University of Pisa
MSc in Computer Engineering

Systems for Strategic Management and Support

LECTURE 16

http://www.iet.unipi.it/m.cimino/ssms/

Mario G.C.A. Cimino
Department of Information Engineering

S373 ## The service-level diagram

S374 • It shows the primary contributions made by each actor. Steps at the service-level are "smaller" than steps in a handoff diagram. It still represents significant activity, suitable for presentations

S375 • Break each step in the handoff diagram into separate steps on the service diagram, as necessary, to show:

(a) Completion of significant achievement or **milestone**, which is a service to the process

(b) Decisions **affecting the flow** in a significant way

S376 • Example of decisions affecting the flow: "Decide if claim requires extended handling"; if that caused a handoff to actors that would not otherwise be involved (b). Do not depict minor decisions within one actor's involvement, unless this led the actor achieving milestone (a)

III) PROCESS WORKFLOW MODELS: MANAGING DETAILS

S377 • Milestone: **significant event** in the life of the work item, which usually changes the state moving the work item toward completion

S378 • E.g. the step *File claim* in a handoff diagram, on the service diagram is broken down into individual services: *Record Incident Detail*, *Register Claim*, *Describe Loss*, *Confirm Coverage*, *Schedule Appointment* (REMEMBER JUST SOME EXAMPLES)

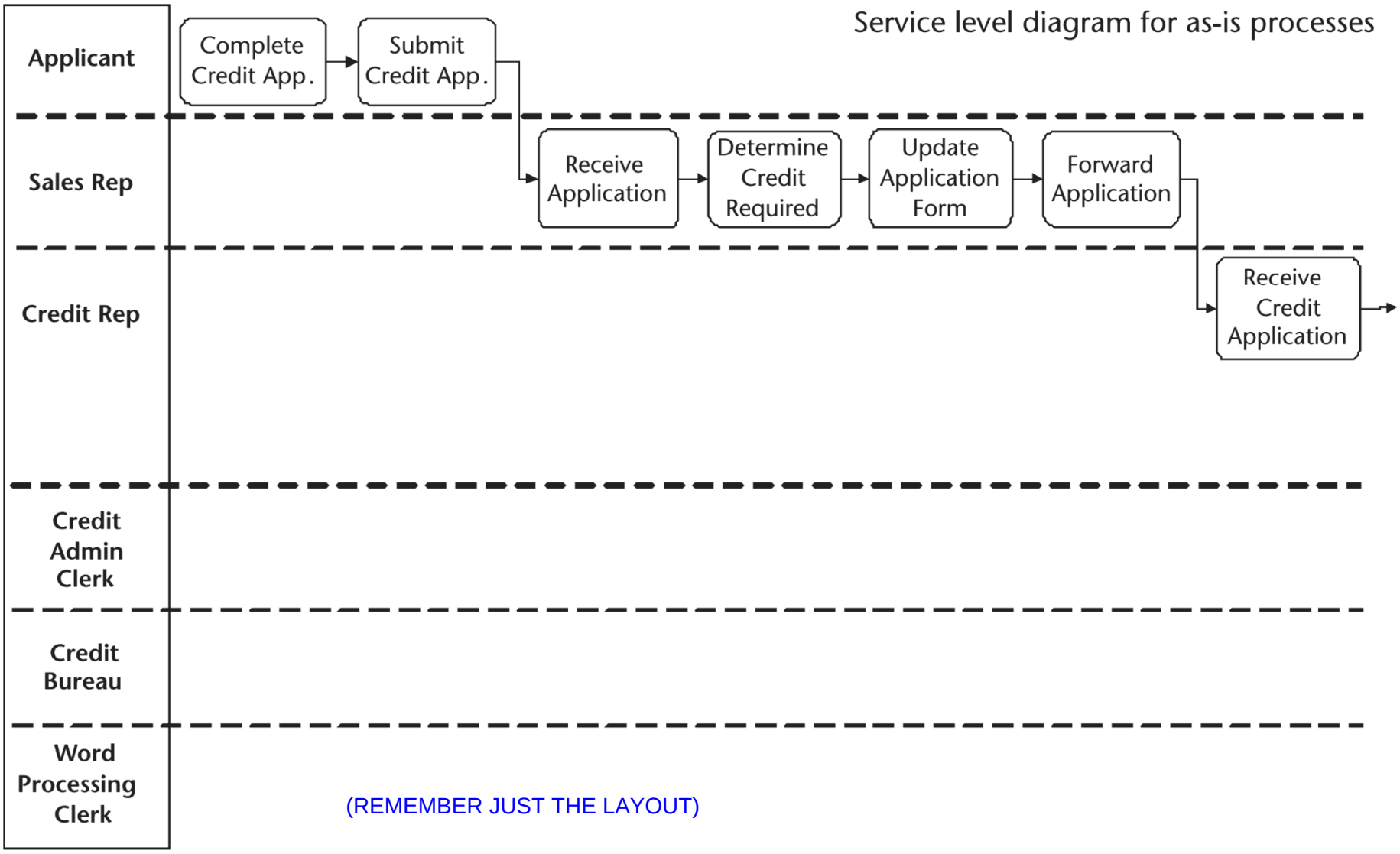
S379 • A level 2 (service) diagram is usually three to five times as large as level 1 (handoff) diagram

S380 • Again, steps on the service diagram will tell us *what* is being done, but should say little about *how*.

S381 • Use post-it to break each step of the handoff diagram without permanently alter it: list what we believe to be the main accomplishments that go into that step.

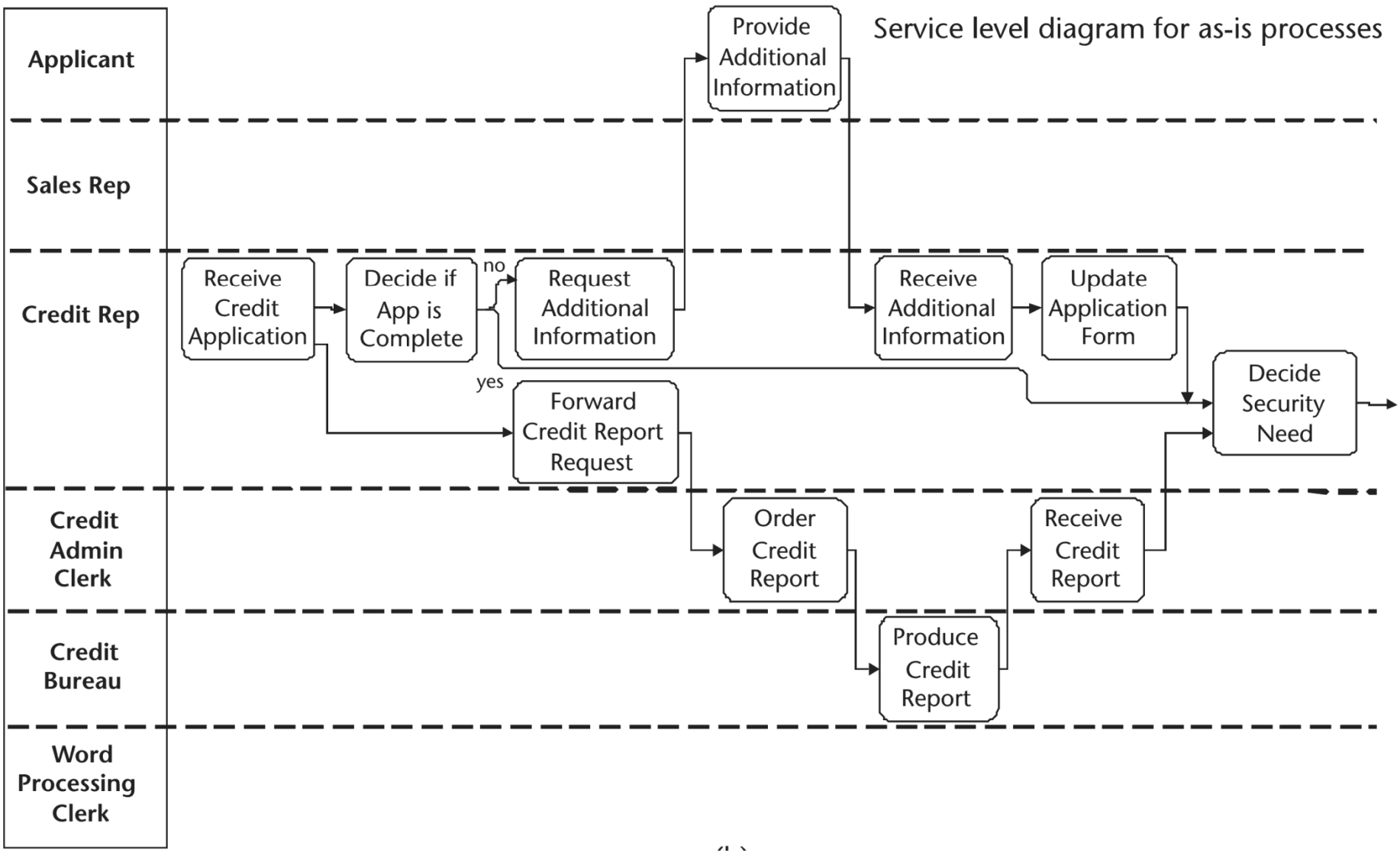
S382 • An example of service-level diagram:

III) PROCESS WORKFLOW MODELS: MANAGING DETAILS

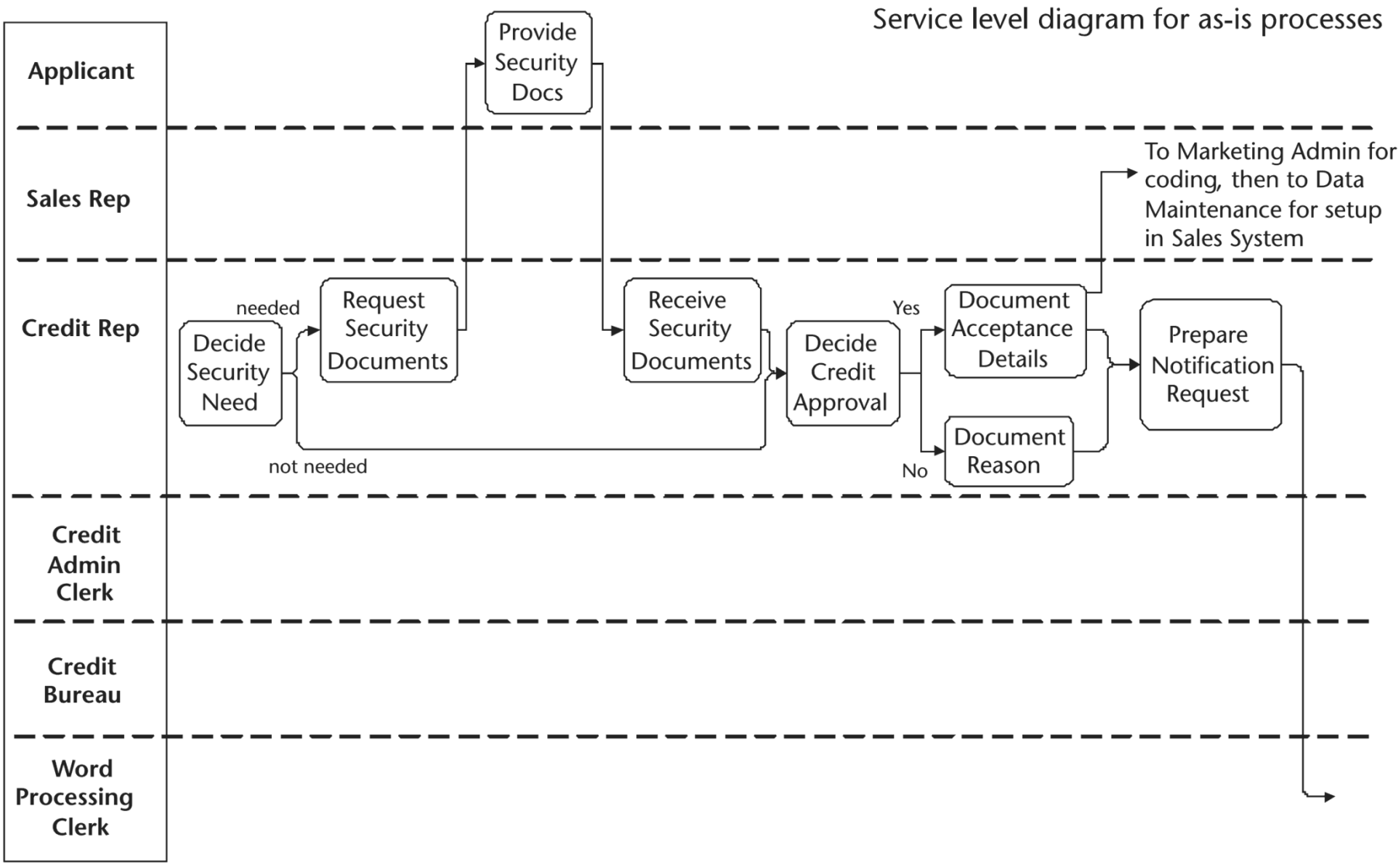


(REMEMBER JUST THE LAYOUT)

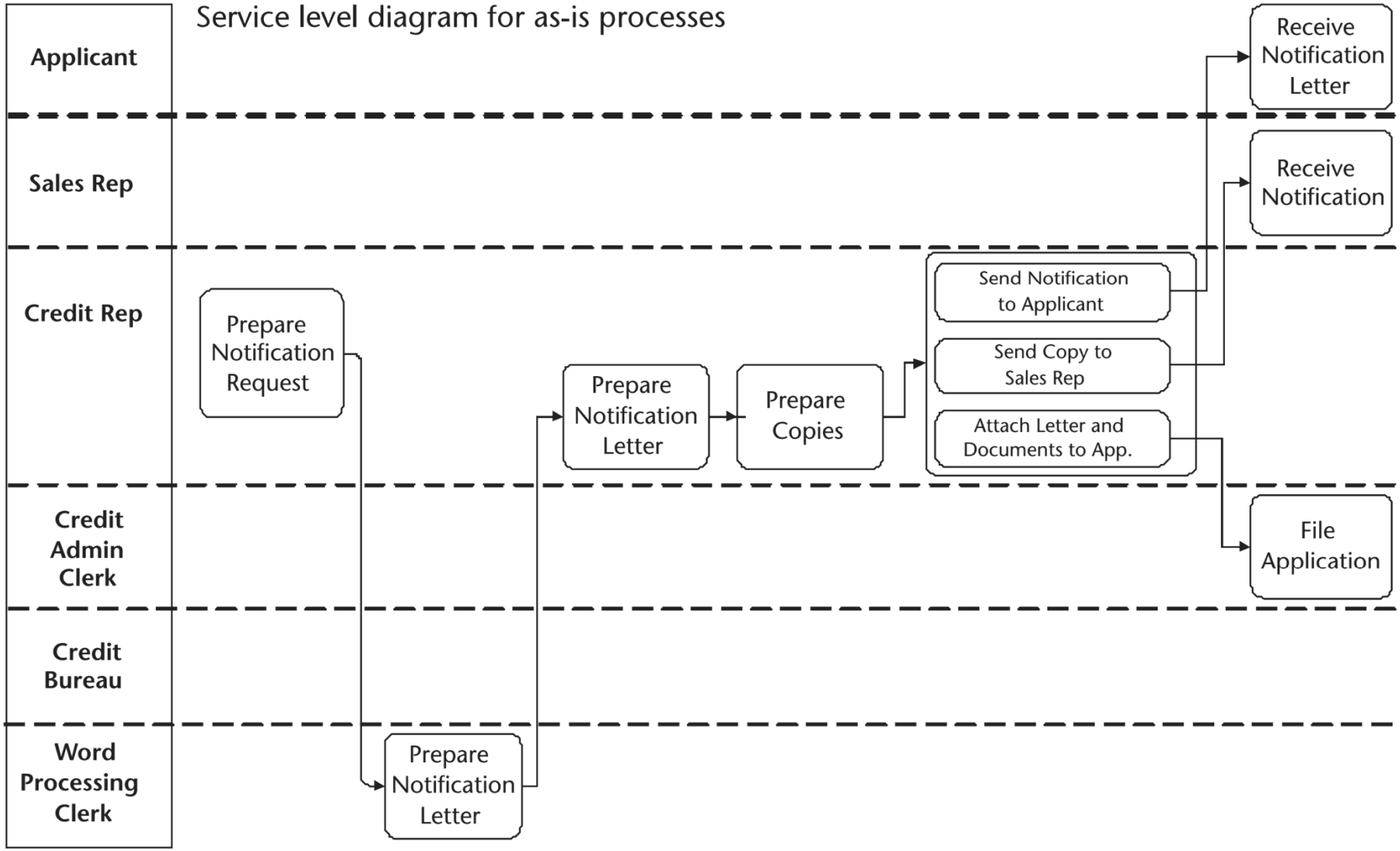
III) PROCESS WORKFLOW MODELS: MANAGING DETAILS



III) PROCESS WORKFLOW MODELS: MANAGING DETAILS



III) PROCESS WORKFLOW MODELS: MANAGING DETAILS



S383 ## The task-level diagram

S384 • The previous levels show *who* is involved *when*, and *what* is accomplished. A task diagram describes *how* some individual tasks carried by an actor leading up to a milestone are implemented

S385 • Example: *Retrieve estimate from file*, *Photocopy estimate*, *Mail estimate to shop*, *Set up appointment using X system* (REMEMBER JUST SOME EXAMPPLE)

S386 • Do not capture step-by-step instructions of the entire workflow model, it is a flow model, not a user manual. It should not be captured on a swimlane diagram.

