

RECRUITING, INTERVIEWING AND HIRING A SAS® PROGRAMMING STAFF

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Introduction

Would you buy a car without a "test drive"? Would you hire a juggler without an audition? Then why would you hire a SAS programmer without an audition? During the last fourteen years, Atlantic Research Corporation (ARC) recruited hundreds of SAS programmers while building several large centers of SAS expertise. Our goal in the recruiting process is to determine whether or not a candidate has the potential to become a strong member of ARC's SAS programming staff. We followed the traditional hiring approach: senior staff spent large amounts of time screening, interviewing, and hiring prospective employees. Six months later, we reviewed the new employee's job performance and found that we had not always accurately assessed the new hire's potential.

Four years ago we began to develop a new approach that begins with an initial screening interview by phone, a review of the prospect's portfolio of SAS code and documentation examples, and finally concludes with an audition (the interview). The screening interview includes a check list that helps us immediately assess the prospect's SAS skills as a beginner, intermediate or advanced programmer. The portfolio review is a second level of screening and prepares our resident staff for the interview. At the audition the candidate presents and discusses their code with a panel of ARC staff. Staff members representing various levels of expertise make up the panel; the premise is that if junior as well as senior staff have input into the interview and hiring decision, then every one has a vested interest in the future success of the new employee. This process has brought excellent results.

This paper presents ARC's program and provides the reader with guidelines and checklists that are a proven success.

Background

The traditional recruiting approach with which we are all familiar begins with an employment announcement in a newspaper or a telephone call to a recruitment service. In each case, resumes begin to arrive, and someone reviews the resumes for candidates whose backgrounds are a good match for the position(s) that you need to fill. This initial selection process is based not only on objective criteria such as the respondent's academic background and job history, but also on subjective factors such as the format of the cover letter and resume, as well as the reputation of the organizations that the person has worked for in the past.

As candidates are selected, we schedule the date and time of the interview so that the prospective employee will meet several technical members of the staff. At the conclusion of the interview the candidate meets with a senior manager. A follow-up meeting of the staff that interviewed the prospect usually takes place, we check out the references, and second and even third interviews may occur. Once we have interviewed all prospective candidates, the hiring decision is made.

At ARC we found that this process yielded random success. There was usually unanimous consent on the stellar candidate who was

a perfect match for the open position. This process was no guarantee of future potential value to the company or that employee's long-term satisfaction, but usually resulted in a successful, long-term hire. However, there were occasions when, even with unanimous consent from the interviewing team, the employee's tenure with ARC was not successful. Sometimes we over estimated an employee's technical strength and potential for the position that we are filling. Sometimes our expectations for the person were too high for the position assigned to them. On occasion, they were not a good match for the personalities of the programming staff they joined.

During the first three months of an employee's tenure, they are in a probationary status. At the end of three months, we review the employee's overall performance, ability to learn new ideas, and ability to take direction and follow company regulations. ARC's three-month probationary review was a good interval for reviewing the success/failure of the interview process. However, in three months, a weak performer is usually dissatisfied with their job, and management is already trying to determine if this person has the potential to improve. This is a three-month loss not only for ARC but also for the employee. Our goal in the interview process was to minimize this potential loss of productivity.

Poor results cost our program managers a lot of time. The employee needed extensive counselling and support in order to gain the acceptance of their peers, and staff morale was affected when everyone had to cover up for the inadequate performance of a new hire. Perhaps the salary offer turned out to be too high for the performance level of the new employee. Sometimes, the employee started out performing as expected, but a few months into the job problems began to percolate that set the counselling process in motion. These are the circumstances that a good recruiting process should prevent.

Recruiting

Two approaches to recruiting include placing employment announcements in the newspaper and using a professional search organization. For the purpose of this paper, I will discuss two types of newspaper employment ads. Selecting an initial group of candidates to interview is usually eliminated if you contract with a professional recruiter.

A very targeted ad is presented as Example 1. This ad clearly defines the specific skills you are looking for, and has a headline that should only attract respondents looking to further their SAS programming careers. An ad like this rarely attracts entry level programmers, because their exposure to SAS is limited. They do not have the experience that would make them realize that there are over 3 million SAS software users and that there are a lot of career opportunities for SAS specialists.

The targeted ad yields fewer respondents, but can produce hiring results in a shorter time period. Fewer respondents also yield fewer interviews, less consumption of staff

interviewing time, and consequently fewer rejections. Our experience is that people responding to the targeted ad are seriously looking for a new job.

