

Implementing millwide integration: part 2

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Last month's workshop entitled, "Understanding millwide integration," (March issue, p. 303) focused on the purpose, benefits, and potential pitfalls of millwide integration. The workshop identified three key issues:

- Millwide integration is not a system or network. It is a working environment where processes and operations, functions, systems, and people work in harmony. Technology is only a utility to support that environment.
- Benefits achieved depend upon how effectively mill staff use the integrated environment. Actual savings will vary depending upon products made, production volumes, and current efficiency of the operation.
- The major obstacle to millwide integration is people, not technology. In an integrated environment, priorities change from the performance of the individual to the performance of the whole. Boundaries and barriers disappear and, along with them, the traditional management hierarchy. The resulting organizational change will invoke fear and resistance. Ownership, the key to success, will be difficult to achieve.

The workshop concluded there are three prerequisites to successful millwide integration:

- A defined, understood, and accepted vision
- A willing, educated, team-oriented environment
- A connected technology facility.

The purpose of this month's workshop is to define a methodology for achieving these prerequisites.

The importance of planning

All the prerequisites to successful millwide integration—vision, ownership, and connectivity—are functions of, or determined by, the initial millwide planning process. The planning process builds the momentum—leadership and ownership, determines the justification, sets the direction, and charts the course.

A successful planning process also builds the necessary cultural environment—a culture that believes in the purpose and the benefits of the effort and will support and take ownership for it. The key to achieving this culture is staff involve-

ment. Everyone must understand the reasons for integration, and have the opportunity to express needs and concerns. They each will then understand why their ideas were, or were not, included in the plan. This understanding is necessary for acceptance.

Staff involvement also builds awareness—awareness of what is possible, what is required, and what the impact will be. This in turn improves understanding of the issues, achieves consensus on the approach, and generates ownership in the program—all of which help to reduce the fear of change.

With that in mind, let's look at the requirements of successful integration planning, and then outline a methodology for achieving those requirements.

Planning requirements

A millwide integration planning methodology, to be successful, must accomplish the following tasks:

- Establish the leadership role and specify importance of the integration effort to unite the organization
- Educate the organization about opportunities, requirements, benefits, and possible alternatives
- Define the goals and priorities for the integration effort
- Involve a broad cross section of staff, from operators to top management
- Determine the existing baseline (where you are now), define the final destination (where you want to be), and specify the route (activities and schedule)
- Evaluate the alternatives and determine the best overall approach
- Determine the financial justification for the integration effort.

