Value Models

Value is generally something that a user derives when offsetting the benefits of a service by its cost. The sum total of the benefits can be thought of as those that you should specify or receive as part of the SLA. If you were to subtract the costs of cloud computing from the sum total of the benefits, you would arrive at a tangible sum that connotes value. Value, therefore, encompasses a cost–benefit analysis as it essentially computes as benefits minus costs.

In various disciplines, different types of value models exist. Just to name a few, there are the user expectancy value model, the place value model, and the customer value model. For our purposes in cloud computing, however, a value model is a standard pattern that defines value to you, as a user of cloud computing, and that is common to a number of users in similar situations. Considering the various benefits of cloud computing, let us examine seven cloud computing value models: (1) operating expense, (2) user demand flexibility, (3) price flexibility, (4) agility for time to market, (5) location flexibility, (6) asset optimization, and (7) profit margin as depicted by figures 12 to 18.

Operating Expense

In order to provide a computing service, your IT department would need to spend capital up-front in order to create and maintain the service. And for that service to remain within the bounds of your SLAs, the IT department would need to create extra capacity. All this capital expenditure represents an opportunity cost to you as the capital could have been employed elsewhere to pursue a business opportunity. Conversely, should the actual demand exceed the compute capacity that you have invested capital in, the extra demand will either not be met or will translate to degraded SLAs. The end result will be an opportunity loss to your business, since the unmet demand will cause loss of business to you. The operating expenditure model of cloud computing, as depicted by figure 12, uses elasticity to avoid opportunity costs and losses.

The upwardly slanting curve for computing capacity of figure 12 is based on two assumptions that are not mutually exclusive: that business demand will grow, and that more automation (i.e., elasticity and resources) will be made available over time via cloud computing.

User Demand Flexibility

Every product or service that your business provides to your customers has a life cycle that comprises of development, testing, launch, marketing and normal business usage. During each of these phases, differing demands are placed upon computing so that you will have periods consisting of peaks and troughs over the entire life cycle. To ensure that you meet all these demands, you will need to invest and disinvest in overprovisioning compute capacity. In any case, there will inevitably be periods where the demand will simply be unmet—especially during product

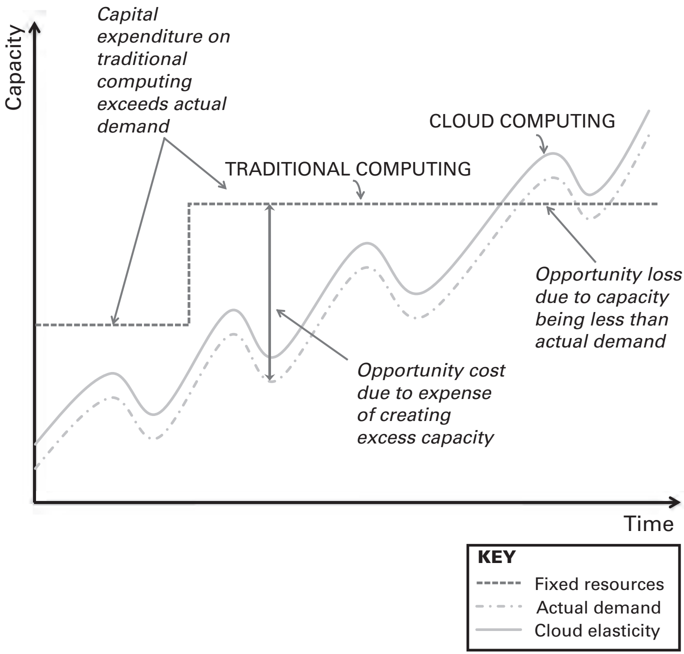

Figure 12 Operating expenditure value model

launches and marketing drives. The demand flexibility model of cloud computing, as depicted by figure 13, uses elasticity to ensure that the various demands on computing during your product's life cycle will be met on an as-needed basis. This means that your investment in computing, essentially the price you pay for computing services, flexes as your demand varies over your product's life cycle.