S387 • Documents that can include this kind of details:

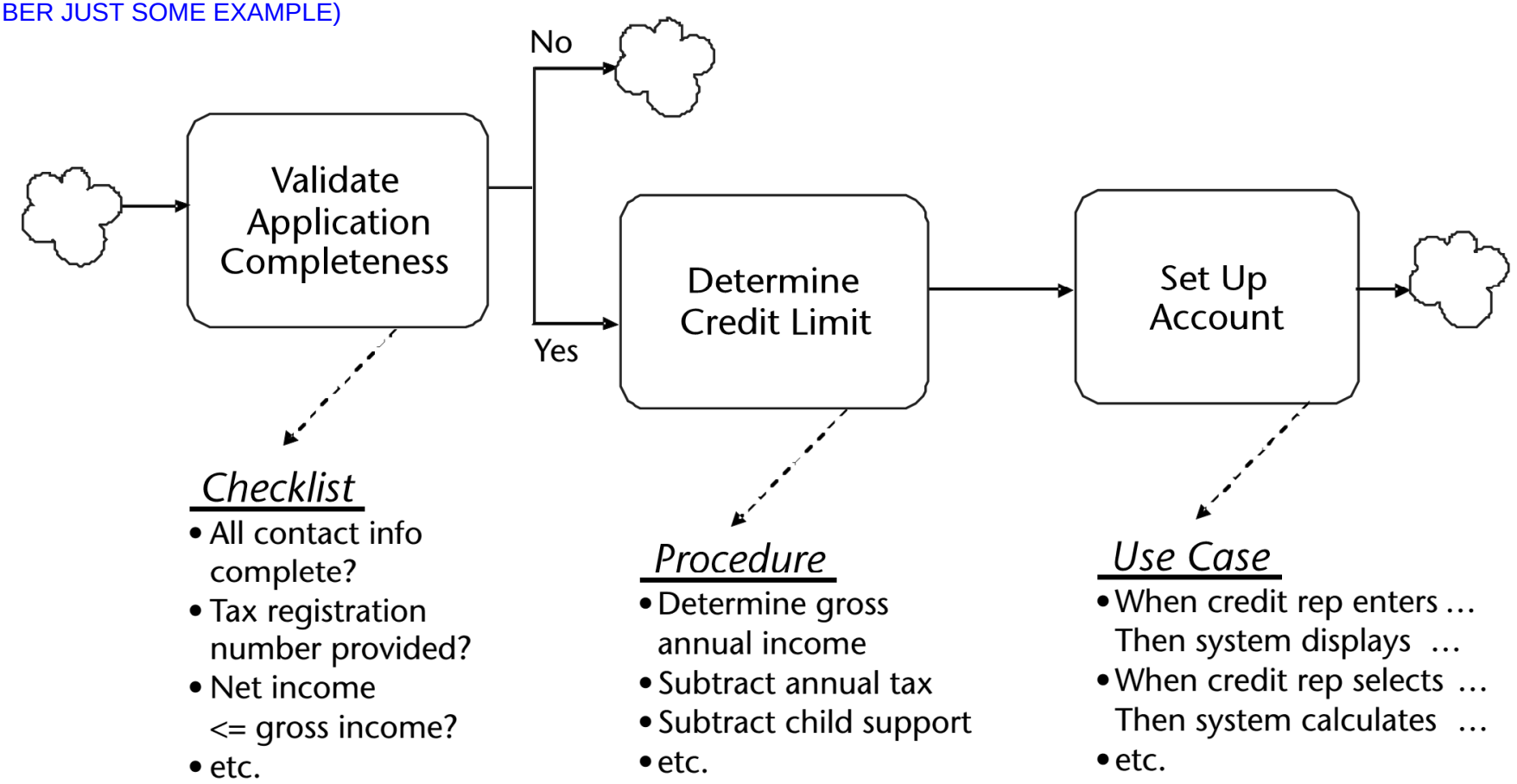
- Procedure descriptions;
- Use cases;
- Check lists;
- Decision trees or table;
- Traditional flowcharts;
- User manuals;
- Online help facilities;
- Other step-by-step formats

III) PROCESS WORKFLOW MODELS: MANAGING DETAILS

S388

- Example: *Retrieve estimate from file, Photocopy estimate, Mail estimate to shop, Set up appointment using X system*

(REMEMBER JUST SOME EXAMPLE)



When to stop workflow modeling and switch to other techniques.

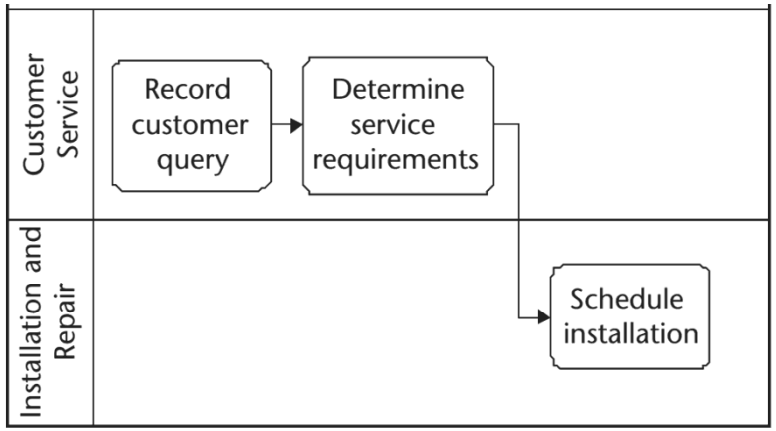
III) PROCESS WORKFLOW MODELS: THE FINER POINTS

S389 **Show <u>every</u> actor that holds the work**

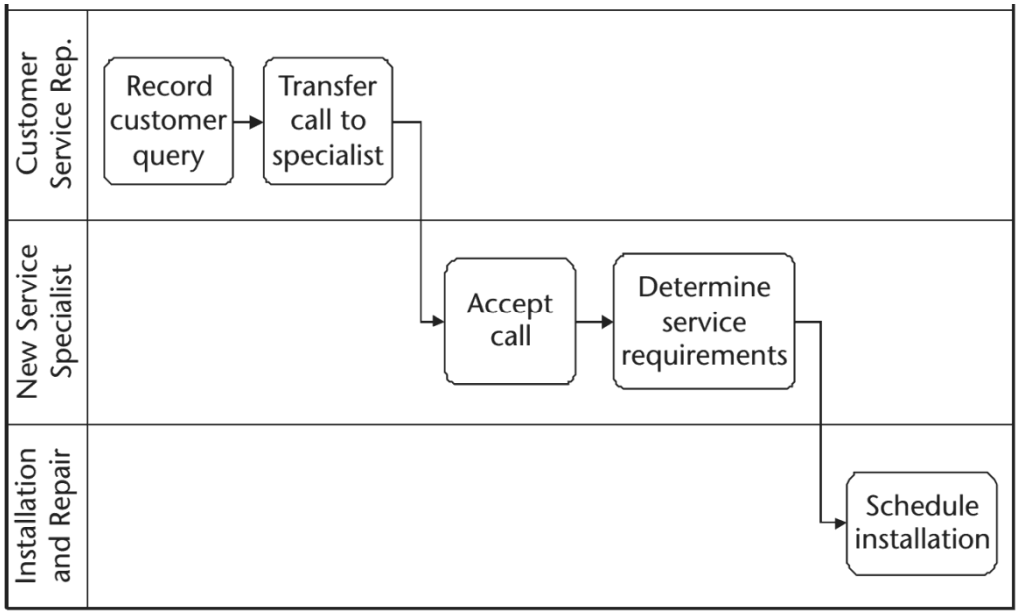
S390 • If someone/something handles the work item in any way, shape, or form, it is an actor, and you must show it.

S391 • If included, you can assess whether their participation is value added, neutral, or a source od delay, error, or expense

S392 • Showing every actor is very beneficial at the highest (handoff) level, because it makes the overall pattern of the flow visible



Showing multiple actors within a department.



III) PROCESS WORKFLOW MODELS: THE FINER POINTS

S393 • Especially if the distinct actors perform different steps, and the handoff will surely affect the process, show all of them.

S394 • If you have different job titles, perhaps based on seniority, but all performing the same steps, you can represent just a single swimlane

S395 • Do not show actors within an organization when we have no control over “who, does what, when”, for instance because they are not within an internal department

S396 • Example: a Postal Service or Courier Company actor, as an external agency, is not broken in all their internal actors

S397 • When the job is strictly to look at flow across organizations and not within them, the model will show the major departments involved but not the individual actors within them, because that was not part of the study

S398 ## Jobs, Roles and Commitees

S399 • Often there is no practical reason to differentiate between actor (e.g. a job role such as customer service rep or investigating officer) and a role (a specific part played in a process).

S400 • The step names make it clear what role is that each playinng.

S401 • *Two actors with the same job title but different roles*

E.g., two clerks, each with the same job title, handling a cash deposit. One's role is to prepare the deposit, while the other confirm the accuracy of the deposit slip. Simply retail clerk #1 and retail clerk #2.

S402 • *One person performing two distinct roles*

- Start giving a pool to the person and two internal lanes to his roles. If the work done by each is of a different nature, and id being handled by one person because of resource constraints, keep two separate swimlanes.

- If there are not really handoffs, or the work flows seamlessy from one role to another (they do not do role A work in the morning and role B work in the afternoon), then you do not have separate roles.

- However, if the handoffs prove to be a source of delay, error, or expense, then leave the swimlanes separate to highlight situation

S403

- *Committee as an actor*

An actor may perform as an individual as well as a member of a committee. In any case we model the committee as an actor, even if all of its members are already represented on the swimlane diagram because of their separate responsibilities in the process.

Hence, sometimes you can explicitly show the member's participation in committee work as a collaborative activity instead of as a unique swimlane.

