What does it really cost for each productive hour worked by a Systems Administrator?
By Alexis Tatarsky, Taos Co-Founder and EVP

The cost of labor is the major budget component of many IT departments - often exceeding the flashy price tags of the high tech equipment they run. Yet many companies scrutinize this expense far less than other, less significant expenses. For CIOs interested in their company's bottom line this can be a very costly mistake.

There are many reasons why dollars spent on employees might be less carefully managed than dollars spent on equipment. One key reason has to do with understanding employee TCO. An IT manager purchasing equipment looks carefully at the Total Cost of Ownership (TCO) of that equipment, and all the related expenses (initial purchase price, support contracts, etc.). Partly, this is because these expenses are generally easily identifiable and fall visibly under his or her budget. However, the departmental allocation of costs related to an employee generally do not cover all the associated expenses - often falling short by a considerable amount. Nor do they factor in the true costs over the entire employment lifecycle, but rather focus on direct and immediate expenses. This can give managers the mistaken impression that employees are less expensive than they in fact are, leading to over-hiring relative to value received.

For over 20 years, Taos has been providing system and network administration talent to its customers. Today, we deliver this outstanding talent in the form of interim talent engagements, project delivery, and managed services. In 2002, Taos conducted a study of its customers to ascertain a) how they account for the costs of System Administration (SA) staff, and b) what management in both technical and corporate roles consider those costs to be. The paper below, is a re-print of the results from this study. The results at the time were striking and as we reviewed them in light of today's IT climate, we found them to be just as relevant now as ever. In this time when many of our clients are facing growth and are re-building/re-structuring to handle pent up demand, we wanted to revisit this important topic.

First, we examine a typical high tech firm we'll call "Nova." Nova, a composite of actual Taos clients, is a leading company making computer software and equipment, and employs over 5,000 people. First-level and middle managers in IT are told that their departments are charged for their employees' salaries, plus an additional load factor of 24% "for company-paid benefits and taxes." To an IT manager at Nova, hiring a System Administrator (let's call him "James") for $80,000 annual salary thus results in a budget hit of $99,200 annually. Additionally the manager's budget for employee training, and if they have paid an agency fee to hire the employee, they are charged back for this too. But is this really the true cost of the new employee?

As an individual contributor IT employee at Nova, James is expected to spend, on average, 2 weeks per year at conferences and training courses intended to enhance his skills. Nova budgets $10,000 annually per IT employee for this sort of training, including course & conferences fees and travel.

$80,000	Salary
$19,200	Benefits
$10,000	Training

James' manager therefore budgets $109,200 per year for his position - or approximately 36% above his nominal salary. We'll refer to this as "direct costs" from here on, and equate it to $9,100 per month.

Using a common rule-of-thumb, the manager might easily believe that James costs about

$55/hour ($109,200 / 2000 hours). However, as we will see, this substantially underestimates the true cost of having James on board.

So, how in fact does one evaluate the TCO of an employee?

Employee TCO

In order to amortize one-time costs over the course of employment, we need to start with the "expected lifetime" of the employee. At Nova, over the past 5 years, the average length of employment for a Systems Administrator has been 42 months (3 ½ years). This factors in voluntary and involuntary turnover, and two rounds of layoffs during the recession. What in fact did Nova pay for those 42 months, and how much productive effort was actually received by the company?

First, we look individually at several categories of expense:

- Hiring Process
- New Hire Training
- Hiring Mistakes
- Employee Management
- Stock Purchase Plan

Then we will go on to examine just how many "productive hours" are contributed to the company by the employee over the employment lifetime, to arrive at a true "cost per productive hour." This paper presents a simplified model, but we believe that the general results are reflective of reality.

For the purpose of calculations in the rest of this paper, we assign a value of $75/hour to HR time, and $100/hour to IT management & senior staff time. These numbers reflect an estimate of the cost per productive hour of those employees themselves, and might vary some from company to company.