A less-specific ad is presented as Example 2. The text of the ad lists SAS as well as other complementary skills such as knowledge of database management packages (e.g. Oracle®, DB2®, Rdb®), experience with other programming languages (e.g. FORTRAN, C, ADA, COBOL), and an understanding of specific operating systems (e.g. UNIX®, VMS®, MVS). This ad placed in a newspaper in a large metropolitan area often yields a hundred or more resumes but includes people who are just "browsing", perhaps to learn how their salary ranks in the current job market. However, people with a broader range of skills may yield potential you won't find in a candidate that is focusing exclusively on SAS programming opportunities.

This ad will also attract the entry-level people who lack on-the-job experience but have academic experience in high-level languages, compilers, and database theory. From this ad ARC has identified recruits with minimal, if any, exposure to the SAS products. After taking one of our internal SAS training courses and being paired with a "mentor" who integrates them into the SAS programming team, these new hires have become stellar performers. Staff development, after all, requires that you recruit for all levels of expertise in order to grow your organization and provide opportunities for your current staff to move up professionally within your company.

Resume Review

Once resumes begin to arrive, you have to review the resumes and schedule interviews. At this step we separate the entry-level respondents and review the remaining resumes for prior SAS experience. If we are recruiting for entry level positions, our company's recruiter conducts a telephone interview. Our senior technical staff review all resumes that indicate some familiarity with SAS.

We use resumes to identify applicants we want to follow up on. The first review of the resume determines whether or not SAS has been used only as a procedural programming tool, or as a programming language; whether SAS has been used primarily as a systems programming tool for computer performance evaluation, or for classic data processing applications. Sometimes a resume indicates sporadic SAS usage for ad hoc reporting.

Following this initial screening, our recruiting staff receives the selected resumes. They conduct the telephone interview to determine salary expectations, the number of years of SAS experience the candidate has, their knowledge of additional SAS products, and their use of SAS programming techniques such as "SET" with the "POINT" option, using the "PUT" function for table look-up, advanced use of procedures such as TABULATE and REPORT, and use of the Macro language. Example 3 presents the telephone interview questionnaire. At this time, the recruiter also asks the candidate to submit an example of their SAS code and some documentation. We assure the candidate of privacy and return all code at the conclusion of the interview process.

Not everyone can provide SAS code in advance of the interview. Sometimes a candidate that sounds like a strong prospect in the telephone interview cannot provide any code or documentation due to the propriety of their current position. In these cases we ask the person to prepare an oral presentation on some aspect of their work, and then we provide them with some code to discuss. We ask people with SAS training experience to present an abbreviated

course lecture. We require people being considered for entry-level positions to submit computer programs that they have written for a class project, as well as the documentation they developed in conjunction with the project.

SAS Code Review

The code usually arrives within a week of the telephone interview. Again a senior member of the staff reviews the telephone interview questionnaire and looks over the code to determine how sophisticated the code is relative to the experience level and salary expectations of the candidate. For example, the code could have been written by a person with 10 years of SAS programming experience, who is mainly using SAS as a report writer, without any apparent understanding of the way the SAS system works. This is often apparent from the use of successive data steps, when one would have been sufficient. Exhaustive use of the "If-Then-Else" structure for reassigning variable values is another indication that a person with 10 years of SAS programming experience has not been curious enough to explore the wide range of programming techniques available in the SAS language. When reviewing the code of an experienced programmer we expect examples of passing procedure output into report writers such as PROC TABULATE or PROC REPORT. Alternately, the code from a person with a few years of experience may exhibit elaborate data manipulation techniques.

Example 1 - Targeted ad for SAS Application Developers (Left)

Computer

SAS® APPLICATION DEVELOPERS IBM/MVS or DEC/VMS

ARC Professional Services Group is a highly diversified systems engineering corporation providing sophisticated technical and complex program management services to Government and industry for 40 years.

We have challenging opportunities in financial and pharmaceutical applications for mid-level SAS programmers with solid DATA step and MACRO programming abilities. ARC SAS programmers are experts using the SAS programming language. We are in high demand by commercial and government clients whose applications require the very best SAS expertise.

Four years of data processing experience and two years of SAS DATA step programming under MVS or VMS are required. Under MVS, ISPF, Dialog Manager, C-List, and DB2 are a plus. Under VMS, ORACLE or Rdb are a plus.

ARC Professional Services Group offers an excellent compensation and benefits program. For immediate attention, call the Software Development Manager at (301) 258-5542. Or send your resume, salary expectations, and professional development objectives to: ARC Professional Service Group, Dept. FXJM0992, 1375 Piccard Drive, Rockville, MD 20850. We are an Equal Opportunity Employer M/F/D/V. U.S. citizenship is required.