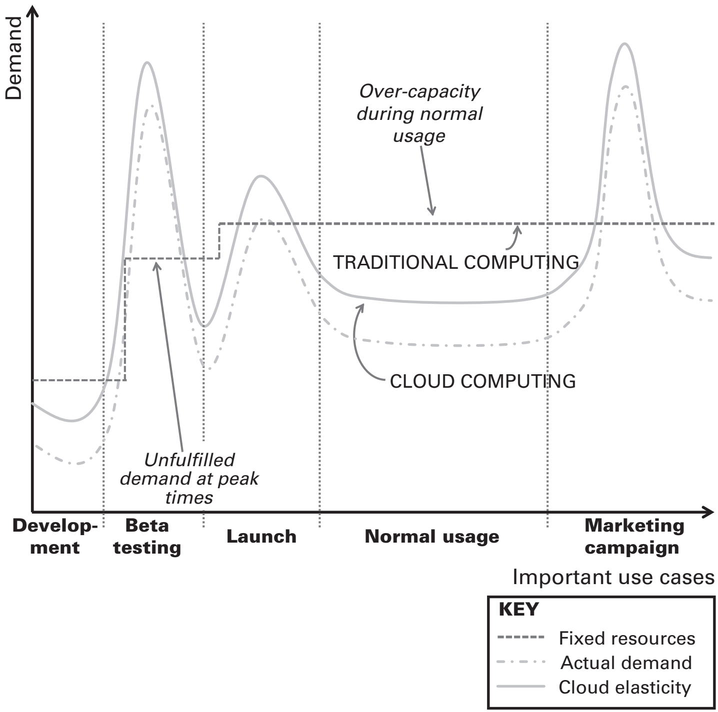

Figure 13 User demand flexibility value model

Price Flexibility

Over time the general trend in price for computing—regardless of whether it is traditional or cloud computing—is downward. This is because of newer technologies coming onto the scene at a fast pace and on a regular basis. Another contributing factor to the downward trend is the economies of scale resulting from the adoption of new technologies as the older ones reach obsolescence. Cloud computing gives you the ability to further introduce a step change to the downward price curve by using different price models as your needs and volume requirements change. So, for instance, at lower volumes, a consumption price model might be optimum for you, whereas a performance price model might be more suitable at higher volumes. Having the choice to change the price model, either using the same cloud service provider or moving to another, allows you to receive more value for money. Thus the price flexibility value model of cloud computing, as depicted in figure 14, uses different price models to lower computing costs over time as demand, volume, and circumstances change. Tiered and hybrid models are examples where the cloud service provider takes advantage of this to offer you greater discounts with increases in volume.

Time-to-Market Agility

The time-to-market value model of cloud computing, as depicted by figure 15, reduces your time to go to market by enabling you to transition from one computing environment to another at a faster pace. This is because you do not have to spend time commissioning computing infrastructure and environments beforehand, as with traditional computing. Rather, at a moment's notice, you can have any number of computing resources available to you to use in order to deploy your business application or service.

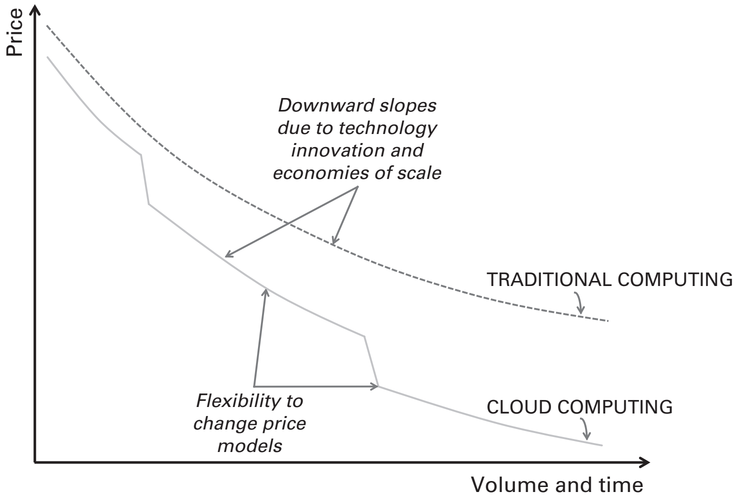

Figure 14 Price flexibility value model

Location Flexibility

The location flexibility value model of cloud computing, as depicted by figure 16, enables you to access your computing environment and work from any location due to the ubiquitous nature of computing. This flexibility increases your productivity and empowers you to have global reach.

