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ANSAwise- Distributed Workflow Applications

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Abstract

Office automation has not significantly improved office productivity. One reason is that workgroup computing does not support end-to-end business processes. Workflows can automate business processes.

This module of the ANSAwise training programme describes workflows, how distributed systems can support them, and additional mechanisms and frameworks to support workflows.

Workflows must be dependable. This is impractical to achieve using conventional database transaction techniques.

The solution being offered is the use of dependable workflows within a distributed system, supported by a flexible transaction framework.

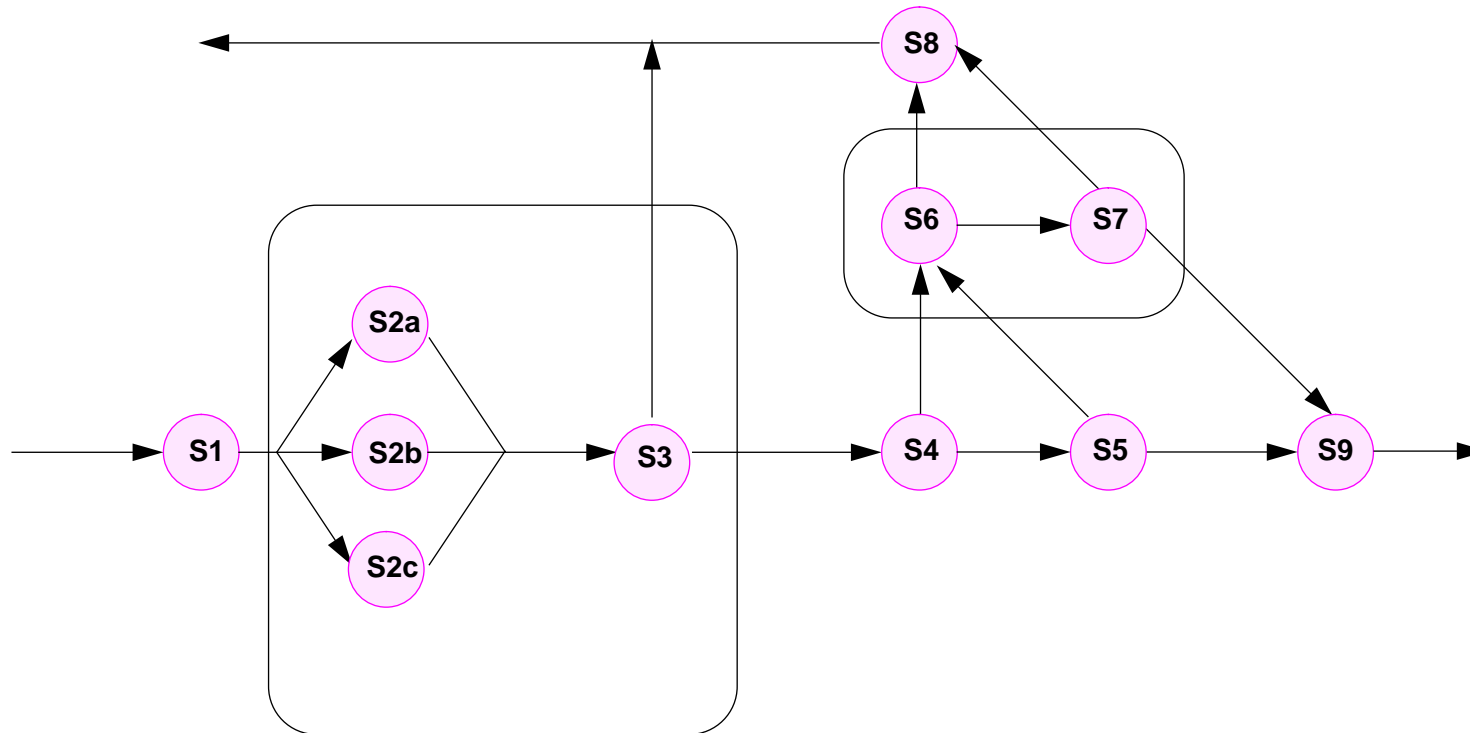
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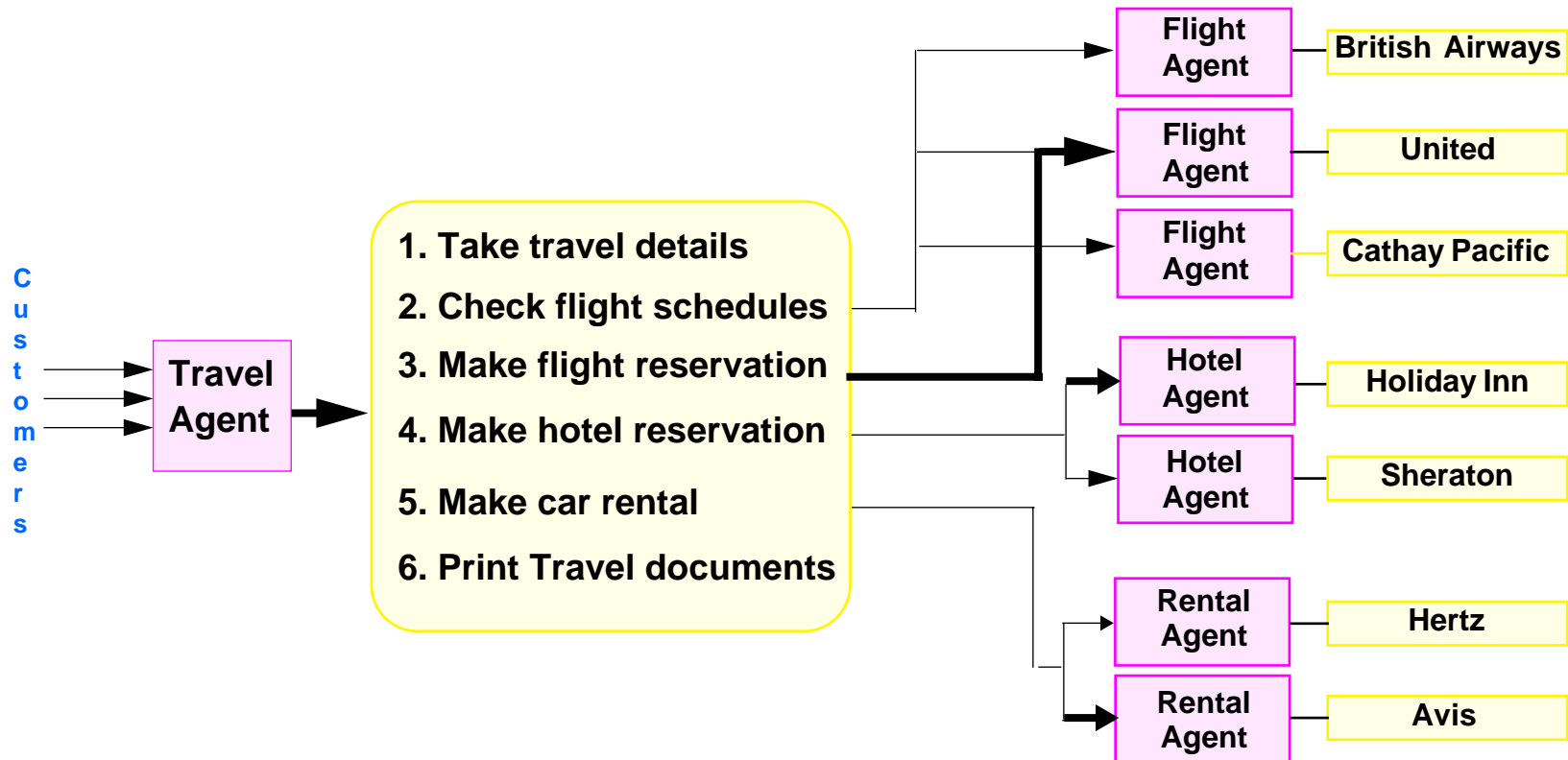
Distributed Workflow Applications



Speaker Notes



Business Trip Reservation





What does 'workflow' mean?