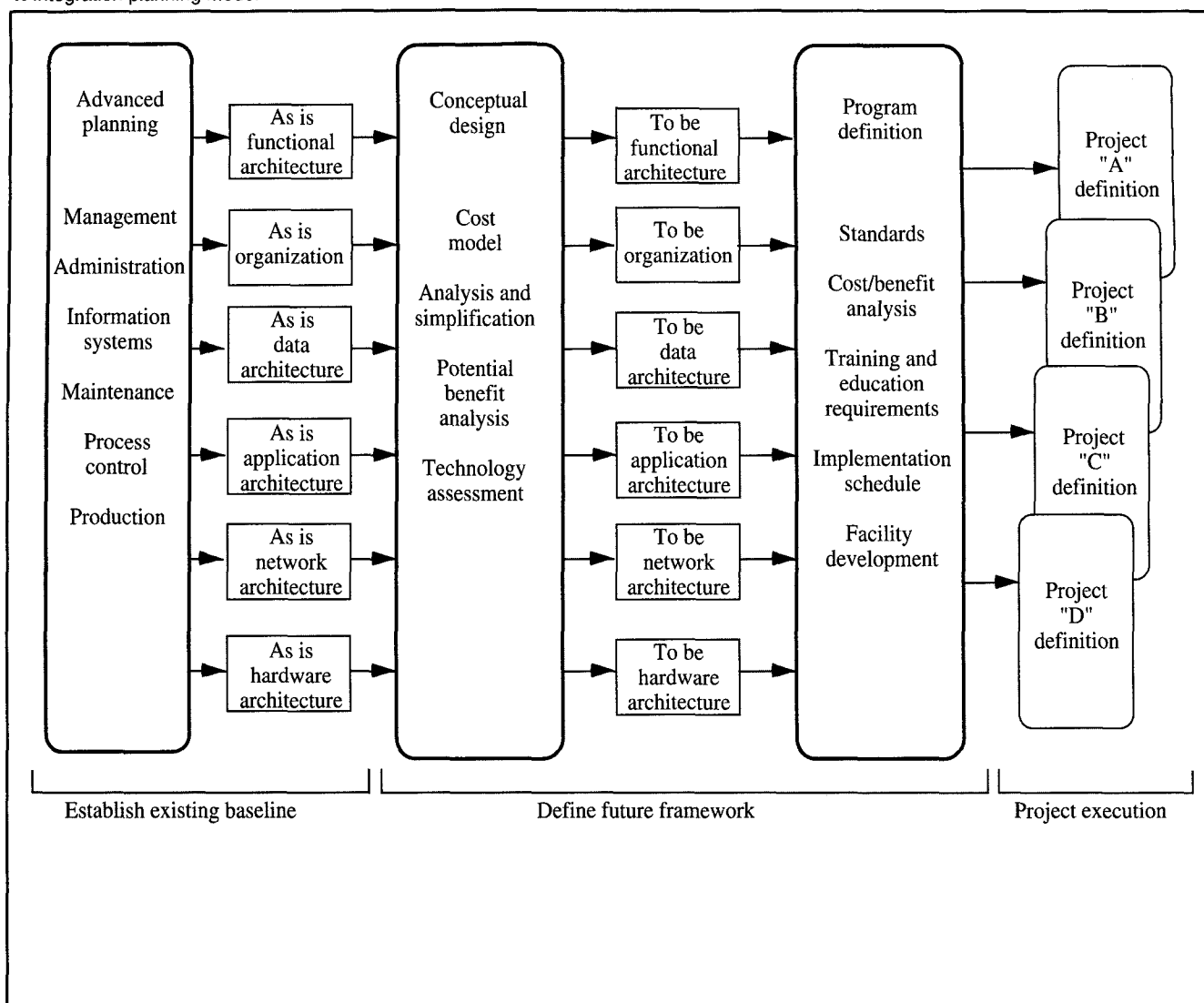
A team approach to millwide planning

The planning methodology recommended for millwide integration is a structured, team-oriented process with a high degree of staff involvement. The methodology must include several distinct activities, each producing a deliverable(s) and a funding review point. This enables control over the planning process and allows an assessment of the justification for proceeding with subsequent activities.

A minimum of six activities are recommended, as illustrated in Fig. 1. These activities are divided into three phases, as follows:

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1. Integration planning model



- A review and definition of the current state of the operation (the existing baseline)
- An assessment of alternatives leading to a specification of the future millwide program (the future framework)
- A series of projects required to complete the program (project execution).

Define the existing baseline

The first phase in the planning process defines the existing baseline. This phase includes two steps: data gathering and documentation.

The approach recommended for the data gathering task is a team-building approach called advanced planning. This approach is basically a structured brainstorming process which draws out goals, needs, facts, concepts, opportunities, and issues (Table I) in an environment that promotes team work, understanding, and consensus.

The advanced planning methodology differs from tradi-

tional data gathering techniques in its team approach. All interviews and discussions take place in small groups in a single conference area. Identified goals, needs, concepts, facts, opportunities, and issues are posted around the walls on 5- x 8-in. cards. This environment allows staff to review ideas identified prior to their participation, stimulating their own thoughts and allowing them to augment existing ideas giving the process an evolutionary quality.

Before starting the advanced planning process, the facilitation team should review existing documentation and distribute questionnaires. Preliminary information from these sources is recorded on "seed" cards for the walls of the workroom. This greatly improves the initial productivity of the process.

When organizing an advanced planning process, remember these three critical requirements:

- Top management must participate to set the direction (goals) and acknowledge the importance of the process.
- Use an impartial facilitator, preferably from outside the

I. Data classification

Type of data	Definition
Goals:	Goals identify the big picture and establish a framework for decision making. An example of a goal might be a startup date or a return on investment.
Needs:	Needs identify specific things which must occur for the project to be a success. An example of a need might be the capture of quality data for ISO 9000 certification or the reduction of machine downtime by 5%.
Facts:	Facts define specific things which may have an impact on choices and priorities. An example of a fact might be that a piece of equipment or control system is too old to support integration and must be replaced.
Concepts:	Concepts are ideas for addressing goals and needs within the context of identified facts.
Opportunities:	Opportunities are areas of potential improvement which, when evaluated, convert into measurable benefits.
Issues:	Issues identify unresolved items that must be handled for the project to proceed. An example of an issue might be the requirement for union approval to change job content.

