

FUNCTION POINT ANALYSIS

DETERMINING THE SIZE OF ERP IMPLEMENTATION PROJECTS

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Introduction

In general, when we receive a request to implement a package, the first question that comes in the PM's minds is how can we estimate such project as we don't have similar experience?

The first step to estimate any project is to determine its size, with which we can estimate effort, duration and staff based on historical data and team experience. This paper shows an approach to calculate the size in Function Points for projects implementing ERP packages such as SAP, PeopleSoft, Oracle Applications, etc ...

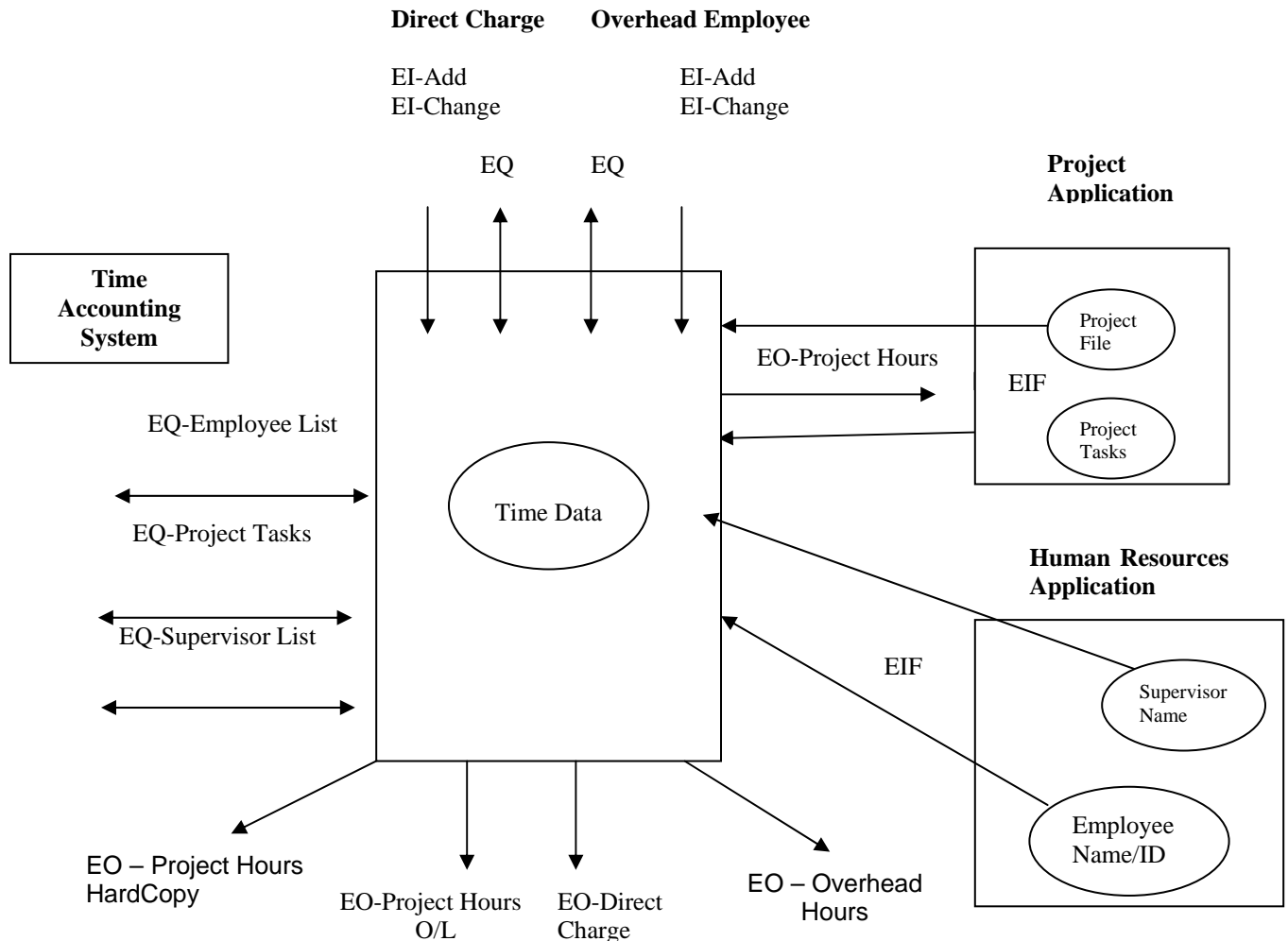
Implementing an ERP is no different from implementing any enhancement project and all FPA techniques apply. It generally involves adding, changing and deleting business functionality, reflected in the specific designs by programs, screens, reports and data structures (files or database sets). Understanding the impact on the business functionality is the basis for determining the size in FP.

