satisfied by the outcome of your evaluation in order to justify the conversion project.

Equivalent Decision Rules for Capital Investment

1. Net Present Value Rule: Accept investments that have positive net present values

2. Rate of Return Rule: Accept investments that offer rates of return in excess of their opportunity costs of capital.

Below, we will step through a number of calculations that comprise the method needed to evaluate the investment. You are probably familiar with many of these concepts so we simply organize them so that you may make some useful comparisons for your specific circumstances.

Concepts to Be Discussed

1. Net Present Value of an investment. ($NPV = C_0 + PV$)
2. Cost of Capital and Adjusted Cost of Capital
3. Economic Rate of Return ($ROI = (C_0 - d)/INV$)
4. Historical Stock Market Rate of Return
5. Real and Nominal Cash Flow
6. Present Value of a Series of Cash Flows ($PV = \sum C_t / (1+r_t)^t$)

Because many of these concepts are familiar to you, we will not go into any detail on the theory behind each. We will however, place these concepts into the context of our conversion project. Let's begin by answering some fundamental questions about the financial impact of converting your network from dial-up to dedicated.

My dial-up network works fine, why should I consider the conversion?

There are a variety of reasons that a retailer may want to convert from dial-up. Some include a reduction in long distance charges, improvement in reliability, a decrease in credit card authorization time and elimination of expensive local telephone lines in each store. There are numerous other reasons that may be specific to each individual company.

We know that a conversion is needed but do not know how to cost justify it?

Cost justification is a matter of systematically evaluating the overall business and identifying elements of that operation that can be improved through the conversion. Such factors as productivity, transaction time, postage, real-time access to inventory information have incremental and ongoing associated costs. The conversion may impact on each and that drives cost down or eliminates it altogether. The cost of the dedicated network itself will most likely be higher than that of your existing dial-up network and is normally not cost justifiable alone. It becomes a worthwhile undertaking when the new "total cost of operating" the business with the conversion is lower than the dial-up solution. Looking at the conversion from dial-up to dedicated on a purely direct cost basis may be inherently flawed because it ignores other quantifiable opportunity costs.

What are some of the potential application-specific cost savings of a conversion?

The table below illustrates common activities found in a retail environment and contrasts the differences in the means by which they are accomplished between dial-up and

dedicated. The cost savings associated with each will vary by retail chains, as will the specific activities themselves.

Activity	Dial-Up	Dedicated
Credit card authorization	12 sec.	2 sec.
Time Keeping	Paper based. Manual Data Entry	Online real time updates.
Human Resources	Paper based	Online
Manuals, Training Docs. & Forms	Paper based	Online. Insures version control
Training and Tech Support	On-site or phone support	Online screen control
Customer Database (CRM)	Distributed and redundant	Single centralized DB.
Sales Capture and Analysis	Next day	Real time
Loss Prevention	Analog Cameras to VHS Tape	Digital recorder to disk archive system. Console shadowing capabilities
Music	DVD media	Digital download to insure the latest play list

Applying the Method of Analysis

The next part of this paper will be a practical exercise in computing NPV and ROI for a conversion in a hypothetical 150-store retail chain. At our imaginary retailer, the CIO has decided a 56K Frame Relay network is the dedicated design that best fits their needs. If you are convinced that it is worth reading on, there are a few things you will think about.