S404 ## Systems as Actors

S405 • If much of the process is done by the system, then delay, error and expense may be introduced by the system itself rather than by humans. The system needs to be shown, although it might be simplified and abstracted to avoid entering into IT issues

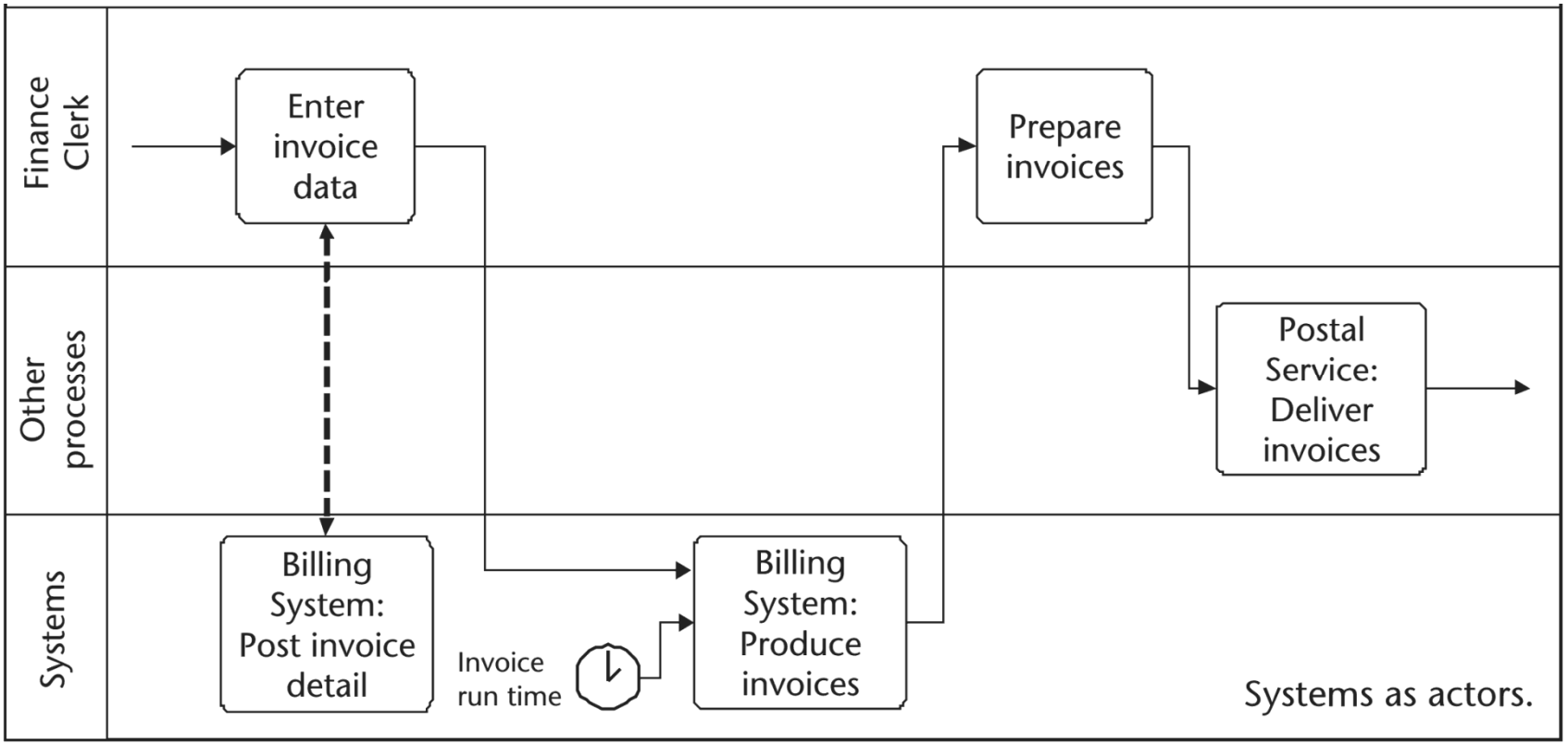
S406 • *Systems supporting human actor*

E.g., Web-based online shopping system, human resources system. The system can be simply mentioned in the step name (*create order via web, assign employee using human resources system)* or represented as a separate swimlane and interaction with it is represented by dashed lines.

Even if you have many systems, generally you can use a unique swimlane labeled “systems”. Preface the step description with the name of the system and, if appropriate, the system function used

III) PROCESS WORKFLOW MODELS: THE FINER POINTS

S407



(REMEMBER JUSTTHE LAYOUT)

S408 • *Batch Systems*

E.g., an overnight production of invoices. It takes the control of the work items, adds values, an introduce delay because subsequent steps wait its result.

III) PROCESS WORKFLOW MODELS: THE FINER POINTS

S409 • The main difficulty in representing systems is to find IT resources who have the technical skills to trace through the batch processes, but who can also explain in everyday language what it being accomplished without getting into the complexity of processing steps

S410 • Creating swimlane diagrams where each subsystem is represented as a separate step (or even has its own swimlane) works well when the subsystems are clearly delineated

S411 • Splitting work across subsystems often drives you to too low level of detail, so no business person could follow the diagram

S412 • Sometimes to show each day as a separate swimlane highlights the delays and serial nature of the process. E.g.

- day 4: Transmit contract record to national clearinghouse
- days 5 and 6: no activity
- day 7: Receive activity report from national clearinghouse

III) PROCESS WORKFLOW MODELS: THE FINER POINTS

S413 • It is usually hard to synthesize out the main milestones without the support of experienced professionals

S414 • *Human actor supporting Systems*

IT staff monitoring batch jobs for successful completion, recovering from failures, checking report outputs, correcting bad data "by hand" and so on, have to be shown as actors. They have a role in the process. Sometimes process steps are less automated than many people are aware. E.g. an e-commerce site where orders are captured on the Web, printed, and manually entered into the order entry system! This "human glue" must be shown.

S415 • *Devices and machines as actors*

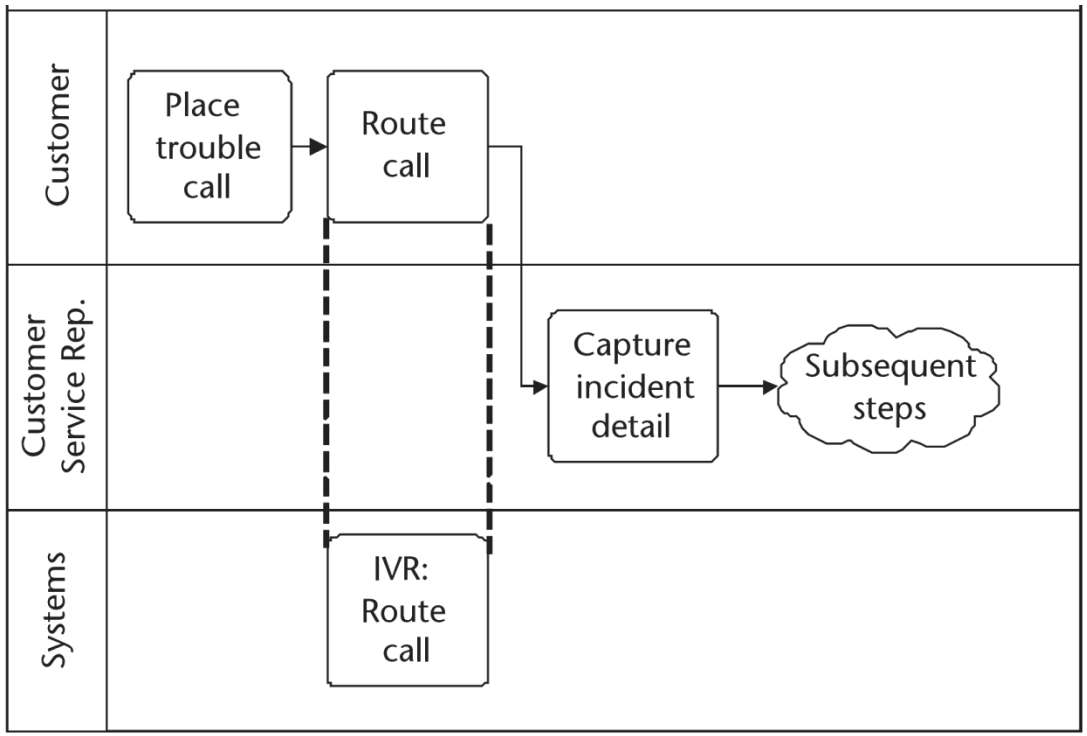
When they take control and add value, can certainly be shown as actors.

