

ABAP Part III

Lesson 7: ALE IDOCS

Lesson Objectives



After completing this lesson, participants will be able to -

- Get familiarized with the jargons used in ALE, IDOC & EDI.
- Know the concept of ALE and Idocs.
- Know more about Idoc structure and its role in Data communication
- Learn basic Outbound Processing of IDoc.
- Learn basic Inbound Processing of IDoc.
- Have a Quick Introduction to EDI.

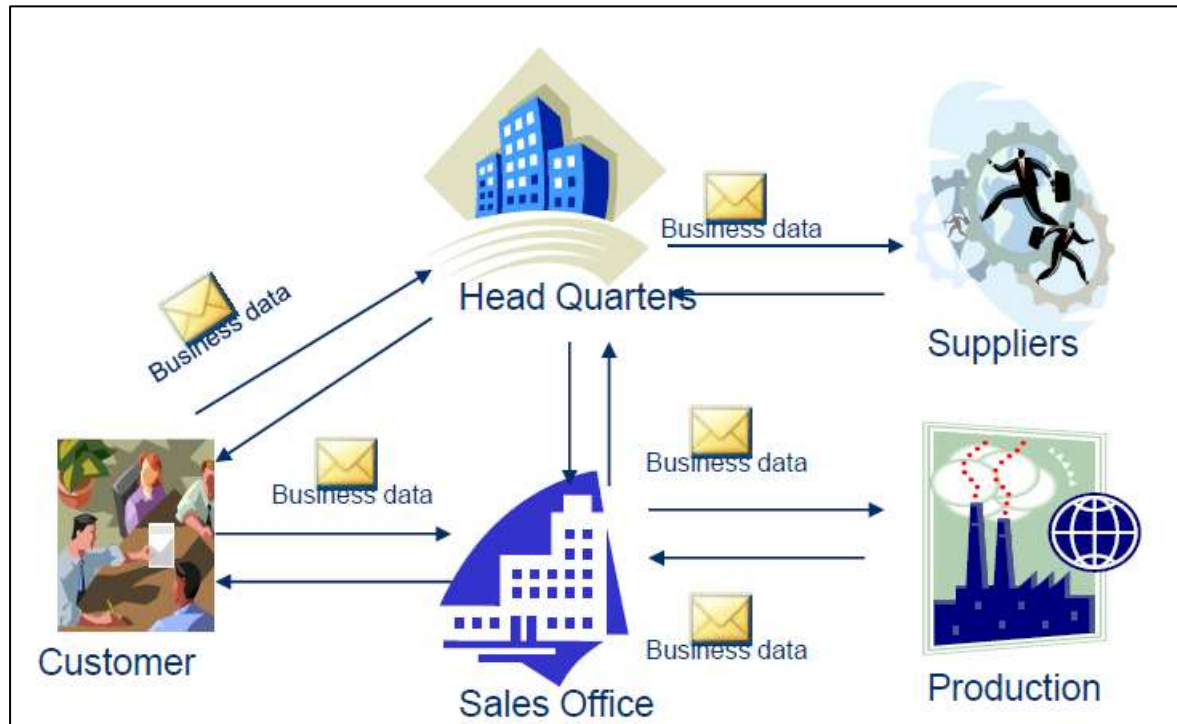


Business Requirement for Integration



A normal business structure comprises of an organization with multiple offices spread across different countries. They do business with customers and vendors spread across different locations.

The organization sends business data to its different offices as well as to its customers and vendors.





SAP Business units (Sales Unit & production Unit) can use ALE for internal data exchange.

ALE is SAP Technology to send and receive business data in SAP Systems. Container for the data is IDoc.

When communicating with Business Partners (customers/suppliers on non-SAP platforms) SAP business units can exchange data through EDI using IDocs.

What types of data Exchanged?



Transaction Data

- Sales Order, Purchase Order, Invoice etc.

Master Data

- Material, Customer, Vendor, etc.

IDoc – Intermediate Document



IDoc is an Intermediate document that holds application data.

- A container used to exchange data
- It is independent of the complex SAP structure to store data.
- It serves as the vehicle for data transfer.

IDoc Type defines the structure and format in which the data is exchanged.

It is similar to a structure in SAP

IDoc data is an instance of IDoc Type

IDoc acts as a standard SAP interface to exchange business data through ALE.