Cost of Capital

Below you will notice that the CIO has to calculate (or estimate) the cost of capital or run rate for the company. This is an extremely important part of an accurate analysis. Many may decide to move forward with a conversion and want to lease both the equipment and services associated with set up over a pre-determined period of time. It is important to note that the lease rate that you use to finance these capital costs of the project is usually not the true cost of capital for the project. This is because the lease factor is based on the general health of the overall business and the new investment combined. We just want the cost of capital associated with the conversion project. So how do I compute the true cost of capital? Each company has its own cost of capital or adjusted cost of capital (or weighted average cost of capital *WACC*). The best and easiest way to find it is to ask your CFO. By getting this from the CFO, you avoid having to actually compute it yourself (it is a complex and often disputed undertaking best left to financial types) and you avoid blame when it turns out wrong. The cost of capital for any company will be constantly fluctuating based on treasury rates, value of the company's equity and debt and with the proportional relation of each, a moving target at best. When the CFO does not know the answer (which is surprisingly often), economists will suggest that you use 11%-12% because that is approximately the adjusted cost of capital for the S&P 500. But be warned, this is simply a rule of thumb and if your company's size, capital structure and operation does not mirror that of the average S&P 500 company, your evaluation may be proportionally inaccurate. It is also common to look at the best alternative investment

available as a cost of capital, especially when considering the cost of capital for the new project. One common alternative investment is, naturally, the stock market and when stock is used, the average return on the stock market over the last fifty years is also approximately 11%-12%. Of course, you may not be comfortable with that number now either given the recent stock market corrections.

Cash Flow(Savings)

Cash flow for the purposes of our analysis of the conversion project is the incremental and after tax difference between the recurring cost of the current network versus the dedicated network. This difference is calculated by subtracting what you pay today from what you would pay if the project were accepted each period. Most people look at this on a monthly basis and in our example below, we look at it monthly over a three-year period (concurrent with a lease and carrier contract). Because the network is usually considered a cost center versus a profit center, our cash flows resulting from implementation of the conversion are actually just net savings over what you pay now.

Lease

We further ignore capital lease payments for the purposes of computing cash flow. This allows us to depreciate the assets on the capital lease and shield income from tax. You could just as easily include the lease payments in the expenses and ignore depreciation if you chose an operating lease. In reality, you will want to use whichever method gives you the better tax advantage.

Overhead Allocations

Then there is the confusing matter of overhead and/or indirect expenses. How do I consider additional overhead expenses that our accountants may want to assign to the conversion project? Carefully, you need to consider if what they are proposing to include is equitable. In many cases, the new project may have a negative effect (lower the total overhead) on the indirect costs of the entire business. In that case, you will want to make sure you do not “overpay” in your cost calculations.

Inflation Adjustments

In an attempt to be as accurate as possible, we must consider inflation. How do I deal with inflation? There are a couple of ways to include it and it is important that you do to get an accurate picture of return. Economists suggest that for capital budgeting purposes, managers work in nominal terms instead of real terms. The difference between the two is immaterial to our discussion but oversimplified, real cash flow accounts for inflation and nominal cash flow ignores inflation. We will convert from real to nominal cash flows so we can evaluate PV using nominal cost of capital. The outcome of the analysis will be the same whether you prefer to work in real terms or nominal terms; you just have to be consistent.

Now that you have a basic refresher on key elements of our preferred methods, let's go through a practical exercise. As mentioned, we are going to evaluate the financial impact of a conversion from dial-up to Frame Relay for a 150-store retail chain and arrive at a decision on whether to proceed.

Case Study: Convert In-Store Dial-Up Network to 56K Frame Relay Network

Assumptions

150 Stores with total capital cost of \$500,000 with 3-year carrier contract and 3-year capital lease.

Table 1. Network Description

Network Element	Existing Dialup WAN (Using standard phone lines)	Proposed Frame Relay Network
Network Management	Store alerts to failure (reactive)	Fully managed network (pro-active)
Store Hardware	RIM modem/router	Cisco Router
Host Hardware	Modem bank, EGP and router	Cisco Router
Connection	On demand - 10 to 20 sec. connection time	Persistent - Always on. 0 connection time
Data throughput	Up to 40kbps async with variable rates	56kbps sync with guaranteed PVC of 32kbps
Fee Type	Usage based	Set monthly price per location
Store dial back-up	None	Standard analog modem dial up