Asset Optimization

The asset optimization value model of cloud computing, as depicted in figure 17, is similar to the demand flexibility value model of figure 13, except that the perspective is different. Figure 13 considers the unmet demand over a product life cycle resulting in loss of business, and figure 17 considers the extra investment you will need to make in order to have excess capacity in order to prevent loss of business. Or, rather, loss of reputation should your business be impeded due to lack of computing capacity. Additionally, when nearing end-of-life of your service, you are left with extra computing infrastructure that takes up needless space and so acts as a drain upon your cash flow. All this assumes that the asset life cycle that affects

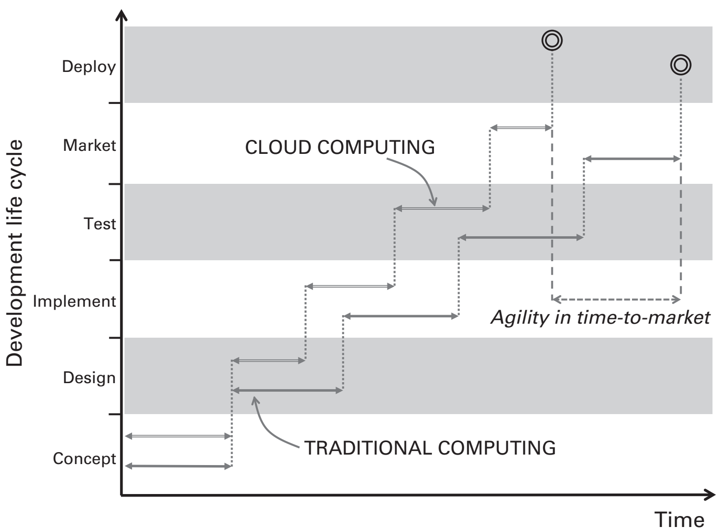

Figure 15 Time-to-market value model

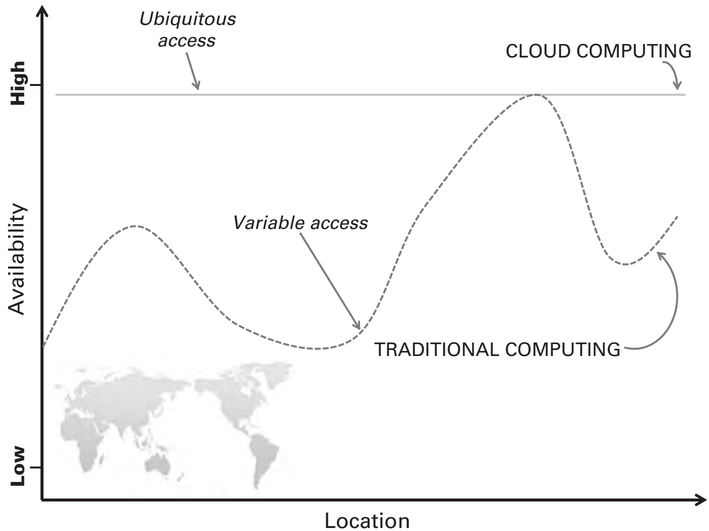

Figure 16 Location flexibility value model

investment follows the product life cycle. So you can optimize your assets through the use of cloud computing.

Profit Margin

When you produce any good or service, value-added costs (including overheads) fall by about 25 percent every time the cumulative volume, or your accumulated experience, doubles. This results in a downward-sloping price curve that increases your profit with experience, and this price curve is known as the experience curve.[1] Cloud computing is an evolutionary, though revolutionary in terms of its application, change to traditional computing as it draws on computing's cumulative experience. As such, it represents a shift in traditional computing's experience curve to the right. This moves the break-even point for using an outsourced cloud computing service, thus increasing your profit margin further. This is shown in figure 18, which is an adaptation of the BCG's experience curve of profit margin instead of costs. In fact one of cloud computing's value proposition is that it increases your profit margin