An example of IVR unit:

III) PROCESS WORKFLOW MODELS: THE FINER POINTS

S416

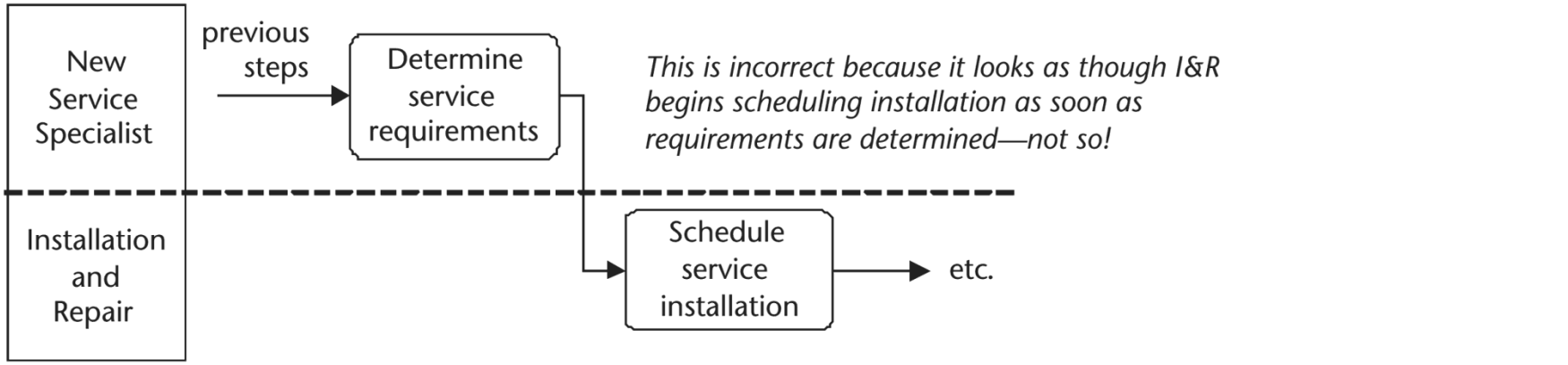
(REMEMBER JUST THE LAYOUT)



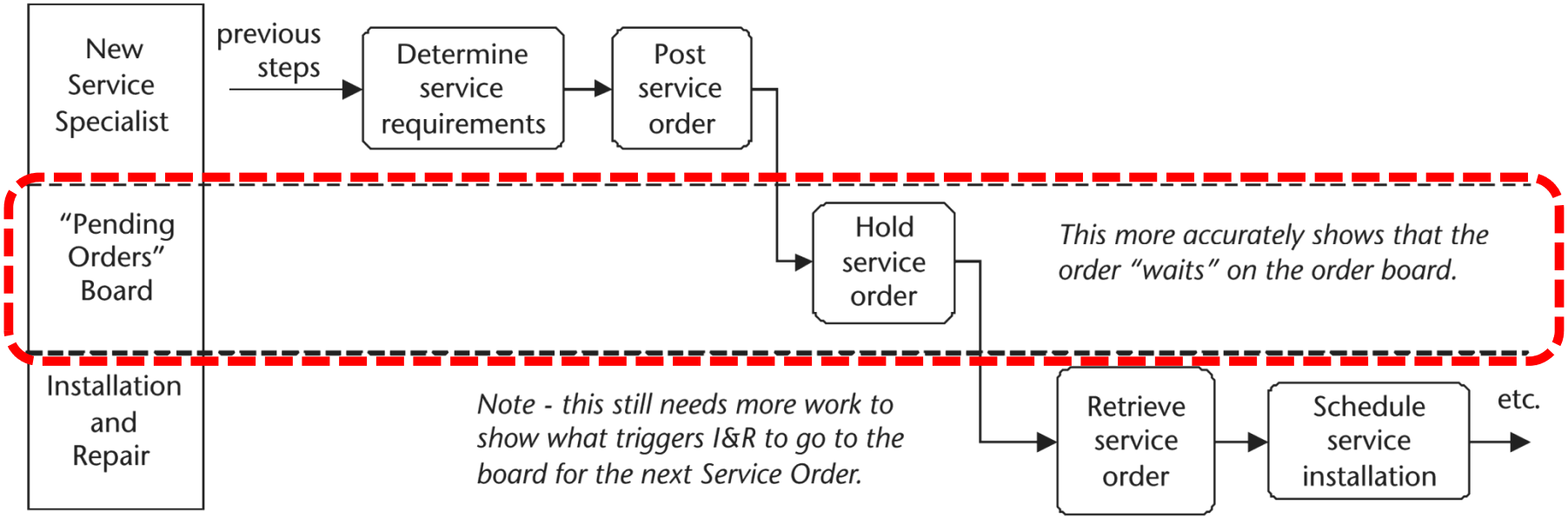
S417 ## Passive Actors

S418 • Sometimes, a passive storage or holding area like an inbox, outbox, or staging area at a warehouse can be shown as an actor, even if it does not do something. This way, it is easy to see all the points in the process where work is waiting.

III) PROCESS WORKFLOW MODELS: THE FINER POINTS



S419 (REMEMBER JUST THE LAYOUT)

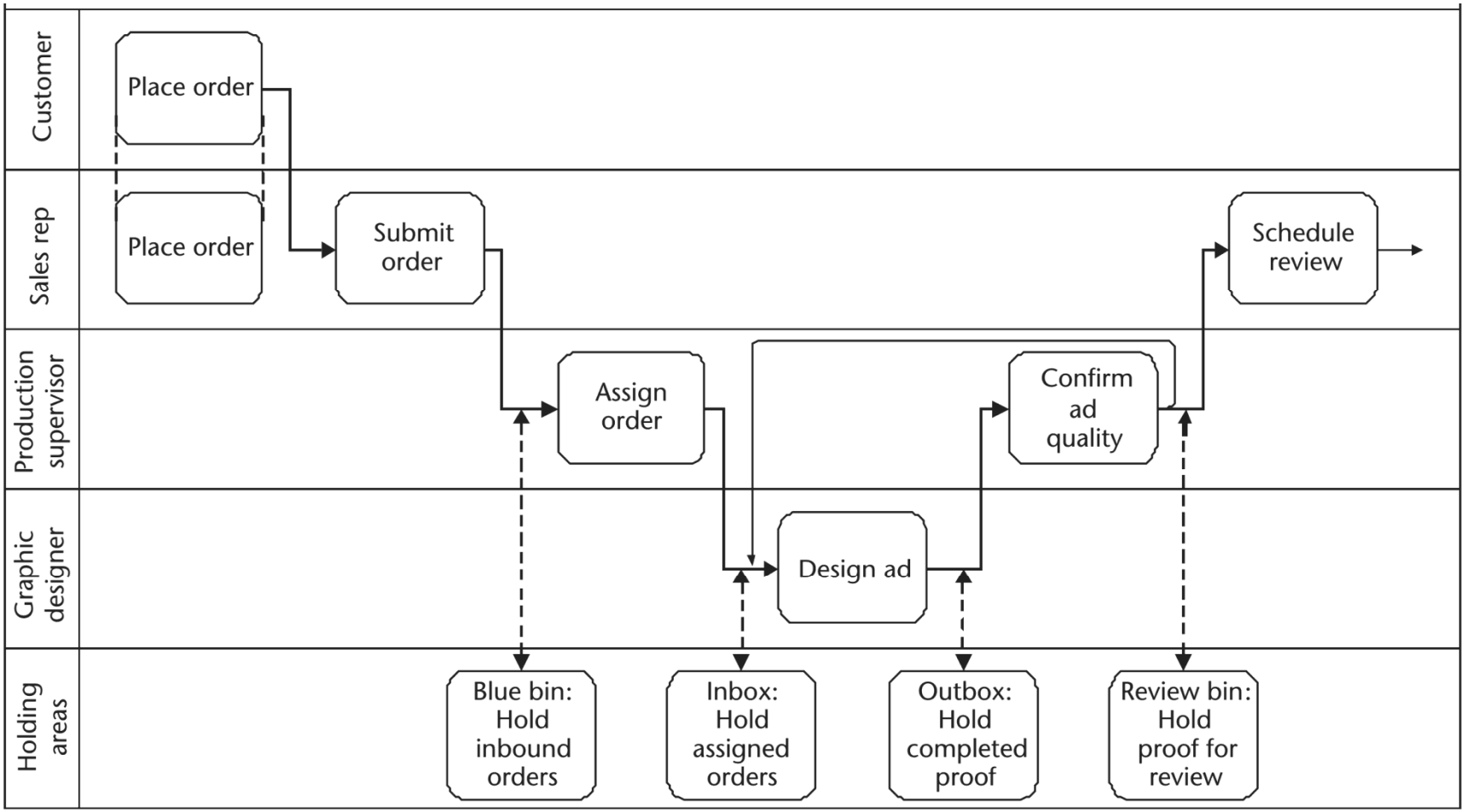


A passive holding area as an actor.

III) PROCESS WORKFLOW MODELS: THE FINER POINTS

S420 To show all the "hold work" steps may make the diagram too long. A more compact alternative is to represent an holding areas as a supporting system.

S421



A holding area supporting a flow.

(REMEMBER JUST THE LAYOUT)

III) PROCESS WORKFLOW MODELS: THE FINER POINTS

S422 • *Transmission Mechanisms as actors*. Some example.

A telephone network is not represented, because it is instantaneous, it does not hold work, it does not produce delay.

An e-mail communication is asynchronous, i.e., the actor does not interact instantaneously, and then it holds the work in the meantime. An e-mail inbox is often represented as an actor.

