The Need for Speed – Filling the Empty Chair

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ABSTRACT

The paper provides an analysis of challenges that engineering and human resources managers face when attempting to recruit new staff. Successful staffing of a software engineering organization in an intensely competitive market is described in terms of the key elements of the staffing process and proven strategies that help to stay ahead of the competition.

THE CHALLENGE OF TURNING A REQUISITION INTO A NEW EMPLOYEE

To the marriage of true impediments let us admit no minds.

> *Oscar Wilde*

Hiring Managers for technical positions, especially software engineering, face daunting odds when they seek qualified engineers to fill their empty chairs. Consider the following:

"There are 18,000 unfilled positions in Silicon Valley. High-tech companies in Austin, Texas say they want to add 15,000 people this year. Last year Boeing hired an astounding 20,000 employees, sometimes as many as 500 people in a single week."[1]

It is little wonder that we often find ourselves seriously considering and then, actually hiring, candidates about whom we have grave reservations. When we lose our objectivity in the rush to fill open requisitions, we have ample opportunity to repent at leisure.

The cost of bad hiring decisions is prohibitive. "My rule of thumb is: *If you make a mistake in hiring, and you recognize and rectify the mistake in six months, the cost of replacing that employee is two and one-half times the person's annual salary*…. The wrong executive making

$100,000 will cost you a quarter of a million dollars *if you rectify the mistake within six months.* And this economic estimate doesn't even consider the emotional costs. Who among us hasn't driven home or lain awake at night having imaginary conversations with a troubled employee or difficult colleague?"[2]

While the pressure on the technical market is an immutable fact of life, we can control our response to these pressures by defining and following a disciplined process to meet our organization's needs.

Three critical activities precede the candidate identification and qualification process and provide a solid foundation for the staffing process.

Every engineer knows that the first step for any activity is requirements analysis. The staffing manager determines what openings exist by analyzing the current staff distribution. Mature organizations have an advantage because they usually employ a rigorous project planning process that generates a detailed staffing plan for each project. The project staffing plan specifies headcount over time, by grade / experience level. Most organizations use an automated system that rolls up this data to project the organization's requirements. This is an important view to keep in mind because the normal de-staffing process will fill some

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[1] Mornell, Pierre, <u>45 Effective Ways for Hiring Smart</u>, Ten Speed Press, Berkeley, CA, 1998, p. 167

[2] Ibid., p5

requirements. Another consideration is the distribution of the current staff. If an organization feels that they are top-heavy, they may wish to focus on hiring more junior engineers and re-distributing some of the current senior staff. The objective of this first step is to develop a clear set of hiring requirements in terms of numbers as well as level and type of experience.

With a clear set of requirements in mind, the next step is to create a realistic requisition. The ideal requisition is detailed and specific, facilitating a match between candidates and openings. Determine if you wish to offer a referral bonus if this is a critical hire

The position description should identify the organization's generic requirements for that grade or level, i.e., education, experience, leadership requirements, job complexity, independence, etc. This description is followed by specific requirements for the position such as programming languages, tools, techniques, and methodologies. It is advisable to use care in this section. Discriminate between "must have" and "nice to have". It is a very rare candidate who possesses all the traits and skills that are considered desirable. Realistically, we expect to invest in every new employee. If we expand the required qualifications too much we will eliminate virtually every potential candidate.

Many organizations post requisitions internally for some period of time to give current employees an opportunity for advancement. This internal posting period must be factored into your timeline.

Finally, set goals for your process capability. How long does is take now, on average, to bring a new engineer on board? What is the absolute best cycle time your organization is achieving? What cycle time must you achieve to meet current staffing needs?

What is your offer acceptance rate at present? What offer acceptance rate is reasonable? Staffing metrics will be addressed in more detail later in this discussion.

TURNING PROSPECTS INTO EMPLOYEES IN PARTNERSHIP WITH HR

If you ask the average engineer, "Who is responsible for hiring?" their automatic answer is "Human Resources." HR is the interface with the candidate for offer negotiations, the planner of job fairs, the author of advertising, the manager of requisitions, and the keeper of the sacred salary data. What HR can not do is evaluate the depth and breadth of an engineer's expertise in light of requisition requirements. While excellent at sourcing candidates by screening resumes, even the best HR staffer does not possess the capability to determine which candidates best meet engineering's needs. This section of this discussion focuses on dividing the hiring responsibilities between HR and Engineering to form a strong, effective partnership.