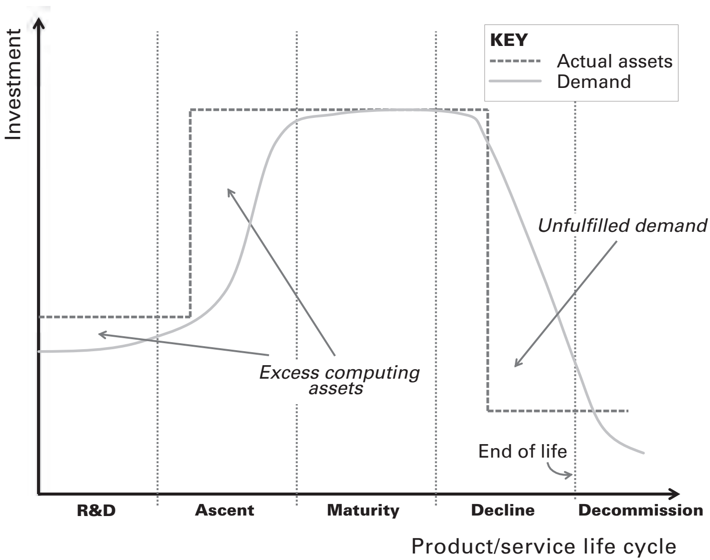

Figure 17 Asset optimization value model

more than traditional computing due to the experience curve effect.

Financial Metrics

How do you translate the value that cloud computing provides you into a meaningful financial measure? There are various financial yardsticks that can be used to assess the value proposition of a cloud service. Let us consider four

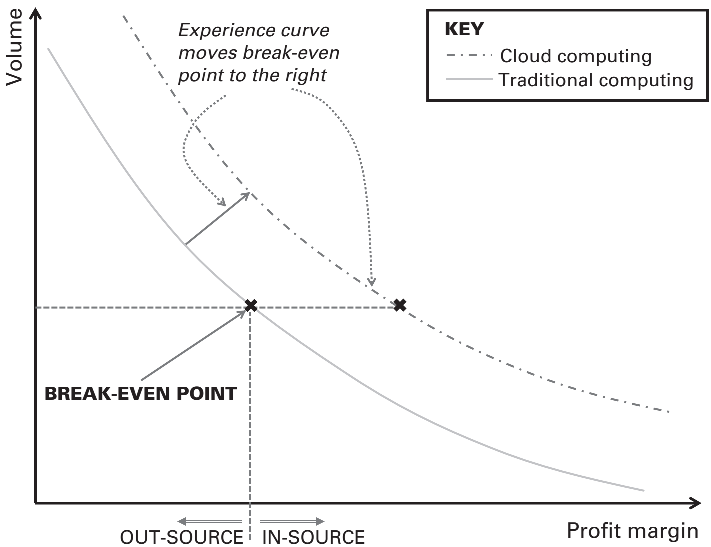

Figure 18 Profit margin value model

common financial metrics: payback method, net present value (NPV), return on investment (ROI), and time to market (TTM). There are other metrics that can be used as well, such as economic value added (EVA), return on assets (ROA), and return on equity (ROE). These latter metrics, however, are difficult to use when considering a single service, product, or project because they typically aggregate the computations at a corporate level and so rely on other factors such as the company's tax rate and its corporate KPIs. So we will not consider them further.

Payback Method

The payback method measures the time needed to recoup your investment in a product or service. A service that has a shorter payback period is deemed to be better than one that has a longer period, as in the following example:

- Suppose that you purchase a cloud service at $1,000 a month so that you can process invoices twice as fast as using your older system.
- Over a year, this comes to $12,000.
- Suppose that the old system processed $10,000 worth of invoices a month and the newer system will process $20,000 worth of invoices over a month.
- The value obtained is the difference between the old and new system, which is $10,000 per month because the new system is twice as fast.

- Per day, the value amounts to $333 worth of invoices assuming that a month has 30 days.

- This means that the new cloud service will pay for itself after 36 (equivalent to 12,000/333) days.

Usually the payback method is better suited for capital expenditure because you can depreciate it over a number of years. So the one year used in our example to arrive at an investment of $12,000 would need to be changed to encompass the years over which you can depreciate capital items. For operating expenditure, you would probably have a lock-in period or a contractual period with your cloud service provider, and it is this that would constitute the one year used in our calculation.

One of the shortcomings of the payback method is that it does not take into account the time value of money, which can have a substantial bearing on the investment calculation in periods of high interest rates or over long periods of time. To cover this, net present value (NPV) calculations are usually used.

Return on Investment

Whereas the payback method considers the time to recoup the investment, return on investment (ROI) uses the percentage of the investment amount that will be recouped.

ROI is widely used in the IT industry to assess capital investments. The formula for ROI is

ROI = (Gain from investment – Cost of investment) / (Cost of investment).