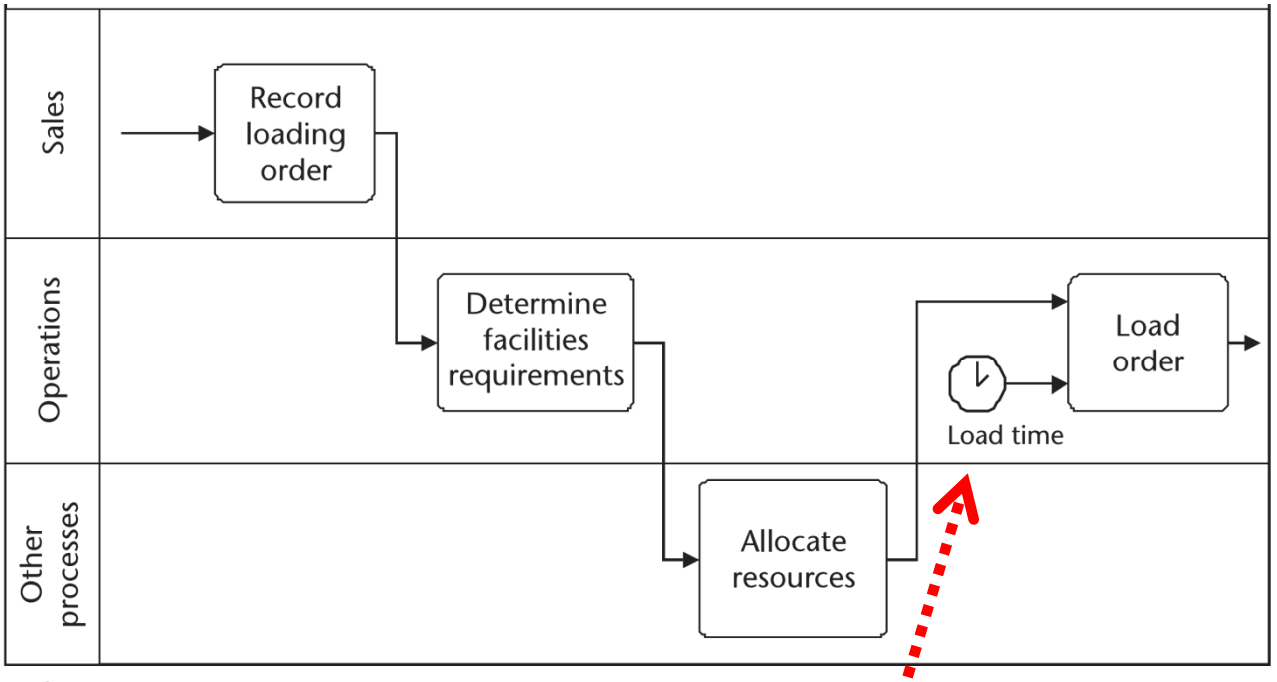
Do not show something that physically holds the work but is in turn held by or is under the control of another actor (truck, delivery cart, mailbag)

S423 • *Processes as Actors*

A separate process can appear as an actor if your process depends on it, i.e., there is a handoff of work to the separate process and a wait for something to come back from that process. E.g., a process providing shared services to many concurrent instances of another process.

III) PROCESS WORKFLOW MODELS: THE FINER POINTS

- E.g., A bulk marine shipping terminal. Every day multiple orders are pending to load ships with the commodities stored at the terminal



Other processes as actors.

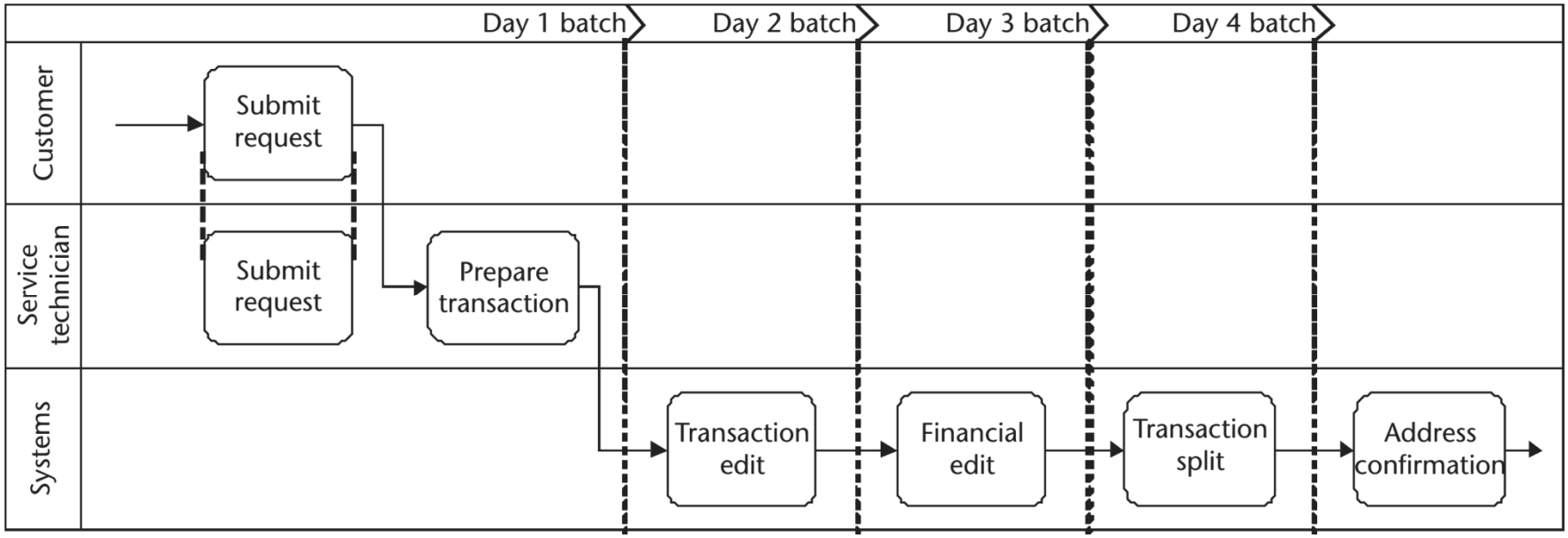
S424 **Some types of steps**

S425 - *Scheduled steps*: are triggered by temporal events, which is labeled so as to clearly express the temporal condition.

(REMEMBER A BPMN VERSION OF THE LAYOUT)

III) PROCESS WORKFLOW MODELS: THE FINER POINTS

S426 • *Time on a diagram*. Add vertical lines to the diagram, each indicating some labeled time boundary or milestone



Adding a time scale to a diagram.

(REMEMBER JUST THE LAYOUT)

S427 • *A part of the process you do not know/care about yet*. Use a cloud icon, with a textual comment. The cloud can be also used to indicate collaborative, creative work in a process that cannot be reduced to a sequence of steps and decisions.

III) PROCESS WORKFLOW MODELS: THE FINER POINTS

S428 **Starting from over-complex diagram**

S429 • Sometimes you will face with overly convoluted and detailed diagram. Cleaning up these diagrams is a good source of income.

S430 • Order the diagram with the main flow going strictly from left to right (except for some looping back, of course)

S431 • Ensure that the diagram contains a single process. If not separate out different processes

S432 • With separate processes, you will be able to simplify even further by separating out variations for one part of a process where alternative flows have been depicted.

S433 • Each variant should be diagrammed separately, including the most common case on the main diagram.

S434 • If a diagram is still too much detailed, combine steps until you have an approximation of a service diagram.

S435 • Rearrange the order of the swimlanes. Combine steps in the service diagram to produce a handoff diagram.

PILOT CASE STUDY: THE AGENCY

Stakeholder assessment

- Workers: Procedure to register a complaint and initiate an inspection request is opaque and daunting, which discourages workers; fear that they will be revealed as a whistleblower; no visibility to inspection status and outcomes.
- Employers: Expectations for inspections (and compliance) seem subjective and are not understood; lack of clarity leads to many follow-up discussions and back-and-forth sending of documents; communication paths are cumbersome and archaic.
- Agency staff: Massively inefficient mechanisms to obtain historical information (e.g., inspection outcomes) and record new information; inspection preparation takes longer than the inspection itself; constantly changing priorities; frustration due to lack of measures to assess effectiveness; frustration with rewards for "shuffling paper" rather than improving safety; moving data from tablets / laptops to the mainframe by transcribing it onto paper is very frustrating; no access to other agency's data, especially licensing, taxation, and environmental information.
- Agency: Inability to demonstrate performance compared to other agencies; fear of losing experienced staff due to frustration; poor customer satisfaction ratings; complex and convoluted processes are difficult to manage; lack of metrics to manage by; burdened by politically-driven metrics; no visibility into operational activities.

Context (changes in the environment)

- Workers and the public have become intolerant of poor workplace safety; expectation is that employers should provide safe workplace conditions, and the agency should enforce it.
- Extreme competition from other jurisdictions leads to employers needing to drive down costs such as insurance and settlements.
- Regulatory environment is much stricter, in some cases driven by international treaties.
- Much greater workload with the same staffing levels.
- Agency is now expected to justify its existence in the face of alternatives.

Consequences of inaction

- Unacceptably high levels of injured, disabled, and deceased workers.
- Increasing complaint volumes to handle due to workplace dissatisfaction.
- Increasing levels of agency staff dissatisfaction.
- Unacceptably high levels of employer closure, leading to loss of employment and tax base.
- Increased costs for employer insurance, making employers and the region less competitive.
- Outsourcing of agency functions is likely if benefits can't be demonstrated at an acceptable cost.

Initial as-is process assessment—issues by stakeholder, context, consequences.

PILOT CASE STUDY: THE AGENCY

Stakeholder goals

Workers:

- Without fear, register a complaint and initiate an inspection;
- Have visibility to inspection status and outcomes for their own workplace and others;
- Perceive a distinct improvement in their workplace safety environment.

Employers:

- Realize a real reduction in lost-time incidents, which will also positively impact their insurance rates;
- Have real-time visibility to inspection processes, data, and status, and to relevant regulations;
- Have clear and standardized processes for interaction with the Agency;
- Alternate communication channels (e.g., Web-based forms) that will free up resources that currently fill in the Agency's paper forms.