Finding Candidates and Filling the Pipeline

The most challenging and time consuming staffing activity is identifying candidates. Until you have a candidate the rest of the process is academic.

One of the most fruitful activities for our organization has been attendance at technical job fairs. HR does the planning, ensuring our advertising is correct, preparing handouts with descriptions of open positions, selecting logo give-aways to distribute, and shipping and assembling the booth on the job fair site. HR also has at least one staffing representative present during the fair. The most important thing we learned during this past year is that while HR can attend a job fair alone, bringing back resumes for engineering to review, results are relatively lackluster when compared with the results where engineers are present during the fair.

A representative of Software Engineering Management attends all job fairs. When we expect high attendance, senior software engineering staff work the fair in shifts to handle traffic. Our objective is "Make sure no good candidate gets past us!" We go prepared with a

schedule of potential interview slots for the week following the fair.

We are aggressive in the sense that we stand in front of the booth, not behind a table, making eye contact with every person that passes our location. We move around a bit, working the crowd. When we spot a likely resume, we move the candidate aside and elicit a few more details about their experience and what type of job they are seeking. If we judge them to be a good prospect we immediately schedule an interview at our facility and give the candidate an information packet with the job application. HR manages the queue for us by keeping possible candidates engaged until an engineering representative is free to talk with them.

These tactics save a week or more in our recruiting cycle time. In the old scenario, HR collected resumes, returned to the office, sorted and catalogued the resumes, and forwarded them to the Hiring Managers. The Hiring Managers eventually got all the resumes reviewed and ranked. If they thought any candidates looked good they notified HR who contacted the candidate to see if they were interested in interviewing with the company. Many phone calls later, with HR serving as the middleman, we might actually get an interview scheduled. This method was especially tedious and inefficient because experience has taught us that 95% of resumes do not meet our criteria. Without the face-to-face screening, our offer rate was much lower and we spent a lot of time interviewing candidates that were not quite what we were seeking.

Another source of candidate leads is advertising. Our results with newspaper advertising have been mixed. It is relatively expensive. We have found that it is most successful when we have a single position with rigorous requirements. It is least effective when we advertise multiple positions at various grade levels. We have had better response to our ads on Internet services and our company web site. These can be discriminated from newspaper ads in that each entry is for a unique position. Attendance at job fairs always includes publicity by the event coordinator. Advertising is a more passive

search method and it does not yield speedy results.

Regardless of advertising methods employed, the Hiring Manager should always review all advertisements. Omissions and mistakes are wasteful and time-consuming.

Internet services, such as Headhunter.com, are excellent places to source candidates. The ability to refine search criteria delivers targeted results. The data sheet contains a lot of useful information, such as the candidate's willingness to relocate and the percentage of travel with which they are comfortable. Our HR recruiter sources daily from Internet sources. Software engineering management made a commitment to respond to HR on all possible candidates within 24 hours. We discovered that if we did not follow up on potential candidates quickly, they disappeared. It is a bit embarrassing to be so slow that they have already started their new job by the time we call.

Many organizations offer employee referral bonuses. The criticality of the position determines the amount of the award. This can be a powerful tool for referrals. Ten percent of our new hires for this past year were the result of employee referrals. The referring employee receives a nice check, the cost of which is much less than many of the activities described above. In turn, we gain a new employee in whom we can have a lot of confidence. The referring employee always takes a personal interest in the new employee's success. These are some of our best (and easiest) candidates.

Who is Interviewing Whom?

The interview is our opportunity for a number of staff to probe the candidate's credentials in more detail to determine if we should offer employment. This is the way it always has been. It will always be this way.

However, in the tight market described in the introduction, the candidate is also looking us over and comparing us to a number of other potential employers. We never forget that we are

being interviewed, too. We put a lot of planning and energy into doing well in the interview.