Table 2. Monthly Costs

Service Item	Existing Monthly Network Costs (A)	Proposed Monthly Network Costs (B)
Network Support (NOC)	\$ 7,000.00	\$ 5,000.00
Store connection/usage and polling	\$ 36,000.00	\$ 40,500.00
Host connection	\$ 4,000.00	\$ 3,600.00
Totals	\$ 47,000.00	\$ 50,100.00

Table 3. Monthly Costs – Capital Lease

Installation/Store Hardware (3 Yr Lease)	\$ 6,750.00	\$ 15,000.00
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Table 4. Potential Monthly Savings

Administrative Activity	Existing Monthly Administrative Costs (C)	Monthly Costs with Network Conversion (D)
Fax Lines at Stores @ \$.07 per page	\$ 3,000.00	\$ 0.00
Fax Broadcast Service	\$ 2,000.00	\$ 0.00
Fedex Charges for mail packs	\$ 10,000.00	\$ 0.00
HR and Payroll Forms	\$ 10,000.00	\$ 0.00
Color Copies @ \$1.00 per page for recurring store layout	\$ 40,000.00	\$ 0.00
Paper and expendables	\$ 5,000.00	\$ 0.00
Totals	\$ 70,000.00	\$ 0.00

Calculations

1.) Estimated Project Cost of Capital (r) = 11%

2.) Calculate Monthly Real Cash Flow (savings) (S)

Total Existing Cost (G) = Existing Monthly Network Costs (A) + Existing Monthly Administrative Costs (C)

$$(G) = \$47,000 + \$70,000 = \$117,000 \text{ per month}$$

Total Proposed Cost (H) = Proposed Monthly Network Costs (B) + Proposed Monthly Administrative Costs (D)

$$(H) = \$50,100 + \$0 = \$50,100 \text{ per month}$$

Real Cash Flow (savings) (S) = Total Existing Cost (G) - Total Proposed Cost (H)

$$(S) = \$117,000 - \$50,010 = \$66,900 \text{ per month}$$

3.) Convert Monthly Real Cash Flow (S) to Annual Nominal Cash Flow (S_{nom})

Projected Annual Rate of Inflation (i) = 4%

Annual Real Cash Flow (S)_{ann} = 12 x Monthly Real Cash Flow (S)

$$(S)_{\text{ann}} = 12 \times \$66,900 = \$802,800 \text{ per year}$$

Year 1. Annual Nominal Cash Flow (S_{nom})_{year 1} = Annual Real Cash Flow (S)_{ann} x [1+ Projected Annual Inflation Rate (i)]

$$(S_{\text{nom}})_{\text{year 1}} = \$802,800 \times (1+.04) = \$834,912$$

Year 2. Annual Nominal Cash Flow (S_{nom})_{year 2} = Annual Real Cash Flow (S)_{ann} x [1+ Projected Annual Inflation Rate (i)]²

$$(S_{\text{nom}})_{\text{year 2}} = \$802,800 \times (1+.04)^2 = \$868,308$$

Year 3. Annual Nominal Cash Flow (S_{nom})_{year 3} = Annual Real Cash Flow (S)_{ann} x [1+ Projected Annual Inflation Rate (i)]³

$$(S_{\text{nom}})_{\text{year 3}} = \$802,800 \times (1+.04)^3 = \$903,041$$

4.) Calculate Tax Implications on Annual Nominal Cash Flow (S_{nom})_{AfterTax}

assumes company is profitable otherwise it is not necessary to discount

Estimated Corporate Tax Rate (T) = 40%

Year 1. After-Tax Annual Nominal Cash Flow $(S_{\text{nom}})_{\text{year 1AT}} = \text{Annual Nominal Cash Flow } (S_{\text{nom}})_{\text{year 1}} \times (1-T)$

$$(S_{\text{nom}})_{\text{year 1AT}} = \$834,912 \times (1-.40) = \$500,947$$

Year 1. After-Tax Annual Nominal Cash Flow $(S_{\text{nom}})_{\text{year 2AT}} = \text{Annual Nominal Cash Flow } (S_{\text{nom}})_{\text{year 2}} \times (1-T)$