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Example 2 - Ad for Software Developers, Including SAS Programmers (Right)

Computer

SAS® SOFTWARE PROFESSIONALS

In the fast growing field of SAS programming, ARC Professional Services Group **STANDS OUT!!** That's why leading companies look to our SAS experts for the latest in professional and technical services. Now you have the opportunity to couple our expertise and your skills towards a career as a SAS Programmer in Applications Development.

Immediate openings exist in Financial, Economics, Pharmaceutical and Scientific applications for persons with at least 2 years of data processing experience and the following qualifications:

- UNIX/C, SOL, COBOL, IMS
- VAX/VMS Programmers with 2 years' SAS experience
- SAS/DB2 Programmers
- SAS Programmers with Pharmaceutical industry experience
- ORACLE, dBASE III, Clintrials, RS/I
- RPL Programming

These openings may offer 3-6 months travel assignments.

We offer an excellent compensation and benefit plan that includes tuition reimbursement and a 401(k) retirement program.

If you want to work with the recognized experts in SAS programming, please send your resume today to: ARC Professional Services Group, Department FXWM/0193, 1375 Piccard Drive, Rockville, MD 20850. An Equal Opportunity Employer M/F/D/V.

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Example 3 - Telephone Interview Questionnaire

NAME: _____

DATE: _____

ADDRESS: _____

PHONE: (____) _____

PHONE: (____) _____

SAS PHONE INTERVIEW

1. Are you interested in employment? YES ___ NO ___
- a) Availability for hire date: _____
- b) Salary expectations: _____

2. What kind of position are you looking for?
- (a) programmer (b) analyst (c) manager (d) marketing (e) other

3. (a) Degree _____ b) Type: BS _____
 BA _____
 MS _____

 GPA _____

4. Do you have experience with:
- a) SAS and other SAS products? _____
- b) Model 204 (if applicable)? _____
- c) DB2 or Oracle (if applicable)? _____
- d) dBASE, etc. (if applicable)? _____

5. Do you have statistical sampling experience? YES ___ NO ___

6. How long have you been using SAS? # years _____ (min. RQD: 2 years)

7. What SAS products have you used?

	Yes	No	Some
STAT	___	___	___
GRAPH	___	___	___
QC	___	___	___
IML	___	___	___
OR	___	___	___
AF/FSP	___	___	___

NAME: _____
(Cont'd)

8. What PROC's have you used?

	Yes	No	Some
FREQ	___	___	___
MEANS	___	___	___
SORT	___	___	___
PRINT	___	___	___
TABULATE	___	___	___
SUMMARY	___	___	___
REPORT	___	___	___

9. What features of SAS (Data Steps) have you used?

	Yes	No	Some
a) "BY" statement	___	___	___
b) "IN" variable	___	___	___
c) "First (DOT)/LAST"	___	___	___
d) "MACRO" languages	___	___	___
e) "Set with "POINT" option	___	___	___
f) "PROF Format" for Table Look-up	___	___	___

10. Are they credible (do they know what the resume implies they know)?

Good ___ Fair ___ Poor ___

11. Are they articulate?

Good ___ Fair ___ Poor ___

12. Do they express themselves well?

Good ___ Fair ___ Poor ___

Remarks:

- 1) Do you have "SAS" code? _____
- 2) Date available for interview: _____

Other Comments:

We are also looking for software developers who exhibit creativity as well as curiosity when they develop programs. A certain amount of curiosity is usually evident when we see the use of obscure or complex techniques such as those found in Macro programming. This often indicates that the interviewee reads the SAS manuals carefully or seeks help from more senior colleagues. Creativity is often apparent when the prospect developed an elaborate solution to a problem because they did not have access to other SAS products (e.g. SAS/QC[®] or SAS/AF[®]).

From time-to-time we have been suspicious that the candidate did not originally prepare the code submitted. In these instances, the reviewer makes a brief telephone call to the candidate in order to further assess their SAS skills.

The Interview

Finally, we schedule the candidate for an interview. The interview takes approximately two hours for the candidate, and it is very important to accommodate a candidate's schedule as much as possible. They must take personal time off from their current job, and possibly travel a good distance for the interview. The ARC interview is conducted by 3-5 members of the staff who will meet with the candidate in a conference room setting. The interview panel will initially ask questions concerning the information provided on the resume and job application. This is followed by the candidate presenting their code, in the format of a code walkthrough. Finally, the candidate has an opportunity to ask the panel questions about our company, the job, and the work environment.

The ARC staff selected for the interview team includes beginner, intermediate and senior-level SAS programmers. A program manager is on the panel who could possibly be the candidate's next supervisor. We provide each member of the panel with an interview packet that includes the prospect's resume, telephone interview questionnaire (without salary information), and the portfolio of coding examples and documentation.