Based on the resume and preliminary screening, we have an idea of where the candidate will fit in the organization. We select potential members of the interview team for specific interview roles to evaluate all facets of the candidate including technical qualifications, interpersonal skills, and experience level. The software engineering Hiring Manager sends Interview Guidelines to the interview team, shown in Figure 1.

The department administrative assistant verifies the interviewers' availability for slots, places the interviews on the individual calendars, and prepares an itinerary with an attached copy of the resume for all participants. The candidate receives an email copy of the itinerary and maps detailing directions to the facility, if necessary. Figure 2 is a sample interview itinerary.

The HR Staffer always opens and closes the interview. All candidates have at least two segments of the interview schedule devoted to technical evaluation. One or more segments focus on behavioral interviewing. One interviewer is assigned responsibility for conducting a tour of the facility with emphasis on our labs.

If we are interviewing a new graduate from out of town, an additional segment of the interview is devoted to advanced degree opportunities in our area.

One member of the interview team is responsible for taking the candidate to lunch. Software management or other senior staff with experience of interest to the candidate often joins them. Our usual practice is to make reservations in a medium priced restaurant with an atmosphere conducive to conversation and an acceptable range of items available to appeal to every taste, e.g., meatless entrees.

If a candidate must travel for the interview, it requires more effort and coordination. The HR administrative assistant coordinates all travel arrangements with the candidate. The travel agency itinerary is emailed to the candidate. If

they are not eligible to drive a rental car, limousine service is arranged. In the case of new graduate candidates, interviews are scheduled to include a Saturday night stay. Employees volunteer to show the candidate around the area, based on what level of attention the candidate seems to feel comfortable with. Activities that applicants have enjoyed include plays, sporting events, visit to our new Science Museum, and shopping at the Mall of America, one of our leading attractions.

The Hiring Manager is responsible for overall coordination and maintains an Excel spreadsheet that tracks staffing activities. This data is also manipulated to produce the metrics discussed below. A section of the matrix is shown in Figure 3. The actual matrix contains four additional columns for "Manager," "Interview Team," "Mentor," and "Notes."

No amount of planning is guaranteed to produce perfection, so we always provide visiting candidates with an emergency number, should something go wrong, e.g., the limousine fails to show and they are stranded at the airport. The number has been used more than once.

Near Real Time Feedback

Our policy is to have an offer decision within 24 hours of the candidate departing our facility. There are rare exceptions, usually related to reclassifying an applicant subsequent to the interview. Then it may be necessary for them to return to interview with different employees.

The 24-hour offer decision demands interview feedback be completed immediately after the interview. All members of the team, including the host(s) for lunch and the tour guide, complete feedback. The Hiring Manager compiles the feedback and forwards it to HR for the files. The Feedback Form is shown in Figure 4.

Our Hiring Manager is authorized to make offer decisions and usually does so immediately, based upon the interview feedback. If there are questions or ambiguities more feedback is sought and the candidate is evaluated by the

Thank you for participating in this interview.

Please use this form to provide feedback on the interview ==> Interview Feedback.doc   (please note that the boxes on the form are table cells and you are NOT limited to one line responses). Feedback must be objective. For example, do not comment on a candidate's accent, unless you believe it would be a severe impediment to effective communication on the job. Please complete your feedback the day of the interview and return to me. Charge time spent on interviews to comp code XX. Please feel free to send me any feedback on the interviewing process to help me improve it.

Behavioral interviewing is predicated on the notion that past behavior is a predictor of future behavior, so questions are formulated to encourage applicants to give you insight into how they have dealt with a variety of situations in the past. We are obviously interested in their facility for problem solving, planning, teaming etc. Probe for behaviors and ask for specific, concrete critical incidents. We are interested in behavior extremes - the best and the worst. Examples: "Tell me about your best technical accomplishment in the recent past. Start at the beginning and walk me through it."; "Tell me about the most difficult technical problem you had to solve in the recent past."; "What was the process you followed to resolve the problem? Can you walk me through it?"; "Tell me about the co-worker with whom you get along with least well? What have you tried to rectify the situation?"; "Tell me about your toughest assignment."; "Describe the last important decision you made. What was the outcome?"