Hiring Process: The process of hiring James involved writing a job description, meetings spent discussing and getting approval for the position, and communicating the position to HR - for a total of 8 management-hours of effort. HR spent $3,000 running a recruiting ad and placing the position on the website. They also spent 30 hours screening candidates to arrive at eight candidates worth passing on to IT management for interview. Each of the 8 candidates was interviewed by two people, and the three finalists each went through a second round of interviews involving four people. In total, 28 interviews were held, averaging 45 minutes of interview time plus 30 minutes of preparation and documentation, or 35 hours of manager and staff time, plus the 8 hours spent in the Req definition and approval process. Over the past 5 years, Nova paid an outside agency for about 1/3 of hires. Fees averaged 20% of starting salary. For our example, we'll count 1/3 of an agency fee.

Assigning value of $75/hour to HR time, and $100/hour to IT management & technical interview time, plus direct costs of sourcing, we arrive at a hiring cost of:

$ 800	Req definition & approval
$2,250	HR time
$3,500	Interview time
$3,000	Sourcing
$5,333	Agency, 1/3 of the time, amortized over all of hires

For a total of $14,883. We'll use this figure for James.

New Hire Training: On average, Nova spends 40 hours of peer-employee and management time bringing a new SA up to speed. In addition, the expectation is that during the first two months on the job a new SA is to perform at 50% of full productivity; 100% thereafter. Summing this up, we get:

Ramp-up costs:
$4,000 40 hours management & peer-employee time
$9,100 Partial-productivity of new employee (1/2 of 2-months direct-cost)
Total: $13,100

Hiring Mistakes: Nova terminated 8% of new SA hires within the first 3 months on the job - after an average of 1.5 months. The direct cost of these bad hires averaged 1.5 months salary, plus 2 weeks severance. Additionally, dismissing a bad hire involved an average of 30 hours documentation and remediation effort on the part of management, and 20 hours of HR time. The total monetary cost of such an employee, counting just these factors, is $18,200 salary (2 months), $3,000 management time in the dismissal, $1,500 HR time. Add this to the $14,883 original hiring cost, and the $13,100 new employee training cost, and each hiring mistake costs $50,683. Amortize this over successful hires (the other 92%), and these mistakes add $4,407 to the cost of each successful hire. This assumes no productivity out of the employee, but it also assumes that he or she hasn't done any damage that needs to be cleaned up. It does not include non-monetary costs such as those related to morale, nor does it count the costs of potential legal action, nor the opportunity cost of lost productivity from the failed hire and from others involved in the remediation and dismissal process.

$18,200	salary + severance (two months direct cost)
$13,100	new employee training
$ 3,000	management time in dismissal
$ 1,500	HR time in dismissal
$14,883	original hiring cost
$50,683	

Amortized over good hires: Hiring mistakes add $4,407 to the cost of each good hire!
(50,683* (.08/.92) = $4,407)

The Bottom Line on bringing on a successful new hire at Nova:

Summing these numbers up,

$14,883 hiring cost
$13,100 new-hire training
$ 4,407 amortized hiring mistakes

Or a total of **$32,390** to bring on a successful new hire at Nova:

Amortizing this cost over the 3.5 year "productive life" of an employee results in a "hiring cost per year of employment" of $9,254.

Adding in the cost of money (at 8%) since these costs are borne at the start of the employment

relationship, not when the productivity is delivered by the employee, adds another $740 to the real cost of bringing James on, for a bottom-line total of:

$9,994 per year of employment

Management The next cost to consider is the cost of managing James. There are two components to management of an employee. The first is assigning and monitoring task completion. This one is generally straightforward, and is largely independent of the number of people completing the tasks. The second component consists of career and guidance related activities, such as performance reviews, regular one-on-one meetings, goal setting, and dealing with personnel issues such as coordinating vacations, personal emergencies, etc. At Nova, a first-level IT manager typically spends 50% of his or her time directly managing their people, and is considered fully burdened with between seven and nine direct reports. So in addition to his own salary, James' cost needs to be burdened with 1/8 of 50% of the manager's time - or about 2.5 hours per week. Again using $100/hr as the fully-burdened cost of a manager, this adds about $12,000 per year to the cost of James' productive work.