The steps to calculate the functional size involve determining the boundaries impacted by the project scope, identifying the data and transaction functions, calculating the unadjusted FP size and adjusting the FP size.

On the present paper the focus is only on the first two steps, determining the boundaries and identifying the functions, as the other steps are exactly the same as in any other type of project.

Determining the Boundaries

Usually one of the most emphasized lessons taught in function points classes refers to the difficulty in determining the boundaries of the project being counted, which would be like building a context diagram under the FPA viewpoint. It is very difficult for students to visualize how important and complex this task can be because the samples presented on the FPA courses are usually of low complexity new developments and/or enhancements with one single application, which represent the simplest case in terms of boundaries identification. Look at the following example extracted from the IFPUG CPM and some other courses:



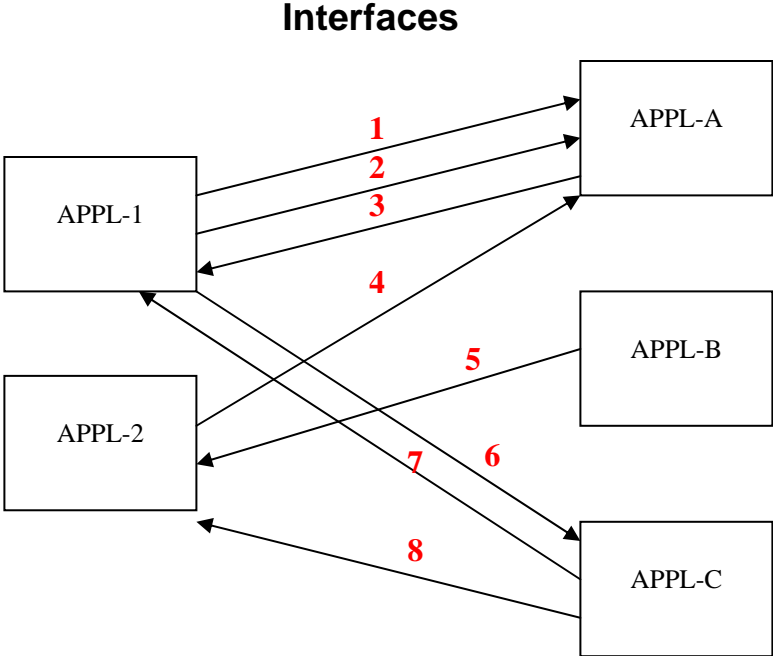
On this example we show the classical timesheet application, simply called here by Time Data, interacting with some external applications, such as Human Resources and Projects.

It is important to clarify the difference between applications and projects. Usually, a project's life cycle begins with a request for proposal (RFP) from the customer for a service that will be estimated, and when approved it may be broken down into multiple projects. What drives the decision of what is in the scope of each project are commercial or political issues and/or the logistics of project management. Each project may involve building or enhancing several applications which, under FPA point of view, form a software unit that corresponds to a functional area as recognized by the business under the user's perspective. During a function point counting, for each application impacted by the scope of the project, a boundary should be determined and the data and transaction functions identified around it.