[Applicant Name] is interviewing against a proposed requisition that contains the following requirements:

[Sample to be replaced with specific requirements]

Digital Map: Render a 2-d or 3-d digital map graphically on a display and follow user initiated movement over its surface -- in real-time. The digital map should be stored on a Fibre Channel disk drive, but may be stored on an Ethernet accessible hard drive or local memory (if enough is available). Required Skills/Experience: Digital Maps, Fibre Channel Disk Drives

2. Video/Graphics Overlay: Using Off-the-shelf hardware, digitize a live video analog camera input, overlay it with graphics, and render it graphically on a display in real-time. Required Skills/Experience: Graphics Accelerators, Video/Graphics Overlays, OpenGL

Tentatively, we have assessed him/her as Benchmark XXXXX. The criteria for this level are below. [Replace level number and criteria below.]

I would like each interviewer to ask [Applicant Name] if (s)he has any questions and evaluate his/her curiosity and level of interest in General Dynamics.

Criteria for evaluating Software Engineers (Benchmark XXXXX) are as follows:

Job Level	Complexity	Supervision	Communication Skills	Education / Experience

Figure 1. Interview Guidelines

The itinerary for David's interview is as follows with focus areas indicated after each interviewer:

8:00   [NAME], HR x5551, Interview introduction, Benefits.

8:30   [NAME], Software Engineering Manager x5552 - Evaluation of candidate's future goals and how they fit with our opportunities

9:15   [NAME], Senior Staff Software Engineer x5553 - Evaluation of technical competence / potential

10:00   [NAME], Senior Staff Software Project Engineer x5554 - Evaluation of candidate's future goals and how they fit with our opportunities

10:45   [NAME], Staff Software Engineer x5555 - Evaluation of technical competence / potential

11:30   Lunch. [NAME], Staff Software Architect x5556 - Evaluation of candidate's response to situations and events (behavioral evaluation)

1:15   [NAME], Senior Staff Software Architect x5557   - Lab Tour and general questions

2:00   [NAME], HR x5551, Close

Figure 2. Sample Interview Itinerary

Candidate	Candidate Indentified	Interview Date	Offer Decision to HR	Verbal Offer Extended	Written Offer	Req #	Offer Accepted	Start Date	Assignment	Office	Bench
[NAME]	9/13/00	9/13/00	9/18/00	9/18/00	7/16/02		9/21/00	January			COOP
[NAME]	9/11/00	10/23/00	10/26/00	10/30/00	10/30/00		11/20/00	January			5161
[NAME]	9/13/00	12/18/00									5161
[NAME]	9/13/00	11/30/00	12/4/00	12/5/00	12/5/00						5161
[NAME]	4/28/00	5/4/00	5/8/00	5/8/00	5/11/00		5/15/00	6/5/00		2S120	5163
[NAME]	4/28/00	5/8/00	5/11/00	5/11/00	5/12/00		5/17/00	6/28/00		2S138	5163
[NAME]		5/24/00	5/24/00	5/25/00	5/25/00		5/30/00	6/5/00		2W130	Intern

Active Candidates

Figure 3. New Hire Tracking Matrix

	Interview Feedback		
Interviewee:			
Interviewer:			
Date of Interview:			

Please rate the candidate in the following areas (relative to current staff):

	High	*Medium*	*Low*
Knowledge			
Skill			
Self Development			
Teamwork			
Communications			
Flexibility			
Interest in GDIS			

Complete this form with notes on the usual subjects below:

General Impression of Candidate

Candidate's Perceived Strengths

Candidate's Perceived Weaknesses

Other Comments

Overall Recommendation

Business Area Recommendation

Figure 4. Interview Feedback Form

entire software management team and their decision communicated to HR. HR communicates regrets to candidates for whom we decline to offer.