- *Document management?*
- *Electronic mail?*
- *Electronic forms?*

...Process automation

We want the entire business trip reservation process automated



Process automation and workgroup computing (groupware)

- *Office automation and the personal computer have simplified tasks*
 - but office productivity has barely risen in the last 10 years
- *Groupware still concentrates on group tasks, not processes*
 - productivity gains will come from automating end-to-end business processes, using workflows

And processes are distributed, because people are...

This classification uses applications from an office environment



Workflow is distributed - in time and space

	Same Time	Different Time (predictable)	Different Time (unpredictable, ad hoc)
Same Place	Meeting facilitation	Work sharing/ shift work	Team rooms
Different Place (predictable)	Conferencing	Electronic mail	Collaborative authoring
Different Place (unpredictable, ad-hoc)	Interactive multicast seminars	Bulletin boards	<i>Workflow</i>

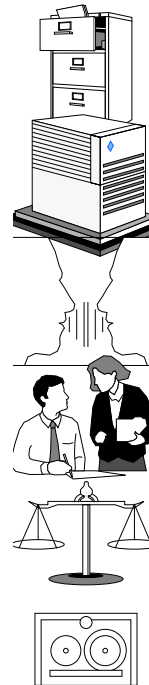
Workflow is the most difficult case, but distributed systems offer a natural solution

Work processes involve a combination of these; workflow applications must be able to support combinations

What are the fundamental activities of workflow..., and how can distributed systems support workflows?

Fundamental workflow activities

- *Look-up (search and retrieval)*
- *Computation*
- *Communication*
- *Negotiation*
- *Decision*
- *Archiving*



How can these fundamental workflow activities be supported by a distributed system?



Supporting workflow activities - Look-up



- ***Look-up (search and retrieval) activities***

- access to high-performance search engines

Text, image, video, audio

- indexing, cataloguing, and abstracting services
- 'intelligent agents'

- ***Distributed systems allow these to be integrated***

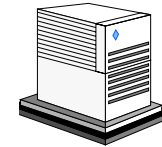
- providing a single point of enquiry
- the average worker spends 50-80% of a task looking for information to complete it

Thus the filing cabinet icon above...

This is likely to be a source of competitive advantage



Supporting workflow activities - Computation



- **Computation services**
 - embodying business rules (e.g. credit control)
 - providing specialist analytical services (e.g. scientific, manufacturing, financial): 'number crunching'

Fluid dynamics, MRP II, trend analysis, neural networks

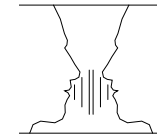
- **Such services are already available to your organization**
 - distributed systems can integrate them

As in the NASA ADS



Supporting workflow activities - Communication

- **Communication services**
 - universal connectivity: e-mail now, video-conferencing soon
 - integrated voice and data
 - information filtering
- **These services are already widely available...**
- **...but system and network management is expensive**



Even now, the tools are crude and end-to-end management is infeasible

- **Distributed systems can help manage the communications infrastructure itself**

As in the AEG/ATM (?) OSI network management overlay

Fundamental workflow activities - Negotiation



- *Early automation attempts tried to reduce ambiguity...*
 - by forcing people to be explicit about their offers and responses
 - literally, “I promise to deliver X by next Thursday”
- *... This legalistic approach was unpopular*

The Coordinator was based on speech act theory. It also assumed work patterns were stable

- *Later attempts have taken a less direct approach*
 - but still cannot cope with the *social* nature of work and the important of nuances

The need for anonymity, better ways to reach consensus,...

- *Support for negotiation is an area of research*

It is not a distributed systems problem.