Agency staff:

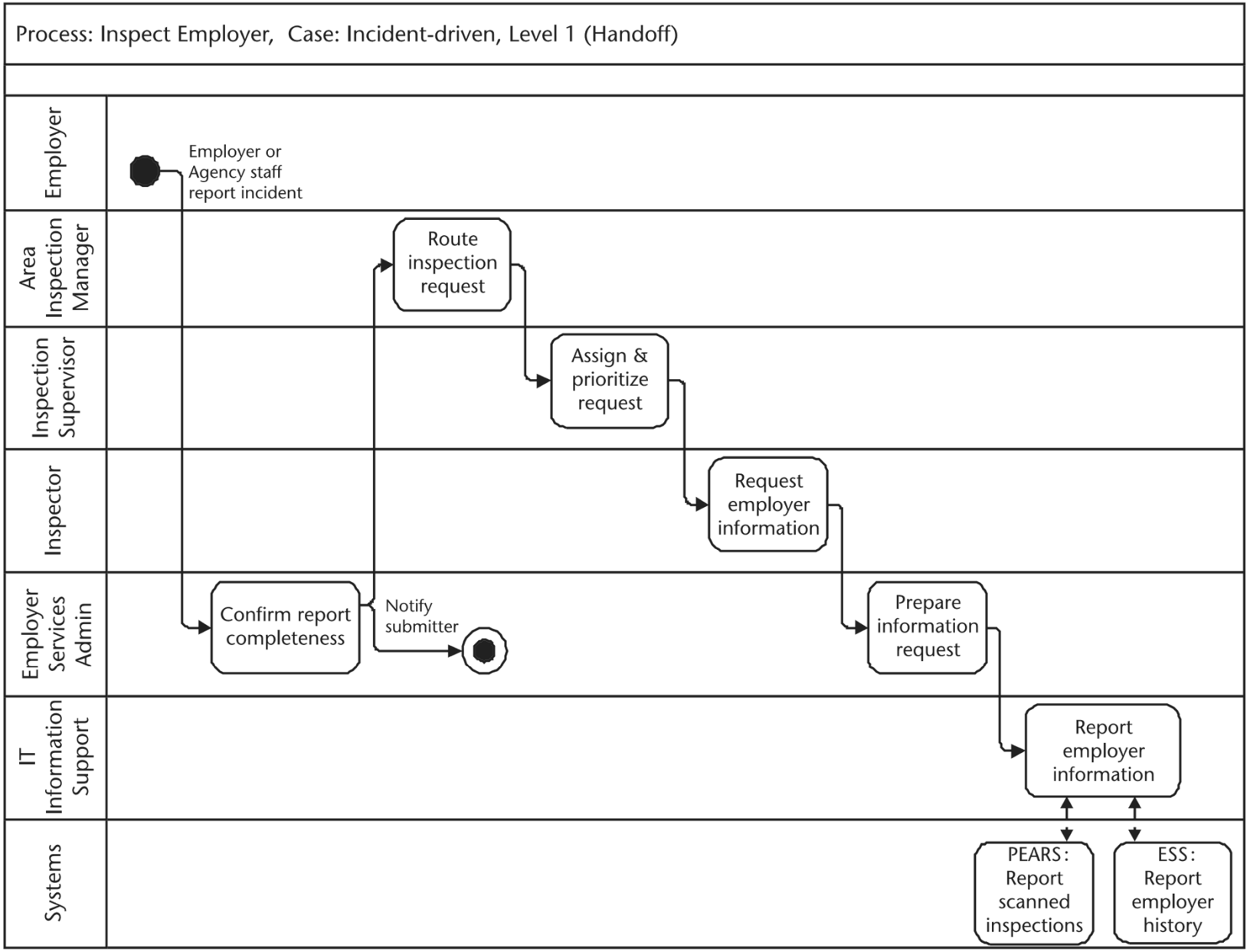
- Spend less time preparing for inspections, leaving more time for site work—should go from a 60/40 ratio of preparation to inspection to 20/80 within six months of implementation;
- Modern reporting and business intelligence capabilities for better targeting and justification;
- Metrics that will allow the actual effectiveness of Inspectors and Employers to be measured based on safety outcomes, rather than focusing on tasks such as completion of a form;
- Clear methods for prioritizing inspections, and elimination of constant reprioritization—fewer than 5% of inspections should be reprioritized once preparation is initiated.

Agency:

- Elimination of the entirely paper-based workflow with an electronic system that would provide full monitoring and visibility into operational activity, as well as high-quality metrics;
- Modern systems that would be easier to maintain and add new capabilities to as needs change, and be easier to recruit support staff for;
- Metrics that will demonstrate the actual safety outcomes achieved through Agency interventions;
- Increased job satisfaction for staff—target is a 50% reduction in the turnover rate within one year.

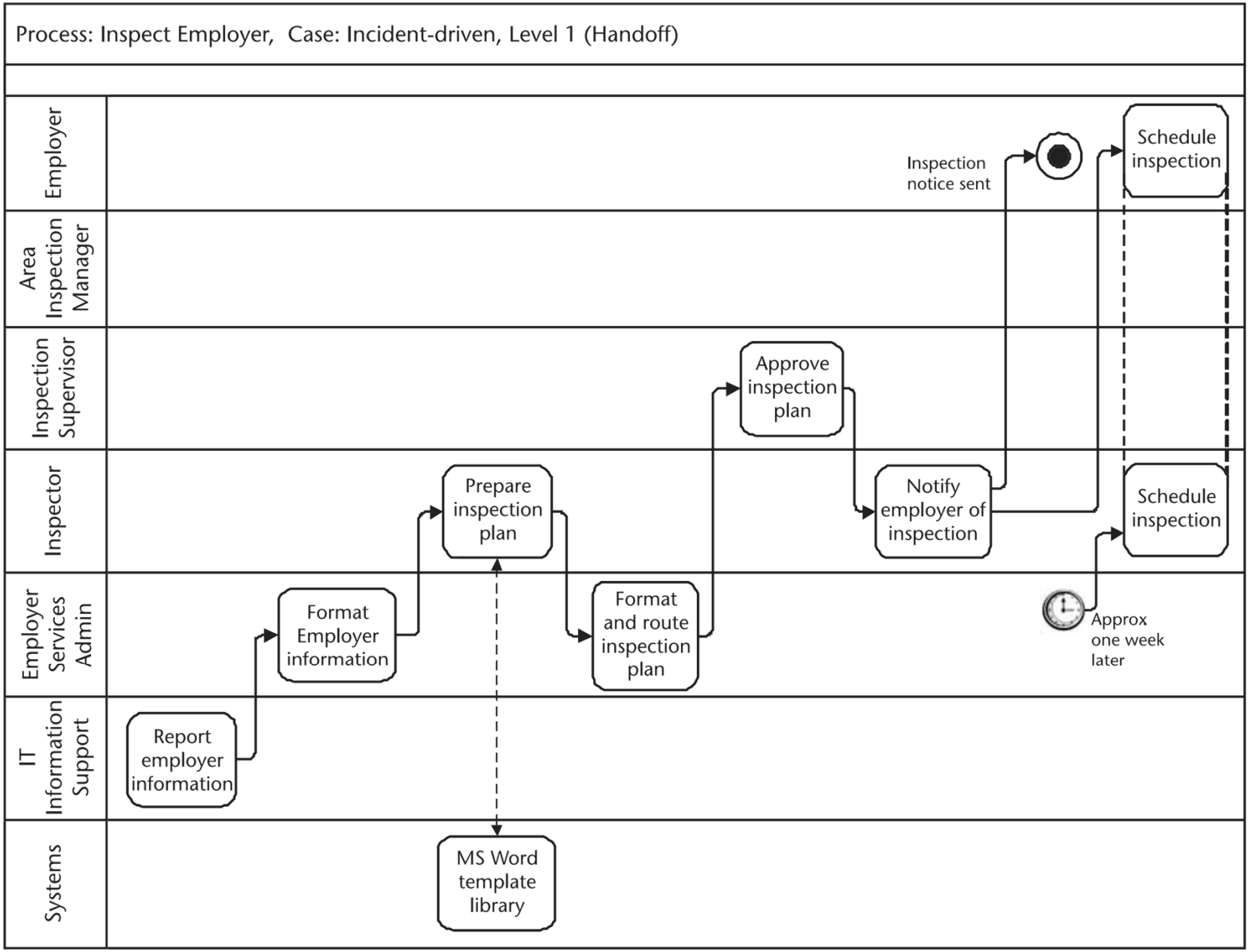
Initial to-be process goals—subjective and objective.