Stock Purchase Plan Many publicly held companies, including most Taos clients, offer an employee stock purchase plan, discounting by 15% the lower of the market price of the companies stock at the start and end of each quarter. Employees may invest up to 10% of their salary this way, and as it's essentially free money, most well paid employees invest the maximum allowed. The cost to the company is more than 10% * 15% of salary (amount spent * discount) because they charge the *lower* price at the start & end of the quarter. If the price has risen by 10% during the quarter, then the subsidy is 10% salary * 25% subsidy = 2.5% of salary. In James' case, let's assume 10% * 20%, or 2% of salary, so the stock purchase plan costs the company 2% * $80,000 or $1,600 per year.

Stock Options Actual stock options (at a fixed price vesting over a fixed term) are not so common for individual contributors at publicly traded companies, but quite common in pre-IPO companies. Where offered, the cost to the company, and how it is accounted for, is arguable. However, an argument can be made that if an employee cashes in, say $250,000 in stock after an IPO, that $250,000 is money the company could have raised by selling the stock itself. For this analysis we will ignore this component of compensation - although it has been very significant to many companies in recent years.

Facilities Office space, telephone & computer equipment, etc. are a considerable expense. Given current economic conditions, one needs to account not only for space used, but for space now unused - leased & built-out due to over-hiring in the past. When amortized over each employee, facilities & infrastructure costs could easily reach $20,000 per year. By the most basic rule-of-thumb calculation, an employee typically uses (counting common space) 350 square feet of space. In the Silicon Valley, between 1997 and 2002, direct full-service per-foot cost of such space averaged about $30.00 per year - or $10,500 per employee. We'll use this figure for James, but we make no attempt to quantify the costs of phones, computers, etc. nor to burden the figure with the cost of under-used space, buildout costs, etc.

Costs not factored in There many are other costs one might consider, but for this analysis we will ignore, such as:

- The cost of employee lawsuits
- The costs of layoffs
- Cost of dismissals (including management time) beyond new-hires

- The costs of unproductive time due to temporary over-staffing
- Costs such as payroll services and non hiring/firing-related HR time which scale with employee count
- Sign-on bonuses, performance bonuses (very significant at some firms), profit sharing.

In summary:

The bottom-line annual cost of hiring James for 42 months then comes to:

Salary:	$80,000
Benefits & Taxes	$19,200
Training	$10,000
Hiring costs, amortized	$9,994
Management	$12,000
Stock Purchase Plan	$ 1,600
Facilities	$10,500

	$143,294

Return on Investment

So the question then is: what does Nova get for its investment of **$501,529** in James over the 3.5 years of his employment? The first question is: how many productive hours does James contribute during this period?

The first answer that comes to mind, and that used by many mangers as a rule of thumb, is:

> 52 weeks in a year
> less 10 days (2 weeks) vacation, 10 paid holidays, 5 sick days
> Leaves 47 working weeks.
>
> And 47 * 40 = 1880 working hours in a year.

Unfortunately, this substantially overstates the number of *productive* hours. This figure, 47 working weeks, needs to be reduced as follows:

- Time off for training. Nova expects SA's to spend 10 days/year (2 weeks) in training.
- Work Overhead - Time spent in meetings (including time spent with his manager) and other non-hands-on System Administration functions. At Nova, this averages about 5 hours/week for the average SA; over the course of a year this adds up to 6.5 working weeks!
- Personal Distractions - Leaving a little early to see a child's class production, coming in late because the car broke down or the cable guy was coming, birthday lunches, etc. We'll assume 3 hours/month, or 36 hours a year (.9 weeks a year).
- Time spent post-notice - the last two week's of an employee's tenure is often unproductive beyond documenting some things formerly in his head, and handing off responsibilities. Over 3.5 years this is .6 weeks/year.

So another 8 working weeks are lost to these factors, reducing productive time to 39 weeks/year, or 1560 productive hours.