IDoc – Intermediate Document

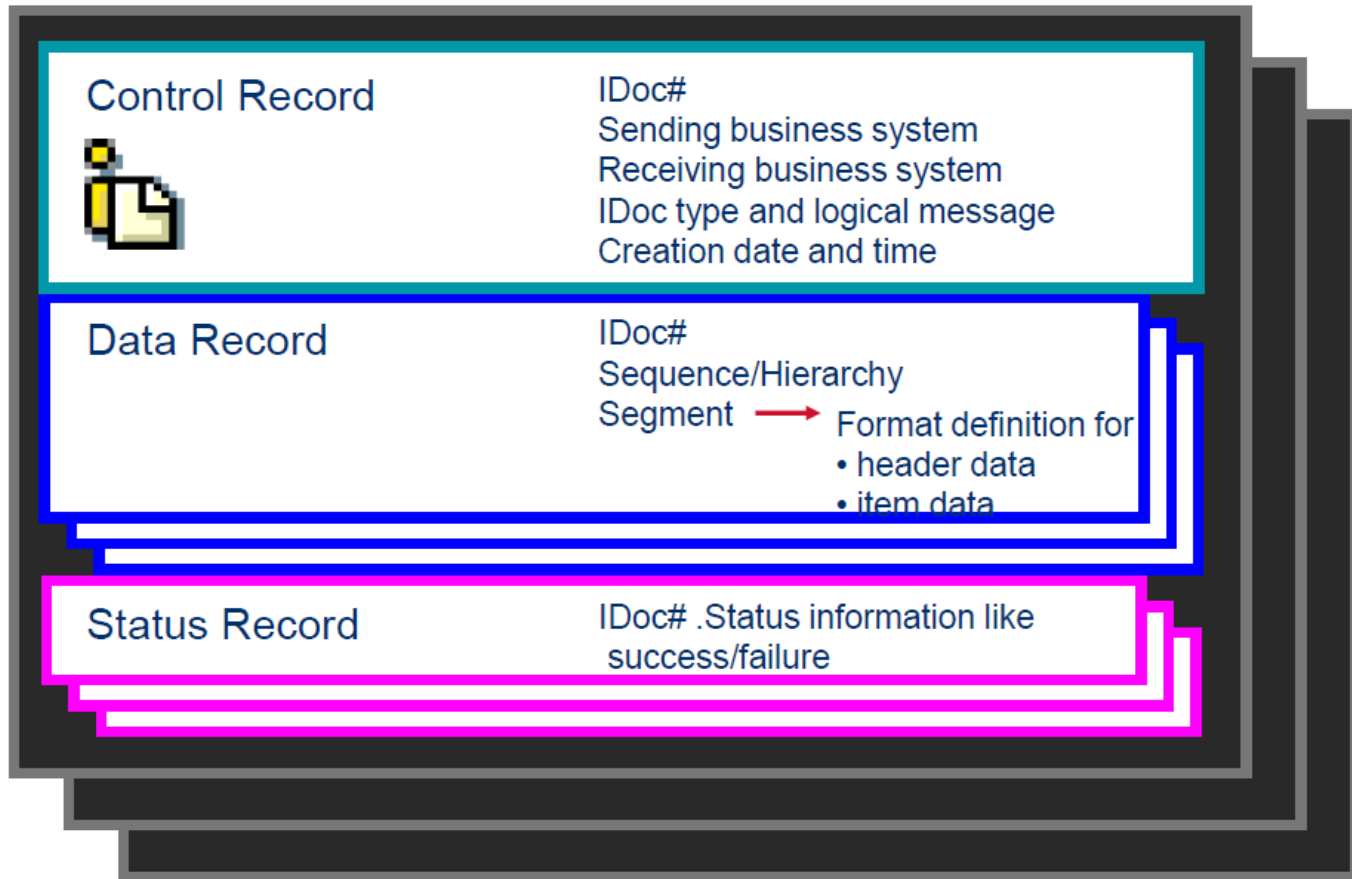


From an SAP system, an IDoc can be sent to and received from

- An SAP R/3 system
- An SAP R/2 system
- An EDI subsystem
- Any third-party application software

Segments: . Idoc data is arranged in Rows, The rows make up segments of an Idoc. Each segment consists of fields/segments. Fields can contain data.