The day after the interview, the HR Staffer prepares the offer worksheet including benchmark salary data, organizational salary data and experience analysis. They recommend a salary based upon the data and the results of their discussions with the candidate. The HR Staffer and the Hiring Manager sit down together and work through the final details, including salary, relocation estimates, if necessary, and signing bonuses. Our policy is to make our first offer our best offer. Once the offer is finalized and approved, the HR Staffer communicates the offer verbally to the candidate at the first opportunity. The formal offer letter is Federal Expressed within 24 hours. We give candidates five days from receipt of the offer to respond. We are agreeable to brief extensions, but try to encourage a timely decision.

We maintain contact with the applicant during their decision period. This initiative is usually handled by Human Resources. They inform the Hiring Manager if they feel the candidate needs to talk with them. The goal is to uncover questions and doubts and deal with them before the applicant declines the offer. It is almost impossible to turn around an unfavorable decision, so trying to head it off it is time well spent.

Because our first offer is our best offer, we seldom negotiate, unless there are minor concessions such as assignments, or small increases in signing bonuses. Our negotiating skills are focused on reminding the candidate of all the positive reasons to say "Yes!"

Speed Bumps

We begin making a good impression with our first contact at the job fair. Candidates have told us that they admired our recruiting style: well organized, professional but personable, upbeat, and decisive. Moreover, they are usually having lunch with one of our engineers before other

firms have even starting contacting applicants from the fair. While we have been successful against competing offers, our success rate declines dramatically when the candidate has multiple offers in hand. We try to avoid that scenario by optimizing our staffing process

Every step of our interview process is optimized for speed. Getting the feedback, making the offer within 24 hours, and trying to limit the response period to five days are all focused on gaining the "Yes!" from the candidate before our competition has even formulated an interview plan. But speed wins the race only if you can maintain that speed throughout. Every step of the staffing process has to meet the criteria for speed and professionalism. Failure to make a timely offer decision and deliver it to the candidate negates all the successful steps that preceded the offer phase.

For critical, short lead-time positions we concentrate on identifying local candidates because the cycle time is much shorter if no relocation is involved.

Everything works better when communication is excellent. Email is an indispensable tool providing support for our process. All the documentation described in this discussion and shown in the figures above is electronic and is exchanged via email. The only physical paper produced is a copy of the master itinerary which is attached to the candidate's resume and provided to the interview team, because the engineers like to have this in their hands to guide their interview questions and record notes. Email is so integral to our process that we are careful to verify the email address on all prospective candidate's resumes.

USING METRICS TO EVALUATE AND OPTIMIZE PROCESS CAPABILITY

As a CMM Level 3 software organization aspiring to CMM Level 4, we strive to make measurement as natural as breathing. The data in the matrix used to track staffing activities (Figure 4) is converted to measurements of our staffing process capability. The process described in this discussion is less than a year

old and the data used to produce the metrics in Figures 5 – 7 is considered our benchmark data. It will be used to establish improvement goals for 2001 staffing activities in two ways. First, analysis of this data exposes bottlenecks where we don't act with sufficient speed. This will allow us to target process improvements.

Secondly, comparison of this data with industry data will allow us to set goals for process capability. Our source for industry data is *Human Capital Benchmarking Report*, published by the Saratoga Institute.

Figure 5 displays cycle time for the staffing process as a accumulation of process steps. The initials are used as reminders, so when some one asks, "What went wrong with the one that took a hundred days?" we are reminded that was a complicated relocation, not a process failure.

Figure 6 displays the monthly activity clearly showing a peak in August. Figure 7 tracks our cumulative acceptance rate. As we plan for next year, we are planning additional metrics and considering some changes to the current set. A comparison to the benchmarking report shows we are fast but our offer acceptance rate is lower than the industry. That will be a worthwhile challenge for 2001.

WHAT HASN'T BEEN SAID

The process described above was developed on the fly by a relatively small software organization, in a modestly sized business unit, that suddenly found itself too small to handle a growing workload. At this writing, the department numbers less than 100 engineers despite about 25% growth over the last nine months. During the intense staffing efforts this year, there was no HR Staffer and the HR manager filled this role in addition to her normal duties, providing timely support and valuable advice.

The software engineering staff was exceedingly busy, spread very thin trying to meet program needs with insufficient resources.