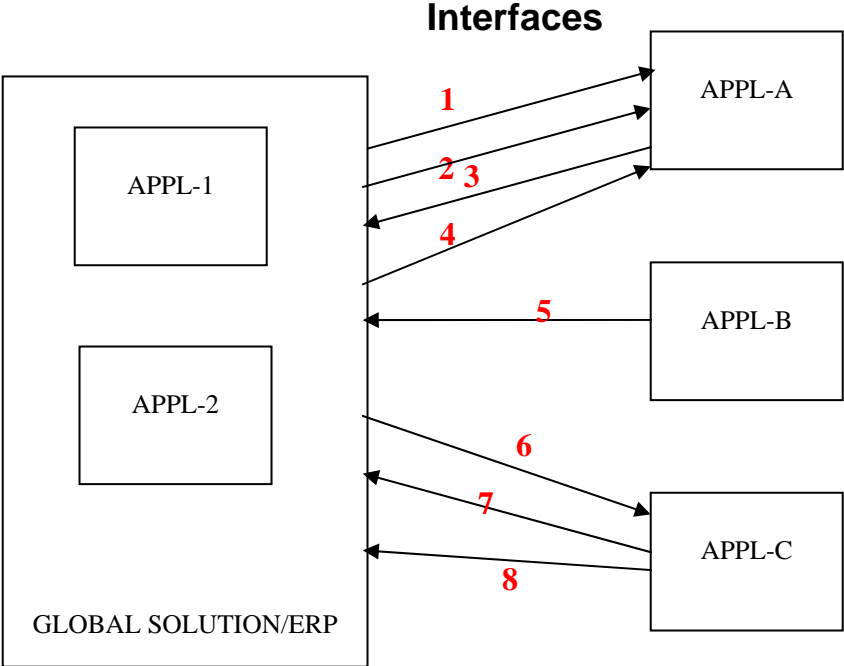
Following is presented a generic example that illustrates the complexity of determining the boundaries, especially important for ERP implementation projects.

In this example, it is presented a scenario of a very large company whose IT philosophy is driven to developing global solutions to be implemented in each of its units around the world. This global solution can be an ERP or a best practice application identified among its units that is adapted to be a global solution. After the ERP is chosen or a best practice application is developed it needs to be implemented in all units, replacing some legacy applications and adapting the remaining existing applications to interface with the new application. This generic example will show the approach to determine the size of the project to adapt all remaining applications, usually a very large and complex enhancement project.

Following is a fictitious legacy architecture in one of the units:



In this case the solution adopted is going to replace APPL-1 and APPL-2 as follows:



The implementation project includes the decommissioning of applications APPL1 and APPL-2 (outside of the scope of this paper as its size is not measurable in function points) and the enhancement of applications APPL-A, APPL-B and APPL-C to adapt its functions and interface with the new solution/application.

In this case four counting boundaries must be identified, one for the Global Solution/ERP that needs to be enhanced and one for each legacy application (APPL-A, APPL-B and APPL_C) impacted by the project, as follows:

BOUNDARY 1

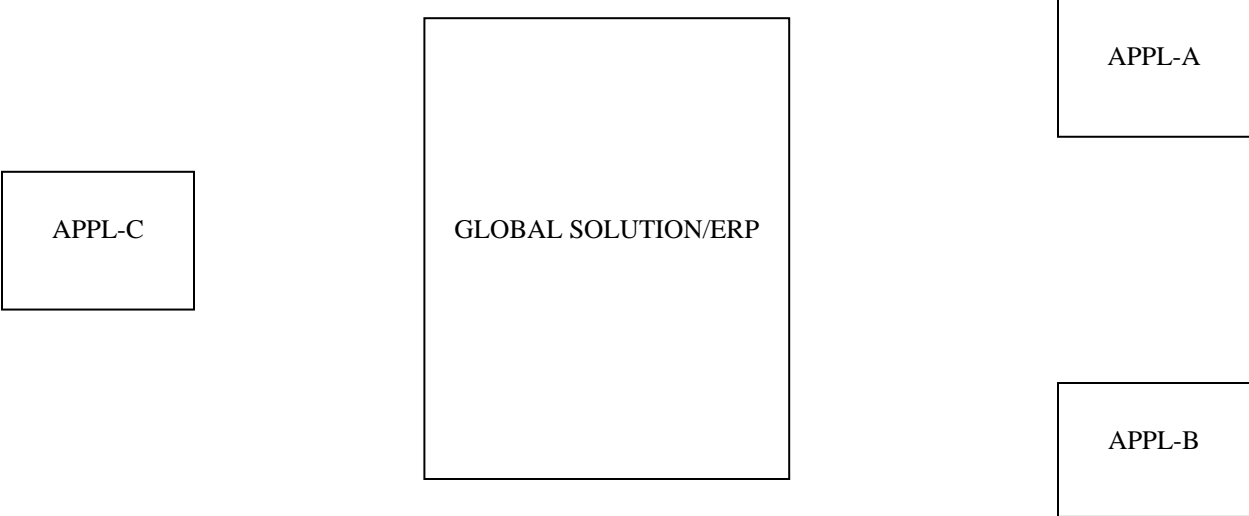


Fig. 3

BOUNDARY 2

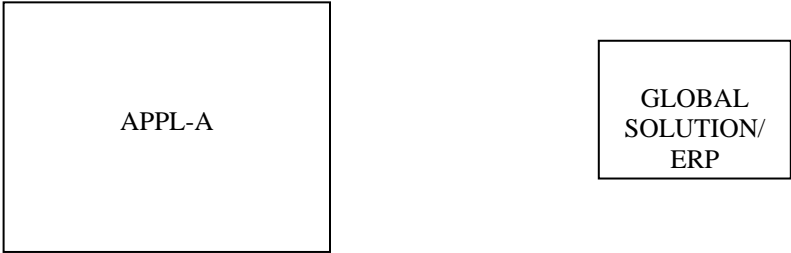


Fig. 4

BOUNDARY 3

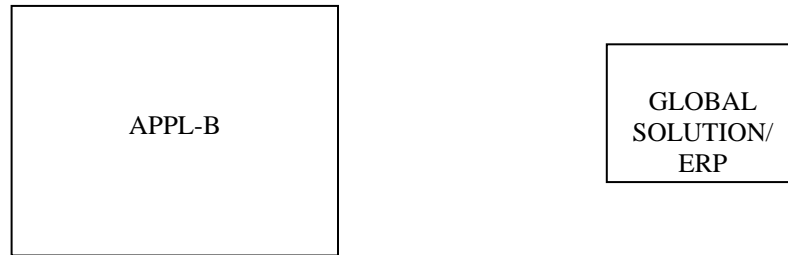


Fig. 5

BOUNDARY 4

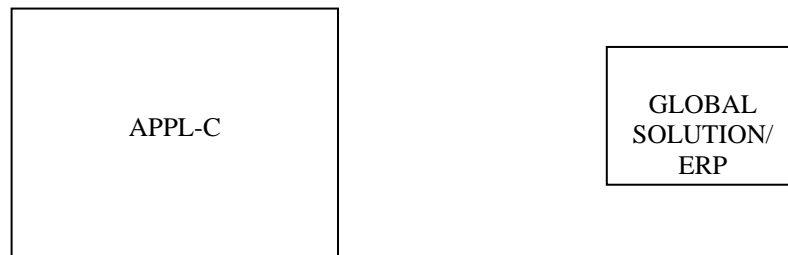


Fig. 6

Completing the counting models for each boundary with the identified functions (EIs, EOs, EQs, ILFs and EIFs) is only possible after the Study or Define phase is finished, determining the high level requirements that will be part of the scope. The study will determine interfaces, reports, inquires and data structures (and corresponding updating transactions) to be changed or created due to the new implemented solution.

For example, there could be reports on the decommissioned applications that are still needed but not produced by the Global Solution/ERP, or reports that exist on the Global Solution/ERP but require modification. Also, there could be files that are not currently sent to the decommissioned applications but are required by the Global Solution/ERP and therefore calls for a new interface to be created on some legacy remaining application, or the same interface already exists but need modification. All these objects will be represented in the counting model by FP functions being added, changed or deleted, like any other enhancement project.

Identifying Functions

With the assumption that the study phase is concluded and all requirements mentioned above identified, let's see how the boundary model for the Global Solution/ERP looks like, based on the following requirements:

- Produce interfaces 1 and 6 (External Outputs – EO)
- Receive interface 5 (External Input – EI, that updates the ILF XPTO-1)
- Produce a new report (External Output – EO)
- Modify two existing ILFs (XPTO1 and XPTO-2) and corresponding functions to update it and inquire from it.
- Add a new ILF (XPTO-3) and corresponding functions to update it and inquire from it.