For our example of a new cloud service at $1,000 per month, the ROI would be computed as follows:

- The gain from the investment is $10,000 worth of extra invoices a month.
- The cost of the investment is $1,000 per month.
- Thus ROI = ($10,000 – $1,000)/$1,000 = 900%

Unadjusted ROI, as calculated in our example, assumes the present value for all gains and costs; thus the assumption is that all gains and costs are produced at the outset, which is not often the case. To adjust for this anomaly, usually an NPV calculation is performed that discounts the time value of money to get a more realistic value for ROI.

Net Present Value (NPV)

When you have multiple cash flows occurring on a regular basis, those cash flows are called a stream of cash flows. When regular streams of cash flows are equal in value, the cash flows are known as annuities. Because of the effect of inflation and interest rates over time, a cash flow amount of $1,000 next month is worth more than the same amount paid to you fifty months later. To assess the present value to you of a series of cash flows, we use NPV calculations. The NPV of an investment is the present value of all future benefits, such as cash flows, generated by the investment, net of initial costs, discounted over intervals of time. For example, you are to receive $1,000 every year for three years and the interest rate is 10 percent. You would discount those cash

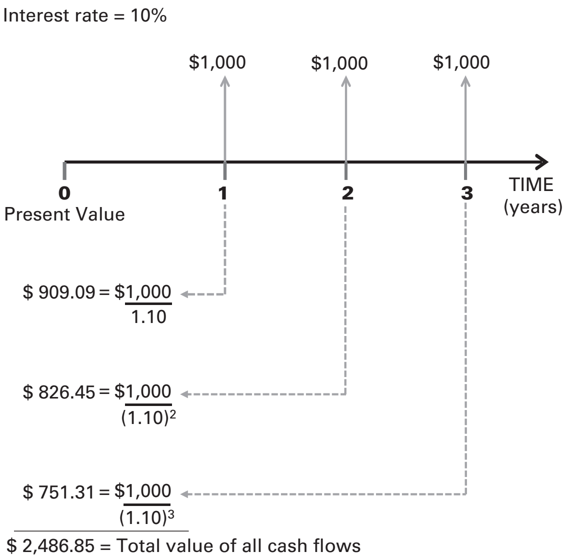

Figure 19 Calculating NPV using cash flows

flows with the interest rate shown in figure 19, and then add the discounted values to obtain a net present value of \$2,486.85. If you had made an initial investment of \$2,000 in order to obtain those cash flows, then you would subtract that initial investment from the discounted cash flows to obtain an NPV of \$486.85, and this would then represent a profit of 24.3 percent for your investment of \$2,000.

Although NPV analysis is frequently used to justify capital expenditures, you can use it to perform a reverse calculation to come up with recurring expenditures as represented by that capital expenditure. Thus NPV provides a means for converting CapEx to OpEx, and vice versa. The benefits of using NPV analysis are the relative precision of the results due to the use of time value of money and the simplicity in the interpretation of its results: a positive NPV indicates a profitable investment. Another benefit of NPV is that opportunity costs are accounted for implicitly because of the use of a discount rate. Thus, if a projected rate of return is less than your hurdle rate, or your desired rate of return, then you would not make the investment. And of those candidate projects that do pass your hurdle rate, the one with the highest rate of return provides you with the optimum opportunity cost.

Returning to our invoice processing example, which had a cloud computing cost of \$1,000 per month, let us suppose that the interest rate is 5 percent per annum and we decide to make use of the service for at least three years.

Those monthly outflows, as costs, can be represented as a capital expenditure using NPV analysis:

r = 5% ÷ 12 = 0.4167% (converted to a monthly rate)

N = 36 months

A = $1,000 (monthly amount)

FV = 0

$$PV = \sum_{k=0}^{N}\left(\frac{A}{(1+r)^k}\right) = \$\ 33{,}365.70$$

The present value of using a cloud service by paying $1,000 per month for its use computes to $33,365 over three years. You then need to compare this amount with the amount that your IT department provides you with for creating your own computing platform. The lower value wins your investment time and money.

Time to Market (TTM)

Estimating the time when revenues will be obtained is another financial yardstick that can be used. For example, let us assume that using traditional computing it would take you a year to go to market with a new offering that you are developing. With cloud computing, however, it could take you three months instead. So the TTM will be nine months sooner. And if you will earn $20,000 per month with the new system, then the earlier TTM would represent additional inflows of $180,000. Thus you can express TTM as time as well as its equivalent in monetary terms.