Our success is the result of extraordinary teamwork, numberless extra hours, and constant extra effort. No matter how over worked, the overwhelming majority of software engineers made room on their calendars for many interviews. They volunteered selflessly to attend job fairs in the evening, to entertain candidates over the weekends, and to perform countless miscellaneous tasks that ensured our success. Without being told, they understood that their workload would never stabilize until we added staff.

They were gracious hosts and hostesses and extremely conscientious in providing thoughtful, detailed feedback assessing each candidate. They never shied away from making a recommendation and their accuracy was amazing. To date, we have not identified a "bad hire" in the batch.

Throughout the year they responded to requests for process feedback with timely, useful suggestions. While we are still hiring, the intensity has abated and we are receiving detailed, well thought out suggestions for improving our staffing process, especially the quality of our interviews.

Success does not depend upon size or number of resources. It does not correlate to the amount of money expended. It is a reflection of will and the effort of the people involved in the process.
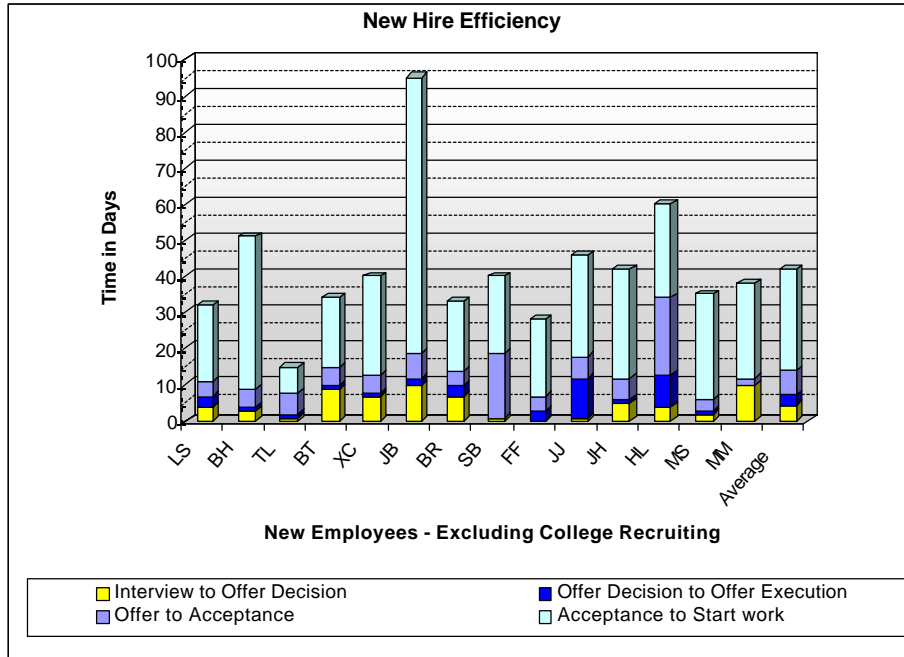
New Hire Efficiency

Time in Days

100
90
80
70
60
50
40
30
20
10
0

LS BH TL BT XC JB BR SB FF JJ JH HL MS MM Average

New Employees - Excluding College Recruiting

☐ Interview to Offer Decision   ■ Offer Decision to Offer Execution
☐ Offer to Acceptance   ☐ Acceptance to Start work