Supporting workflow activities - Decision

- **Decision services**
 - meeting support and decision tracking
 - design and quality assessment
 - planning and policy support
 - authorization



Also the rationale for decisions

Authorization requires security mechanisms; it also entails real-world commitments

Here, we're talking about operational decisions, not management decisions - the DSS (Decision Support Services)/EIS type of application

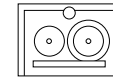
- **Distributed systems can support multi-disciplinary teams**
 - by interconnecting and federating different meeting support systems

The marketing Mac users and the product design workstation users



Fundamental workflow activities - Archiving

- **Archiving services**



- Dependable long-term storage

Must meet audit (legal and regulatory) needs

- Cost-effective and transparent data migration

In past times to tape; in future to disk

- **A traditional strength of the mainframe**

- legacy systems can be readily integrated into distributed systems
- distributed systems will accommodate scalable 'data warehouses'

Video-on-demand shows that these data volumes can be distributed



Two styles of workflow

- ***“Heads-up” - you are ‘outside’ the process***

The machine is your butler. (Enable Software chose the name “Higgins” for their product with this in mind.)

- product design
- financial control

e.g. auditing, risk assessment

Also quality audit, publishing,...

- ***“Heads-down” - you are ‘inside’ the process***

The machine is your gangmaster.

- tele-sales
- customer service

- ***Practical workflows fall between these extremes***

It's easy to see the business justification for “heads-down”, but what about “heads-up”?



Workflow and business knowledge

- *Knowing the operation of your own business is your best advantage*
 - “IT is not a sustainable advantage”

“It’s not what you know or have that matters, but how you use it”

The way you design your products, or deliver your services, is the crucial factor

- *This process knowledge is dispersed across the organization*
 - it is impractical to keep teams of key personnel permanently together
- *Workflows allow you to reuse the process knowledge*
 - accelerating complex processes, for example ‘design to manufacturing’

If anything, the gains are greater in heads-up than heads-down



Workflow

Moving from the idea of 'workflow' to 'a workflow'

- **Collection of tasks organised to accomplish some business process**

Automated, rule-based

- **Workflows specify**
 - business structure
 - human/computer tasks
 - task ordering and synchronisation
 - control flow/data flow/resource usage
- **Workflows enable:**
 - many human sequential tasks -> concurrent computer tasks
 - reuse of existing computer system/services
- **Workflows underpin:**
 - high-level graphic/script languages/tools -> rapid assembly
 - rapid installation/provisioning/reconfiguration of services



Workflows in the real world

- *Activities do not always run smoothly*
- *Workflows require coordination*
 - interoperability to link together activities