PILOT CASE STUDY: THE AGENCY



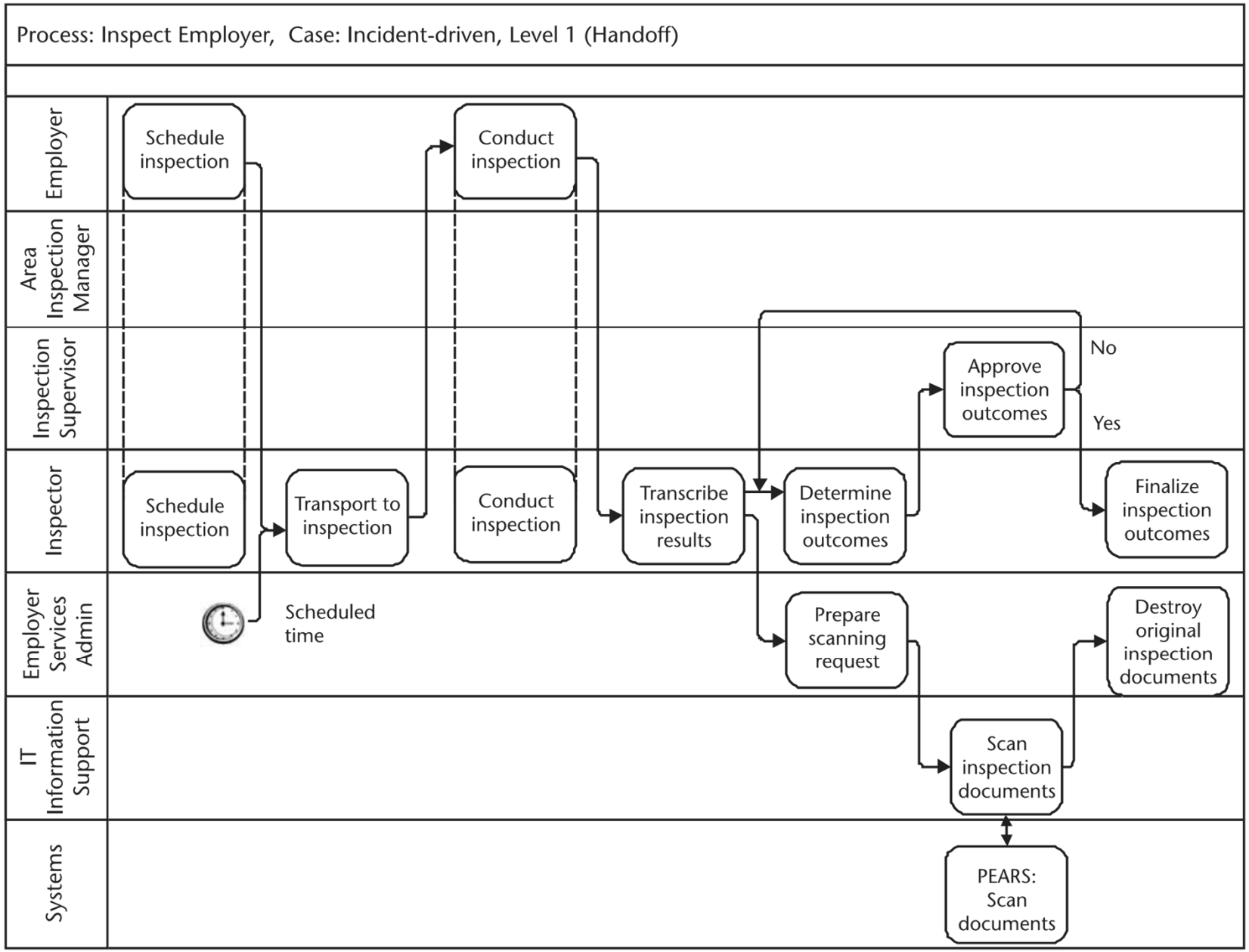
Handoff (level 1) swimlane diagram of the as-is process, main case (page 1).

PILOT CASE STUDY: THE AGENCY



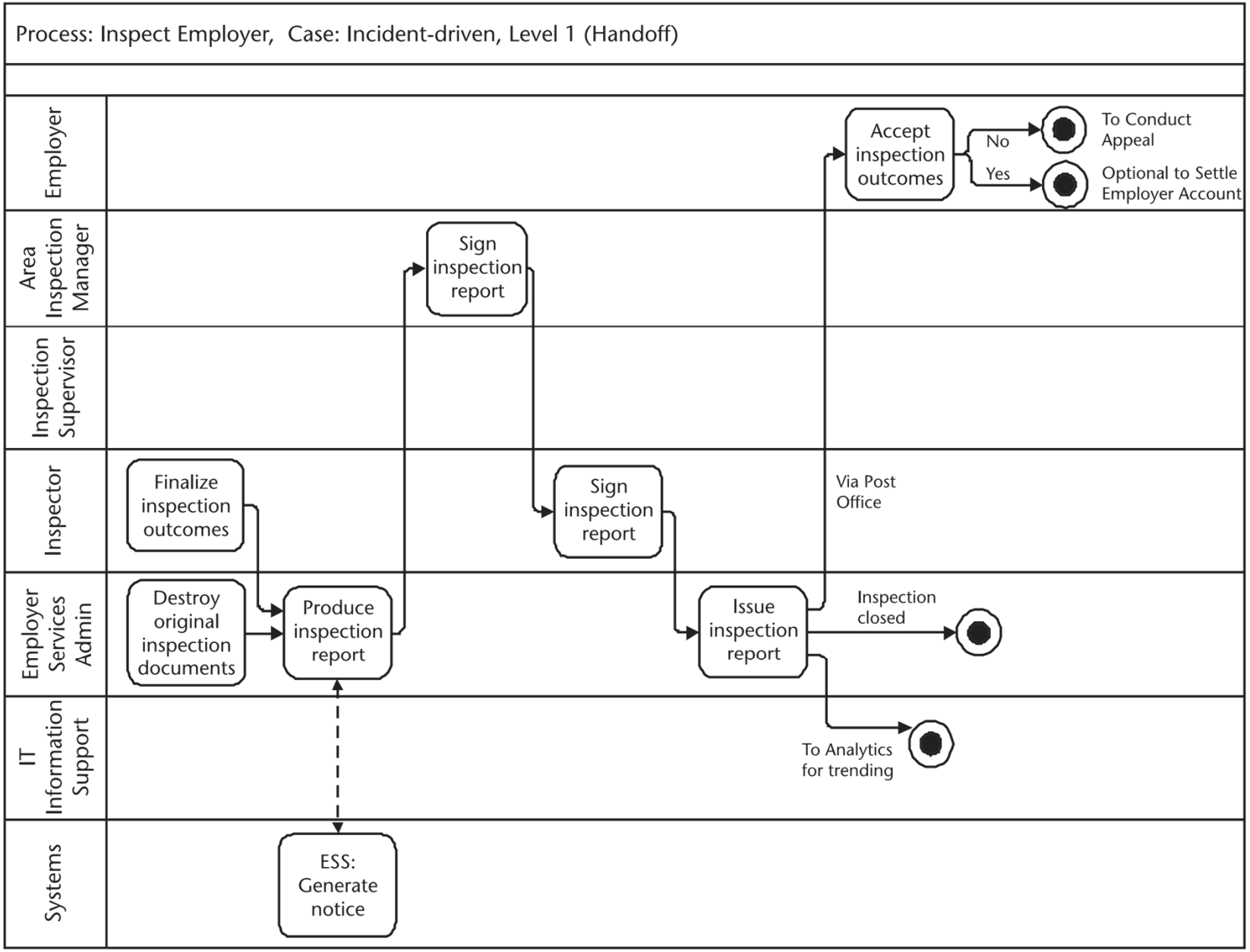
Handoff (level 1) swimlane diagram of the as-is process, main case (page 2).

PILOT CASE STUDY: THE AGENCY



Handoff (level 1) swimlane diagram of the as-is process, main case (page 3).

PILOT CASE STUDY: THE AGENCY



Handoff (level 1) swimlane diagram of the as-is process, main case (page 4).

PILOT CASE STUDY: THE AGENCY

S436

Issue Workflow	Potential Solution
Far too many handoffs because of support staff doing systems work, for approval, for signatures, etc.	• Provide Inspectors with tools to gather the information needed for preparation. • See note under "policies and rules."
Issue Information Systems	**Potential Solution**
Absolutely no "canned reports" or other facilities are available to aid inspection preparation.	• Develop a standardized suite of reports • Acquire business intelligence and analytics tools
Communication between the Employer and the Agency is paper-based and cumbersome.	• Notifications and reports should make use of Web presentment technology.
Inspectors capture data on laptops or tablets, then manually transcribe it, after which it is scanned into a non-queryable form. Pictures and video are also captured, but can't be maintained in shared form.	• Modern database technology should be used seamlessly from the point of inspection onwards, eliminating transcription and scanning. • Facilities for capturing video and images.
Issue Motivation and Measurement	**Potential Solution**
Inspectors are not measured and rewarded for improvements in workplace safety, only for the volume of paper they produce.	• The ability to capture workplace data, develop safety metrics, and incent inspectors must be developed.
Issue Human Resources	**Potential Solution**
Inspectors spend too much time on paperwork, as do their support people.	• Modern solutions and business process management technology will free up resources.
Admin support people have much higher potential than is currently being used.	• With tools and training, Admin Support could play a greater role in preparing for and interpreting inspections.
Issue Policies and Rules	**Potential Solution**
Policies such as requirement for approvals and signatures add no value and introduce delay.	• Eliminate our policies on requiring approvals and signatures—spot checks and audits will suffice.
Assignment of inspection to Inspector isn't done consistently, nor is prioritization.	• Heuristics should be developed to allow automated assignment and prioritization.
Issue Facilities	**Potential Solution**
The cost to maintain facilities for document storage and scanning is growing, and maintaining the scanning equipment is becoming a major expense.	• As noted before, eliminate paper-based methods and scanning with the right combination of process management and database technology.

(REMEMBER JUST THE LAYOUT)

Final as-is assessment by enabler with potential improvements (potential characteristics).