Figure 5. Staffing Cycle Time

GDIS Software Engineering 2000 Monthly Activity

Number of Candidates

20
18
16
14
12
10
8
6
4
2
0

Feb Mar Apr May Jun Jul Aug Sep Oct Nov

College Recruits Reflected ONLY in 'New Hire Starts' Category

☐ Candidates Identified   ☐ Candidates Interviewed   ■ Offers Extended
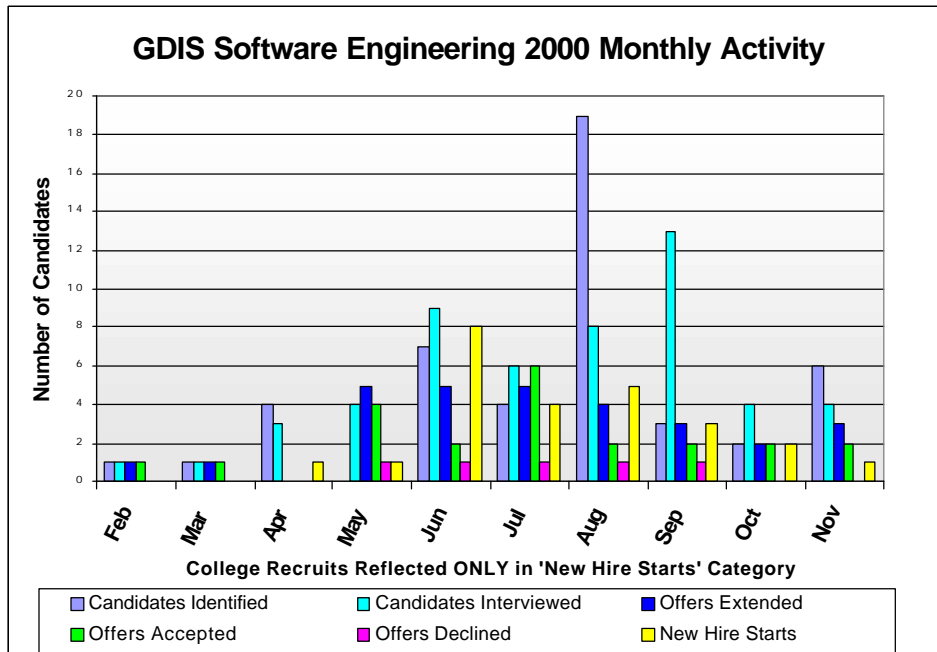☐ Offers Accepted   ☐ Offers Declined   ☐ New Hire Starts

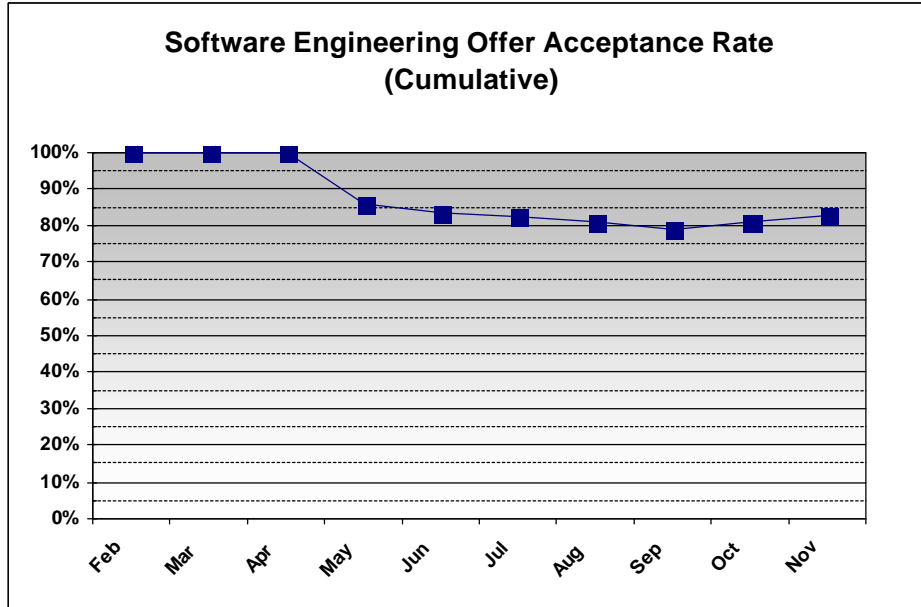**Figure 6. Monthly Staffing Activity**

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Figure 7. Offer Acceptance Rate

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Human Capital Benchmarking Report, Fifteenth Annual Edition, Saratoga Institute, Santa Clara, CA, 2000

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Toni has over twenty years of experience, predominantly in military systems development, encompassing software development, software test, software quality engineering, process improvement, and project engineering. Her professional experiences have convinced her that process is the key to success in any endeavor. She is the manager of Tactical Avionics Software Engineering for General Dynamics Information Systems in Minneapolis, Minnesota, and serves as the engineering focal point for staffing and recruiting.