No need to follow up interoperability any further

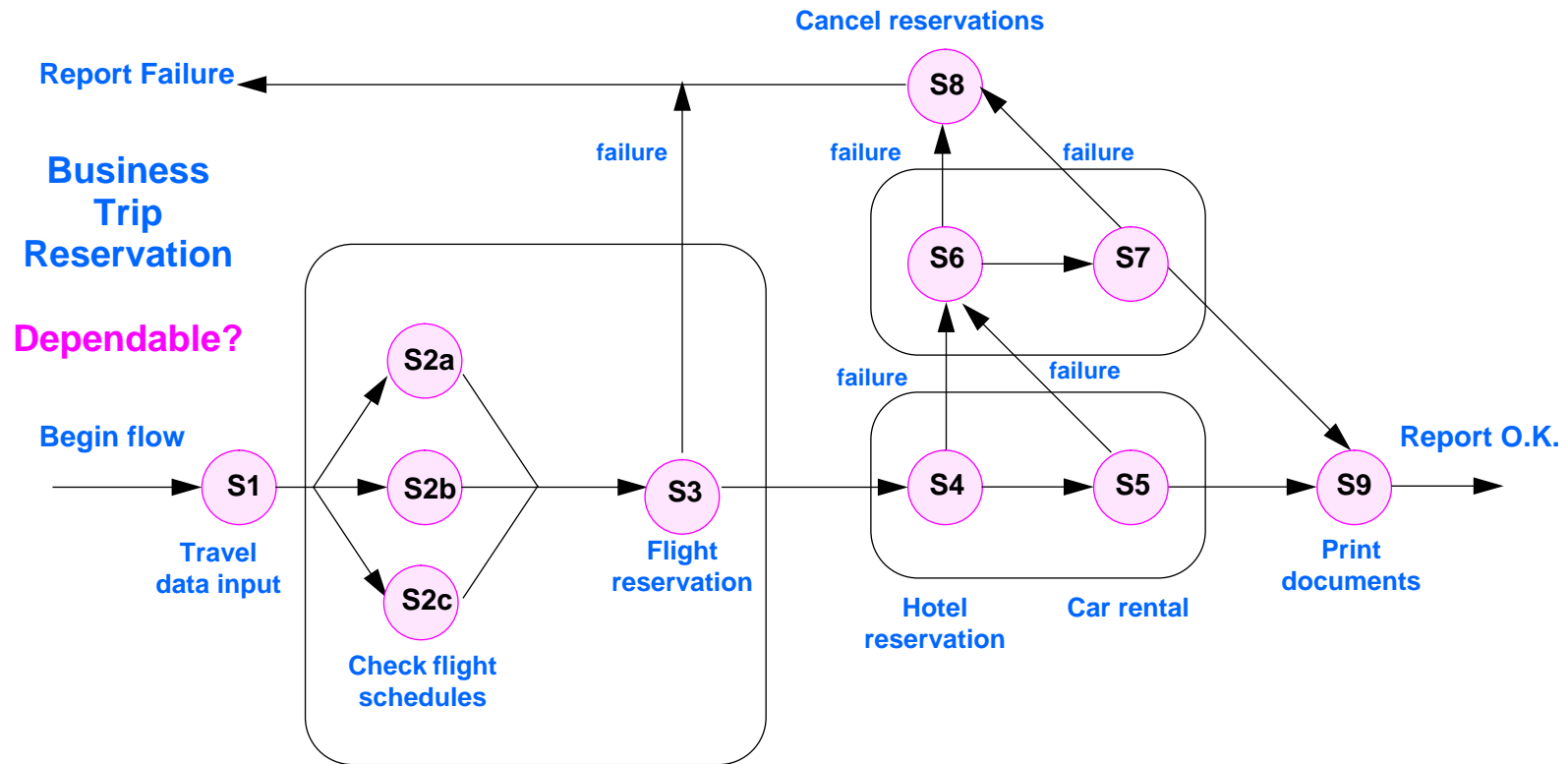
- dependability to cope with failure

Workflows are unpredictable

- flexibility to cope with process change
- ... they must be managed



Business Trip Workflow





Dependability

- ***All workflows must be able to cope with failure***

Failure is a property of the real world

- they must be dependable

Distributed workflows must be just as dependable as non-distributed workflows

- ***More than 50% of white-collar work is correction/rework***

Suppose there was 50% rework in manufacturing!

- dependable workflow applications can reduce this...
- ... by designing by failure tolerance

- ***Dependable workflows give assurance***

- instilling management confidence in business processes

This encourages delegation, and job empowerment

- enabling automated workflows that cross organizational boundaries

Between companies



Mechanisms for dependable workflows

- *Traditional Database transactions are a basic mechanism...*
 - for recovery from failure (all-or-nothing atomicity)
 - for independence (serializability)
- *... but they are too rigid for workflow activities*
 - activities can continue for days, weeks, or months!
 - activities cannot be isolated from each other
- *Extended transaction models are possible*
 - relaxing the isolation between activities
- *A flexible transaction framework is also required*
 - to control the activities for a particular application

This is too complex to cover here. See the referenced document



Workflow applications using ANSA technology

ANSAware and/or ICL DAIS

- *Document image management product*

ICL Powervision/EM

- *Newspaper story retrieval system*

CTI Hyperpress

- *Customer Service for major utility*

OASIS - Scottish HydroElectric



Summary

- ***Workflows support business processes***
 - the way organizations actually work
- ***Distributed systems are a natural match for workflows***
- ***Distributed systems require a flexible transaction framework***

If you are in the electronic services marketplace, you cannot ignore this



More information

- ***For more information on flexible transaction frameworks***
 - **see “Flexible Transaction Framework for Dependable Workflows”**