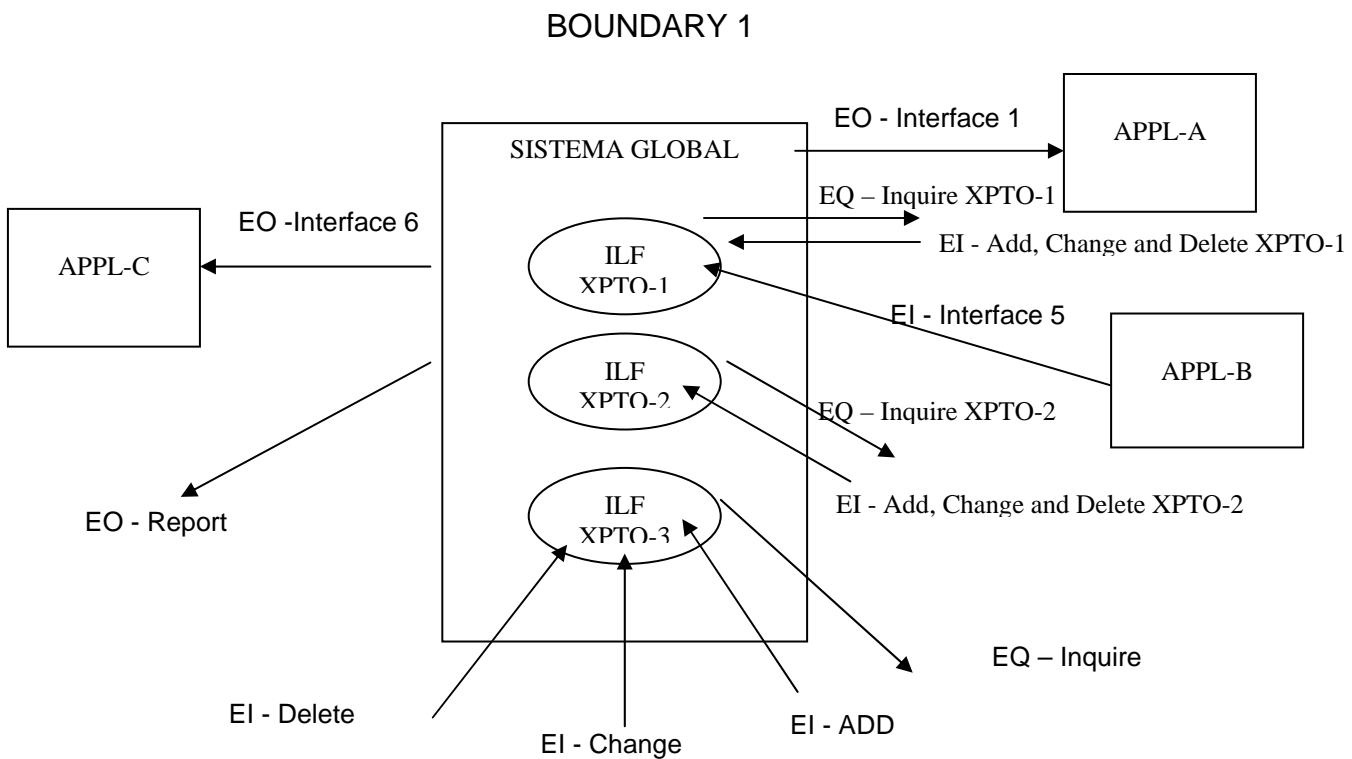


Fig. 7

The following table shows the summary of the count to adapt the Global Solution/ERP:

<i>Function</i>	<i>Function Type</i>	<i>Operation (Added, Changed or Deleted)</i>
1. Interface 1	EO	C
2. Interface 6	EO	C
3. Interface 5	EI	A
4. Report	EO	A
5. ADD XPTO-3	EI	A
6. Change XPTO-3	EI	A
7. Delete XPTO-3	EI	A
8. Inquire XPTO-3	EQ	A
9. XPTO-1	ILF	C
10. XPTO-2	ILF	C
11. XPTO-3	ILF	A
12. ADD XPTO-1	EI	C
13. Change XPTO-1	EI	C
14. Delete XPTO-1	EI	C
15. Inquire XPTO-1	EQ	C
16. ADD XPTO-2	EI	C
17. Change XPTO-2	EI	C
18. Delete XPTO-2	EI	C
19. Inquire XPTO-2	EQ	C

Fig. 8

The above table will be the basis for the unadjusted FP calculation, when complexities of each function are determined, which is outside of the scope of this study.

Now we need to do the same as we did for the Boundary 1, to all boundaries identified (APPL-A, APPL-B and APPL-C).