As a first-cut, each of James' productive hours costs $143,294 / 1560 hours = $91.86 per hour.

Certainly, this is a far cry from the $54/hour James' manager might have estimated he cost - a belief that can lead to terrible misallocation of IT budget dollars.

Beyond this there are a number of factors that make the true cost of an IT employee substantially more than, in this case, $91.86/hr. For one thing, not all bad-hires are terminated early. Many are kept on, marginally productive, year after year, because doing so is easier than building a case for termination. An informal poll of IT managers showed that if there were no cost, difficulty or humanitarian considerations in doing so, they would, on average, like to replace 15% of the System Administrators on their permanent staff. If we assume that each of these 15% is one half as productive as a good employee (probably a generous assumption) then we can add an additional load factor of 7.5% to the cost of the productive SysAdmins. In our example, 7.5% of $91.86/hour adds $6.89 for carrying the weight of under-performers, bringing James' cost per available productive hour up to **$98.75**.

Allocation of Time The final significant consideration is to contemplate the difference between 'available productive hours' with 'hours spent productively'. James might have 1560 hours in which he's available to be doing productive work, but how many of these hours is he actually being useful? Let's make the assumption that James is quite diligent, and that his nominal 40-hour work week does not include any time spent on extended lunches, restroom or coffee breaks, browsing the web, making personal calls, engaging in office small-talk, etc. It is still the case that productive hours might be well below 1560.

The reason for this is fluctuating workload. Every IT department makes a decision as to exactly what level of staffing to maintain. Too little, and important work doesn't get done on time. But any amount of staffing above that needed for "slowest period workload" means that at times the staff is less than 100% well-utilized. One could make a stock market analogy with the "Beta" of a stock - how volatile its price is during the year. An organization with "high beta workload" of necessity has substantial inefficiencies in allocation of labor. The only way around this is to hire and fire as necessary each day to do just the amount of work that is cost justified.

Companies such as Nova, at which high priority work must never fall through the cracks, try to maintain a little margin in available SysAdmin staff. Even if people are often working overtime to get things done, the regular staffing-level generally exceeds that needed for vital work during the slowest periods. Having this excess gives some cushion to cover absences & resignations, as well as peak projects. At a minimum, even in a fairly low-Beta company, smooth operation requires a cushion of at least 10% staff in excess of minimum requirements. Factoring this into James equation, brings his true "cost per productive hour" up by $9.89 to **$108.64**.

One last factor comes out of having staff cushion. What does staff do during less than maximally busy periods. Sometimes, managers send staff for additional training. Even more expensive however is the assignment of tasks that might interest the employee, but not be germane to the company's real needs. Over time these "background" projects sometimes become part of the baseline workload, and increase the apparent needed staffing level by an additional amount. These creeping-requirements are one of the reasons that big companies tend to have higher overhead than small ones, and "lean & mean" usually implies "young and small." We will not try to quantify this cost, but CIO's need to be aware of its significance nonetheless.

Conclusions

Financial executives generally understand, at least intuitively, the true cost of maintaining IT staff. Lower-level IT managers often do not. The wide gulf between "departmentally perceived costs"

and "cost to the bottom line" can lead to expensive errors in decision making.

The actual cost per productive hour, by our analysis, is nearly exactly twice the "rule of thumb" cost used by many managers ($108 vs. $55 in the Nova/James case study). The most effective way of watching costs is to avoid taking on low-priority projects in the first place. Better understanding of the costs of doing a project might lead IT managers to be more cautious in taking on additional workload.

For work that really does need to be done, there are various ways to meet the need. Many of the costs we've examined are employee-specific, and do not apply to contingent labor or to outsourced functions. Understanding the true cost of employees vs. alternative solutions might tip the balance in favor of alternatives, leading to reduced costs.

The specific numbers in this paper are representative of Taos clients surveyed, but are not precise for any one firm. If you're interested in examining the efficiencies of Taos service offerings, please contact us at contactus@taos.com.

Cheers,
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