IDoc Components

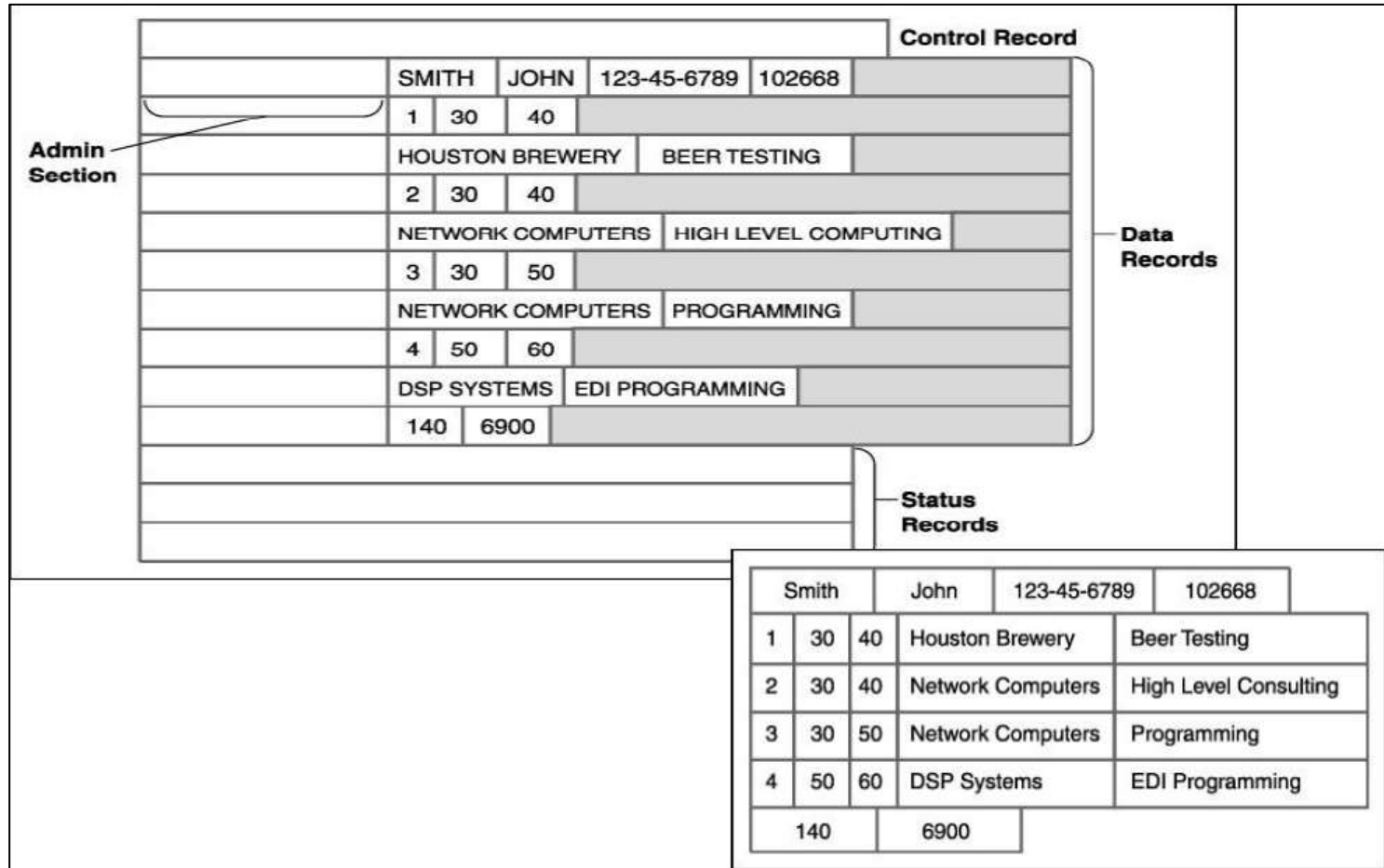


**IDoc # the unique identifier for each idoc.

IDoc – Intermediate Document



IDoc is an instance of IDoc type. It contains actual data .





Data Records constitute of segments with a sequential segment number, a segment type description and field containing the actual data of the segment (to a max of 1000 bytes)

The screenshot shows the SAP IDoc Display interface for IDoc 0000000000000002. The left pane shows a tree structure with segments: Control Rec., Data records (E1MARAM, E1MARA1, E1MAKTM, E1MARMM), and Status records (03, 30, 01). The middle pane shows additional information for the selected segment E1MARMM, including segment numbers 000001 through 000004. The right pane displays short technical information and the content of the selected segment.