II. Advanced planning participants

Corporate management	Mill management
Woodyard	Digesters
Bleach plant	Stock preparation
Paper/pulp machine	Finishing
Converting	Utilities
Engineering	Process control
Technical	Maintenance/stores
Woodlands	Distribution
Traffic	Scheduling
Information systems	Customer service
Accounting	Human resources
Purchasing	Safety
Sales	Marketing
Research	

organization, with no preconceived ideas, agendas, or political allegiance.

- Use technical experts, preferably from outside the organization, for each area of discussion to ensure the accuracy and completeness of the information gathered.

The scope of the advanced planning process should, as a minimum, include the mill and corporate personnel identified in **Table II**.

The second task required in the definition of the existing baseline is documentation. Graphic models representing functionality, organization, architectures, and data flow are recommended for this task. Graphic models, like pictures, are easier to comprehend than written descriptions. Their clarity highlights possible errors and omissions not immediately visible in a written document.

The existing baseline definition should include the following models:

1. Corporate organization
2. Business and manufacturing functions
3. Process/production flow
4. Information architecture
5. Application architecture
6. Logical network architecture
7. Physical hardware architecture
8. Operating costs
9. Material and energy balance (optional)

Depending upon the facility size, number of areas, systems, functions, and personnel, the time required to define the existing baseline will vary. An average integrated pulp and paper mill should allow approximately 30 man weeks of facilitation effort to complete and document the existing baseline. Models can be created by hand; however, these will be difficult to maintain and will require far more effort to update in subsequent steps of the strategy definition. Therefore, a computer-aided modeling tool is highly recommended.

Specify the future framework

The next phase in the planning process specifies the future framework. This phase includes three steps; conceptual design, documentation, and program definition.

The first step—conceptual design—begins with the creation of a macro level cost model for the operation. This model is used to quantify the financial impact of the specified goals, needs, and opportunities and to audit the results of the program. If the impact on the cost model merits proceeding, alternatives for achieving the specified goals, needs, and opportunities are developed. Each alternative is assessed for effectiveness, reliability, support, and cost. The next step is to update the “as is” models to represent the “to be” opera-

tion. This task ensures that changes are properly thought out and integrated into the existing operation. The updated "to be" models will then form the bulk of the program definition.

The final task in the future framework specification is to augment the "to be" models with the following additional information:

1. Standards for equipment, communications, interfaces, and data storage
2. Standards for reports and operator interfaces
3. Requirements for training and education
4. A description of changes in manpower and job content
5. An implementation schedule outlining the projects required to implement the integrated environment
6. An order of magnitude (+/- 25%) cost estimate for each of the projects required to implement the program

Outside assistance is also recommended for this step of the plan. Again, an impartial third party with no preconceived solutions or products, but knowledgeable in all aspects of the business, process, and technology, is best. The expertise necessary to complete the future framework definition includes

process/operations, financial management, operations management, business management, process control, information systems, engineering, systems analysis, technology, and labor relations.

Depending upon the facility size, number of areas, systems, functions, and personnel, the time required to specify the future framework will vary. An average integrated pulp and paper mill should allow approximately 27 man weeks of facilitation effort to complete and document the future framework. This does not include simulations that may be required to more definitely prove the effectiveness of changes to the process and operation. Useful simulations may include mass and energy balances, high-fidelity dynamic process simulations, and low- to medium-fidelity expert system-based dynamic simulations.

Project execution

The final phase in a millwide integration effort is project execution. This phase will include the execution of many individual projects and usually extends over a 3—5 year schedule. Typical projects within the overall integration program will include:

- Upgrades to equipment, processes, and operations
- Upgrades to instrumentation and control systems
- Addition of process optimization strategies
- New or upgraded information systems and communications networks
- Educational and training programs
- Changes in job content, organization, and procedures.

Each of these projects will require an individual planning effort to specify implementation level detail, appropriation grade cost and return on investment (ROI), source of supply, etc. Staff involvement also is important here to reinforce the established team environment. A good approach to planning individual projects is to follow the planning methodology described above. Use advanced planning sessions to gather additional detail and further promote project ownership. Add detail to previously developed models to create project documentation and ensure conformity to the program. Build on the existing program definition (standards, functionality, scope, etc.) to reduce the effort required for each project definition.

Post-implementation audits

Credibility is important when implementing millwide integration. Projected benefits must be achieved if the program is to progress to completion. The implementation method described above provides the ability to monitor progress by project. Actual cost factors affecting the return of each project can be applied to the operations cost model. This allows a before-and-after comparison, by project, to provide the necessary insight as to the financial success of each project and the program as a whole. □