First, we ask the candidate to complete a job application. The application form includes job history (usually from the resume), education background and grade point averages. This gives the candidate a chance to relax, and provides the ARC personnel office with the information necessary to proceed with the hiring process as soon as the hiring decision has been made. At this time we explain the ARC interview process. We ask them to begin to think about questions they may have for the interview panel at the conclusion of the interview.

We conduct the candidate's technical interview around a conference table. All members of the ARC interviewing panel meet with the candidate at the same time. The interview is separated into three parts. We begin with a "warm-up" during which we ask questions that arose from our initial review of the resume. For example:

Have you taken formal SAS programming training?

How do you receive your programming assignments?

Why is there a gap between the year you graduated from college and your first job?

On a scale of 1-10, where would you place your SAS/JCL/TSO/DOS skills?

What has been your most challenging assignment in the past year?

This part of the interview usually relaxes the candidate and enables them to present their credentials and boast about their career.

The second part of the interview is the code walkthrough or oral presentation. The oral presentations have consisted of a ten-minute lecture on solving a statistical problem, creating a complex report, or explaining how they determine user requirements from an ambiguous set of specifications. If the candidate is conducting a formal code walkthrough, we let them control the conversation, with our panel asking questions to clarify the use or absence of a specific coding technique. We always ask them to explain what problem the program was written to solve, how they debugged it, and who was responsible for the final acceptance of their work. We avoid controversy, "trick questions" or embarrassing situations.

The purpose of the code walkthrough is to determine that they in fact wrote the program, explored several possible solutions, and were enthusiastic about their work. We inquire as to problems they may have had in developing the code, how long it took, and how well it was received. We are also interested in how they have tested the code. We ask the candidate to explain how they tested their programs. The responses range from "it compiled without errors", and/or "I let the end user do all of the testing", to "I create a few test cases" or "I check out all of the numbers by hand". Through this discussion we learn a lot about how thorough the person is and how concerned they are about producing a quality product. By this time, the candidate is quite relaxed and the atmosphere of the walkthrough is quite friendly. We allow as much as 30 minutes for this part of the interview.

The final part of the interview is an open forum, where the candidate asks the ARC staff any questions they may have concerning their prospective employment. The questions have been as basic as "what are the hours?", and "how flexible are the start and end times?", to "have there been any layoffs recently?", or "what do you like/dislike about working at ARC?". The panel has always been very frank with the candidates and this part of the interview also leads to some interesting conversations that give us more insight into this prospective employee's potential success.

Since there are both junior and senior members of the staff present, the candidate can see how we interact with each other and respond to unexpected topics that arise during the course of the interview. Software developers must interact with a wide variety of people in the course of a day. First, there are the people in need of the program. Then, there are their peers from whom they will seek advice and guidance or with whom they will work to develop the application. Finally, there is their manager whom they will invariably interface with regularly. Good interpersonal skills are very important in our business.

The Hiring Decision

After the candidate departs, the interview panel meets to review the interview. Keep in mind that only the senior member of the panel is aware of the candidate's salary history. The panel first discusses the candidate's strong points and what assets they bring to the job and to ARC. Next, they discuss the candidate's weaknesses, areas where they will need training, and any negative factors that the panel members want to present. Finally, the panel members assess the candidate's potential six months hence by pairing them with a current member of the staff of comparable skill.

Identifying the candidate's peers is a challenge, especially for the junior staff. However, it is an immediate indication of whether or not the candidate's salary expectations are in the proper range for the position we are recruiting for. Also, this gives the junior staff an opportunity to express how they feel about hiring someone that might become their supervisor.

Finally, we ask for a yes/no/wait-and-see-more vote from everyone in attendance. If any member of the panel is uncomfortable with hiring this person, they must detail the specific reasons. Sometimes this results in a second interview that concentrates on additional technical discussions. A second interview often clarifies issues that we did not have time to pursue during the first interview. It is unusual for us to hire someone if there is not unanimous consensus on the hire.

A review over the last fourteen years strongly points to the validity of this experience. We are looking for new employees with the following attributes:

- Strong skills at the level at which they present themselves;

- A positive mental attitude about the work they are currently doing;

- Enthusiasm for their prior assignments;

- Eagerness to learn; and

- Good communication skills.

All of these attributes can be assessed in an interview that is really an audition.

Conclusion

For the last four years ARC has used this approach to recruit, interview and hire SAS programmers. A focused approach to recruiting has yielded individuals who are eager to pursue careers as SAS application developers. An audition, in lieu of a traditional interview, enables ARC to readily assess the candidates' SAS programming skills, as well as their interpersonal and communication skills. We have reduced the amount of time it takes to interview people and make the hire/no-hire decision, and we have learned enough during the audition to anticipate and plan how to integrate newly-hired employees into our existing staff.

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