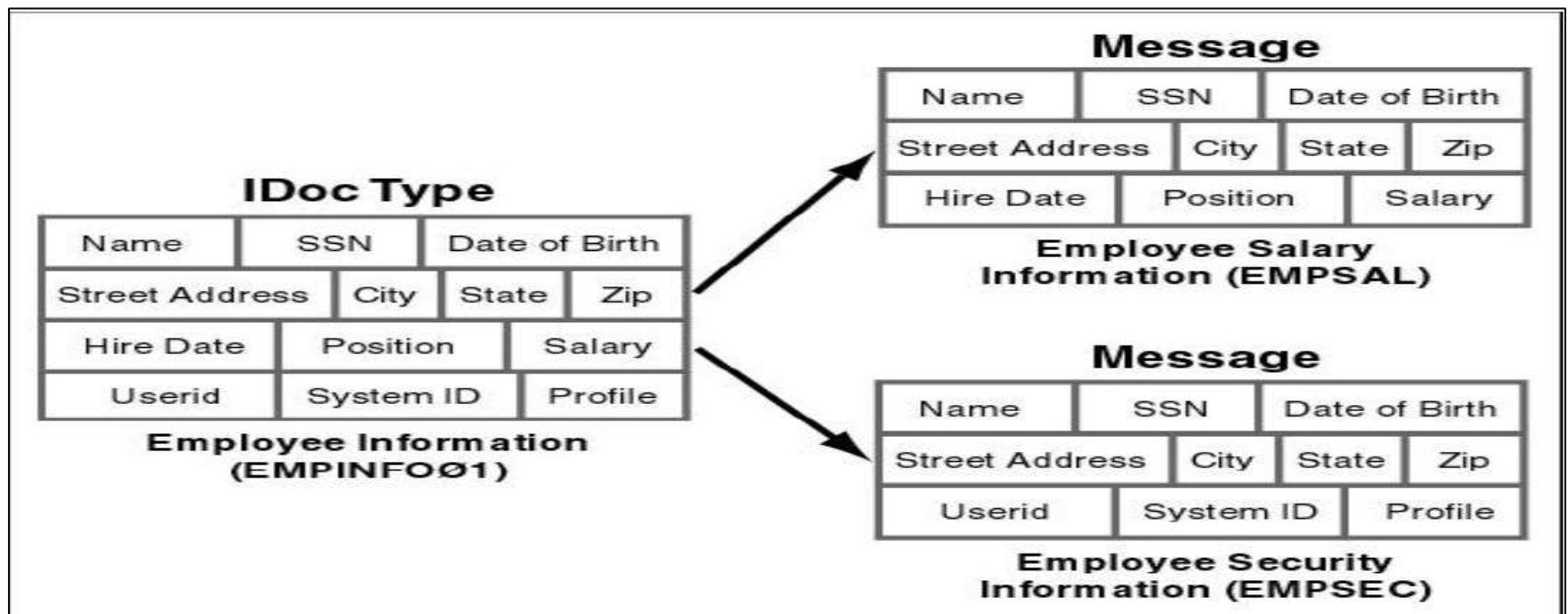
Short Technical Information	
Direction	1 Outbox
Current Status	03
Basic type	MATMAS05
Extension	
Message Type	MATMAS
Partner No.	LNDCLNT200
Partn.Type	LS
Port	ZPORT9

Content of Selected Segment	
Fld Name	Fld Cont.
MSGFN	005
MEINH	KGM
UMREZ	1
UMREN	1
LAENG	0.000
BREIT	0.000
HOEHE	0.000
VOLUM	0.000
BRGEW	0.000
NEST_FTR	0
MAX_STACK	0
CAPAUSE	0.000

Message Type



A message type represents a specific type of document that is transmitted between two partners. Messages will be logically related.



Message Types



Table View Edit Goto Selection Utilities System Help

Display View "Output Types and Assignment to IDoc Types": Overview

Output Types and Assignment to IDoc Types

Message Type	Basic type	Extension	Release
MATMASAD	MATMAS03		40A
MATMAS_BAPI	MATMAS_BAPI01		46A
MATMAS_BAPI	MATMAS_BAPI02		700
MATMAS_BAPI	MATMAS_BAPI03		700
MATMAS_GDS	MATMAS03		46C
MATMAS_GDS	MATMAS04		46C
MATMAS_GDS	MATMAS05		470
MATMAS_MASS_BAPI	MATMAS_MASS_BAP.		610
MATMAS_MASS_BAPI	MATMAS_MASS_BAP.		700
MATMAS_MASS_BAPI	MATMAS_MASS_BAP.		700
MATQM	MATQM01		46A
MATTYPE	MATTYPE01		40B
MBGMCA	MBGMCA01		46A
MBGMCR	MBGMCR01		730
MBGMCR	MBGMCR01		45A
MBGMCR	MBGMCR02		46A

Position... Entry 1,519 of 2,479

WE82

Message Types



Table View Edit Goto Selection Utilities System Help

Display View "EDI: Logical Message Types": Overview

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EDI: Logical Message Types

Message Type	Short text
MATMAS	Material master
MATMASAD	
MATMAS_BAPI	Create and change material master data
MATMAS_GDS	Master Material for GDS
MATMAS_MASS_BAPI	BAPI for Mass Maintenance of Material Data
MATQM	Replication of QM inspection setup
MATTYPE	Material types
MBGMCA	Reverse goods movements with MB_CANCEL_GOODS_MOV
MBGMCR	Post goods movements with MB_CREATE_GOODS_MOVEMI
MDMFDB	MDM: Feedback object status
MDMMETA	MDM Extractor - Metadata
MDMRECEIPT	Receipt MDM
MDMREQUEST	Request MDM
MDMVERA	MDM Verification
MDM_EQUIPMENT_SAVEREPLICA	BAPI for Mass Maintenance of Equipment
MDM_FUNCLOC_SAVEREPLICA	