Let's use the Boundary 4 (APPL-C) as our next example. Following is the list of requirements identified:

- Change Interface 7 (External Output – EO) to a new format compatible with the ERP.
- Produce a new Interface 8 (External Output – EO)
- Change an ILF (XYZ-1) and corresponding updating and inquire functions.
- Change the reception of a file (External Interface File – EIF) that is sent from APPL_B and is also changed as part of this project.

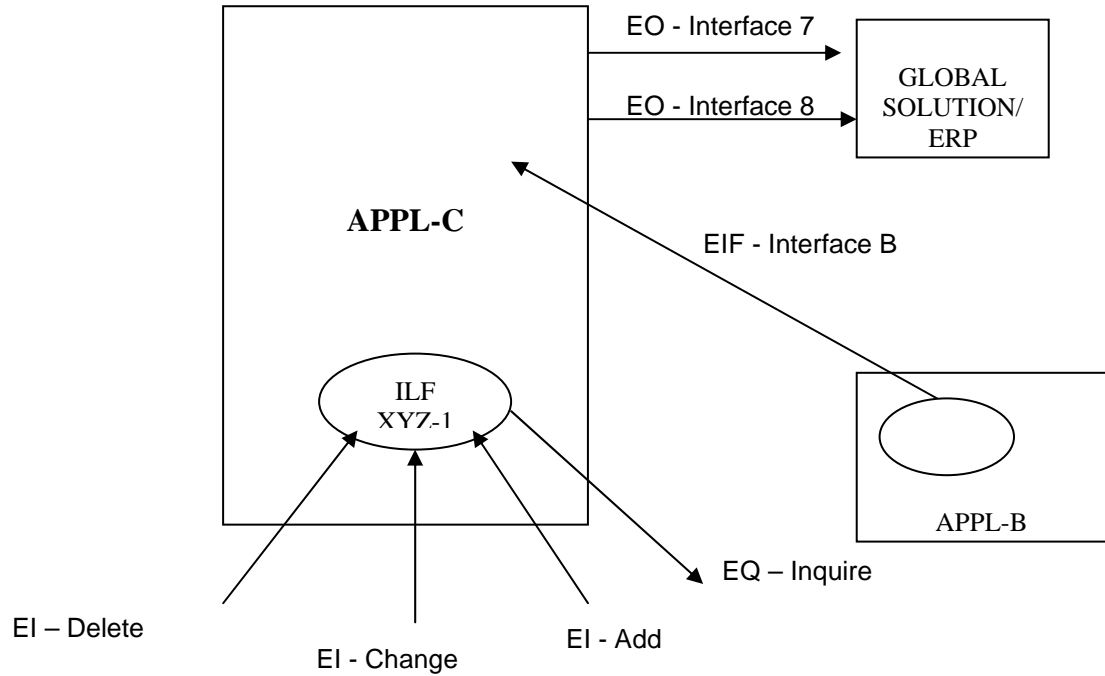


Fig. 9

The following table shows the summary of the count to adapt APPL-C:

<i>Function</i>	<i>Function Type</i>	<i>Operation (Added, Changed or Deleted)</i>
1. Interface 7	EO	C
2. Interface 8	EO	A
3. ADD XYZ-1	EI	C
4. Change XYZ-1	EI	C
5. Delete XYZ-1	EI	C
6. Inquire XYZ-1	EQ	C
7. Interface D	EIF	C
8. XYZ-1	ILF	C

Conclusion

After the conclusion of those tables for each of the four applications impacted by the project, we must calculate separately the adjusted (AFP) and unadjusted (UFP) function points, keeping in mind that each of these applications can reside in different platforms and programming languages and have different project characteristics, what can lead to different value adjustment factors (VAF).

Then, and only then, we can add up all sizes counted to come up with the total size of the project of implementing a Global Solution or ERP in one of the units of this fictitious company.

Estimating the project (effort, duration and staff) is another story. Whether this is going to be treated as a single project or one project for each application depends on the particular strategies adopted by each organization. Having several counts, one for each application will give also the flexibility of having multiple projects and estimates.

It is also important to consider that, although not part of the scope of this study, the legacy applications decommissioned and replaced by the ERP are being deactivated and there is an effort associated that must be estimated and added to the project estimates, but is not based on function points.