$$(S_{\text{nom}})_{\text{year 2AT}} = \$868,308 \times (1-.40) = \$520,985$$

Year 1. After-Tax Annual Nominal Cash Flow $(S_{\text{nom}})_{\text{year 3AT}} = \text{Annual Nominal Cash Flow } (S_{\text{nom}})_{\text{year 3}} \times (1-T)$

$$(S_{\text{nom}})_{\text{year 3AT}} = \$903,041 \times (1-.40) = \$541,825$$

5.) Calculate Net Present Value (NPV)

Total Capital Cost (INV) = \$500,000

Present Value of Savings (PV) = Annual Nominal Cash Flow $(S_{\text{nom}})_{\text{year 1AT}}/(1+r) +$
Annual Nominal Cash Flow $(S_{\text{nom}})_{\text{year 2AT}}/(1+r)^2 +$
Annual Nominal Cash Flow $(S_{\text{nom}})_{\text{year 3AT}}/(1+r)^3$

$$(PV) = \$500,947/(1+.11) + \$520,985/(1+.11)^2 + \$541,825/(1+.11)^3$$

$$(PV) = \$451,304 + \$423,565 + \$395,492 = \$1,270,360$$

Net Present Value (NPV) = -INV + PV

$$(NPV) = -\$500,000 + \$1,270,360 = \$770,361$$

√ **Rule Check:** If NPV is positive, then proceed.
\$770,361 > 0 Yes, invest!

6.) Calculate Rate of Economic Return (ROI)

Depreciation of Assets (d) = 5 Year MACRS (\$500,000)

Year	Percentage	EOY Balance
1	20%	\$400,000
2	32%	\$240,000
3	19.2%	\$144,000
4	11.52%	\$ 86,400
5	11.52%	\$ 28,800
6	5.76%	\$ 0

Depreciation of Assets (d) Three Year Cumulative = \$356,000

assume that tax advantages due to depreciation are equivalent in both the existing and the proposed network and are ignored

Economic Rate of Return (ROI) = [Net Present Value of Savings (NPV) – Depreciation of Assets (d) Three Year Cumulative]/Capital Cost (INV)

$$(ROI) = [\$770,361 - \$356,000]/\$500,000 = 82.8\%$$

√ **Rule Check:** If ROI is greater than the cost of capital, then proceed.

82.8% > 12% **Yes, invest!**

It appears as if our imaginary CIO should invest in the conversion. However, the use of intelligent techniques does not guarantee intelligent decisions. You can have good technique and poor judgment, or vice versa. You can be conceptually perfect, by relying on NPV, and still fall down in execution. For example, many companies think they can ignore inflation in cash-flow forecasts because “on the average revenues increase to cover inflated costs.” Others use nominal discount rates without fully reflecting future inflation in their cash-flow forecasts. In the end, taking the time to do the homework and verify its accuracy will frequently pay off in the form of good managerial decisions. For the companies out there that do not have the resources or time to do a thorough analysis of their operation with respect to this or any other project can always retain a qualified consultant or seek assistance from the vendor community.

About the author:

Mark Stuhlreyer is the Vice President & General Manager of Contingent Network Services based in Dayton, Ohio. Contingent has eight-plus years experience in the conversion of regional and national retailer telecommunications networks from dial-up to dedicated under numerous designs. Mr. Stuhlreyer served four years active duty in the United States Marine Corps, achieving the rank of Captain. He holds degrees from the University of Cincinnati (BS in Mechanical Engineering) and the J.L. Kellogg School of Management at Northwestern University (Masters of Management '00). He can be reached at (800) 506-9609 ext 439 or via email at mstuhlreyer@contingent.net.

Reference:

Principals of Corporate Finance – Richard A. Brealey and Stewart C. Myers – Fifth Edition, Copyright 1996 © McGraw-Hill