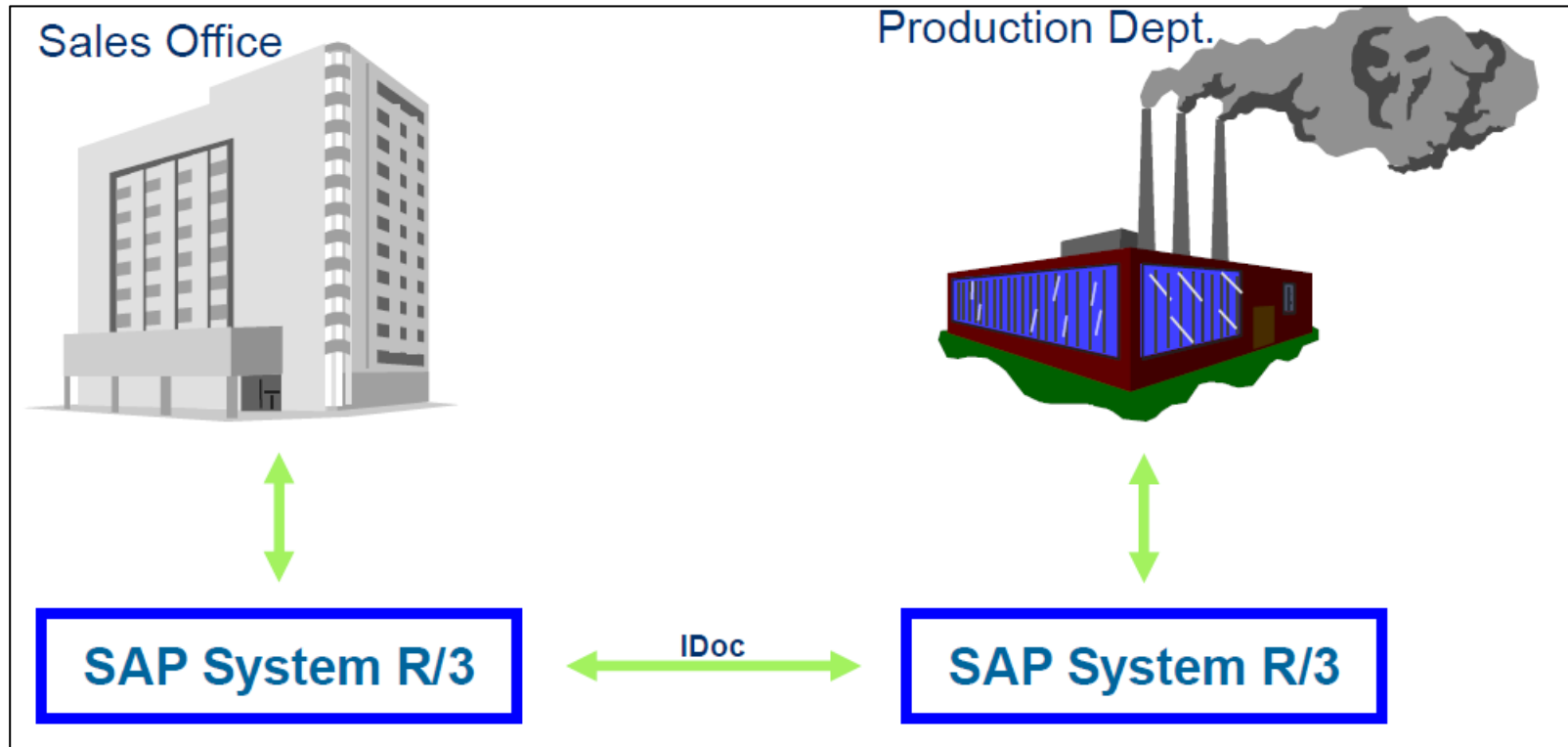
Position... Entry 1,238 of 1,930

WE81

ALE Scenario



Typically ALE used when data needs to be exchanged within the company.
For example between Sales Office and Production Department.



ALE – Application Link Enabling

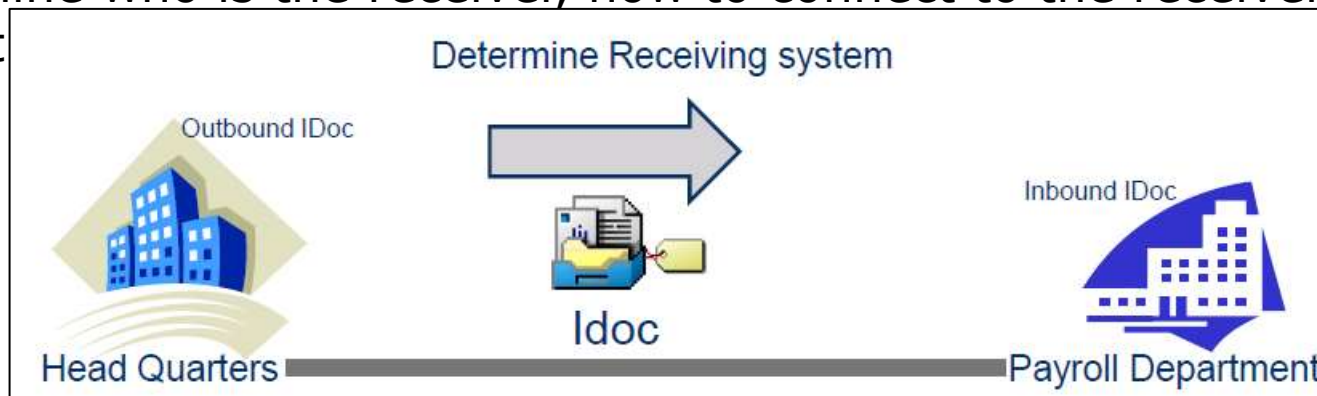


Application link enabling is SAP's terminology, used to integrate business processes between R/3 Systems and non-R/3 systems.

ALE is the technology used to transfer business data between different systems using IDocs.

IDoc is the container for the business data and ALE is the technology which builds the road for data transfer.

For example to send Employee Data to Payroll department from HO, HO will populate Employee detail into the EMPINFO01 format(IDoc). ALE settings will determine who is the receiver, how to connect to the receiver and transmits t



Services involved in ALE



ALE comprises of three layers:

- Application Services
- Distribution Services
- Communication Services



Services:

Application Services

Distribution Services

Communication Services

This is where the SAP applications (SD, FI, MM etc.) generate their data and documents



Services:

Application Services

Distribution Services

Communication Services

- **Recipients**
- **Formats and Filters the data**
- **Creates IDocs (Intermediate Documents**



Services:

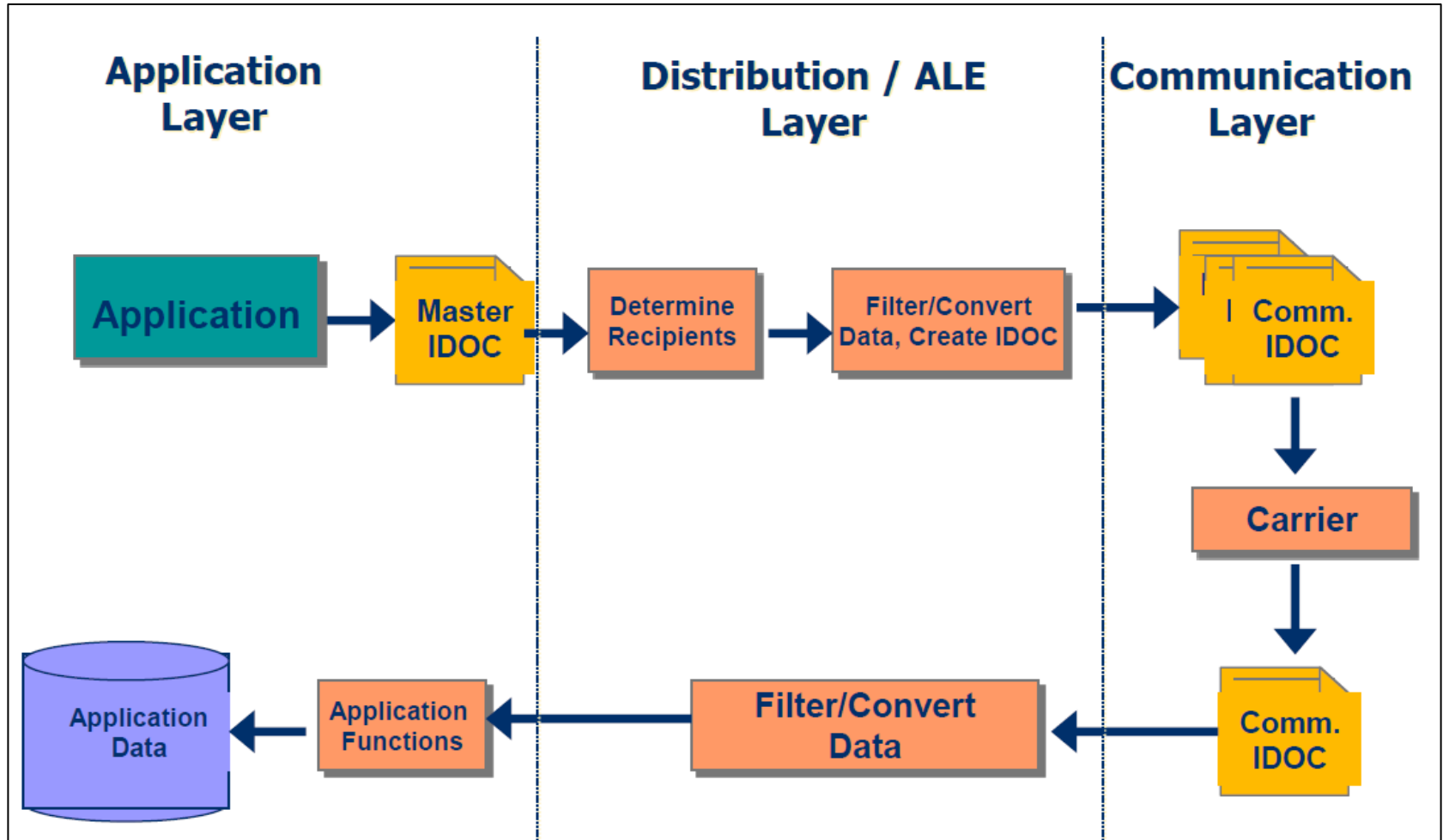
Application Services

Distribution Services

Communication Services

- tRFC
- TCP/IP
- RFC
- etc

To Sum-Up





ALE business process is used for following distribution of tasks:

- 1. Synchronizing customizing data between systems.
- 2. Master data distribution
- 3. R/2 Connection
- 4. External system connection

ALE Model is independent of the participating application systems.

Technology supports guaranteed delivery.

Ensures backward compatibility of messages exchanged between systems.

E.g. Version Compatibility.

- Reduced Processing Cycle time
- Reduced Paperwork
- Reduced Cost
- Standard means of communication

Basic components Involved in ALE Model Setup

The below are the basic configuration steps involved in exchanging the business data between two systems in distribution service layer.

- Logical Systems (TCode – SALE)
- R/3 Clients involved in data exchange (TCode – SALE)
- RFC Connections (TCode – SM59)
- Distribution Model (TCode – BD64)
- IDoc + Message Type (TCode – WE82)
- Partner Type / Partner Profiles (TCode – WE20)
- Ports (TCode – WE21)



Logical System is a name given to uniquely identify, the systems involved in data exchange.

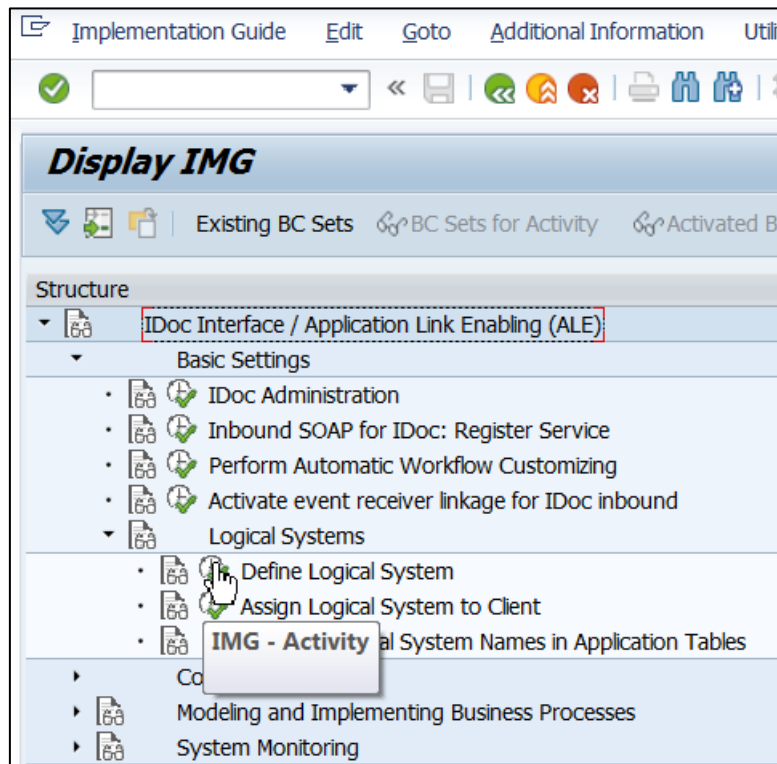
Logical Systems (LS) represent R/3 or external systems in the SAP R/3 environment for the distribution of data.

- A client of an SAP instance is represented by a logical system in the ALE context. This logical system will act as sender or receiver of Idocs.

Partner Type - Partner type are used to classify the business system.

- Ex: Logical System (LS) –for other SAP clients,
- Customer (KU), Vendor (LI) etc..

SALE is Tcode that is used for all ALE customizing





In ALE the systems communicate with each other through Remote Function Calls (RFC).

An RFC destination contains technical details about other SAP systems.

- E.g.: If EC1 wants to communicate with BW.
- In EC1 system we will define an RFC destination for BW.
- This will contains technical details about BW system.

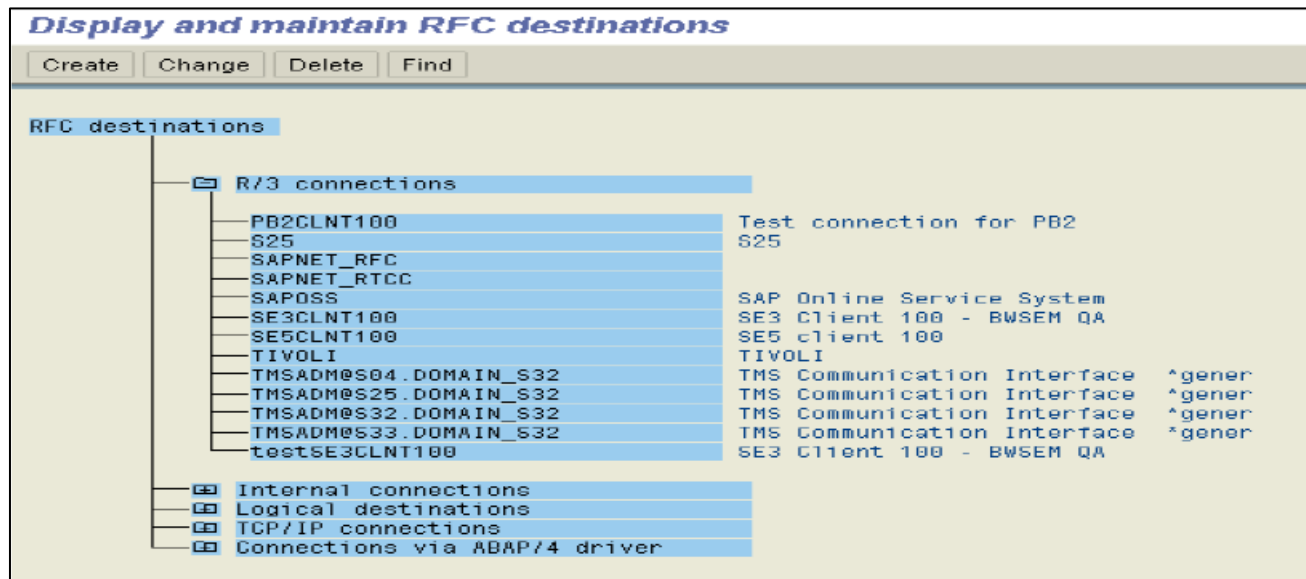
For ALE you will create RFC destinations for all participating systems (which is a part of communication services layer in ALE).

Tcode - SM59 / SALE ->Basic Settings ->Communication
->Create RFC Connections



For ALE we choose to create an RFC destination of type R3/ABAP. This type of RFC is used when we want to connect to other R3 systems as this protocol (tRFC) is only understood by SAP systems.

In RFC destination details like target host IP address , system number , user logon data are provided.



Distribution Model



A model that describes the ALE message flow between logical systems. Applications and the ALE distribution service layer use the model to determine receivers and to control the data distribution. Relationships between logical systems, message types are defined in the distribution model.

Distribution Model



Distribution Model Edit Goto Environment System Help

Change Distribution Model

Check Models System View Filter Model Display Create Model View Add BAPI Add Message Type

Distribution Model	Description/Technical Name	Business Object
Model Views		
ALE_SYNC	ALE_SYNC . No short text exists	
CRM Scenarios	CRMSZ	
Customizing Data Synchronization	CONTRLDATA	
Example of MM contract distribution (filtering at header k	MM-PUR1	
Example of MM contract distribution (filtering at item lev	MM-PUR2	
Example of distributing test settings	QM-CONTR	
HR <-> FI Scenario	HRFICOUPLI	
Internet Scenarios	INTERNET	
Logistics Scenarios	LOGISTICS	
Master Data Distribution (MDM)	MASTERDATA	
ZVCAPMODEL	ZVCAPMODEL	
Logical system for client 100	LNDCLNT100	
Logical system for client 200	LNDCLNT200	
MATMAS	Material master	
No filter set		

Tcode – BD64
Sender Logical System – LNDCLNT100
Receiver Logical System – LNDCLNT200
Message Type – MATMAS

Ports



You specify the technical characteristics of the link between the SAP System and the other system in the port definition.

The following port types are supported:

- Transactional RFC
- File
- XML File

We can create PORTS in Tcode WE21.

The screenshot displays the SAP WE21 'Ports in IDoc processing' interface. The left pane shows a tree structure of ports, with 'ZVPORT5' selected under the 'Transactional RFC' category. The right pane shows the configuration for 'ZVPORT5', including its description 'Port Created by Vandana K', version selection (IDoc rec.types SAP Release 3.0/3.1 or IDoc record types SAP Release 4.x), RFC destination ZRFCV, and processing options.

Port	Description
ZVPORT5	Port Created by Vandana K

Version

☐ IDoc rec.types SAP Release 3.0/3.1

☒ IDoc record types SAP Release 4.x

RFC destination: ZRFCV

Processing Options

☐ Send Only Fields of Segment Version

☐ Use SAP Release of Receiving System in Control Record

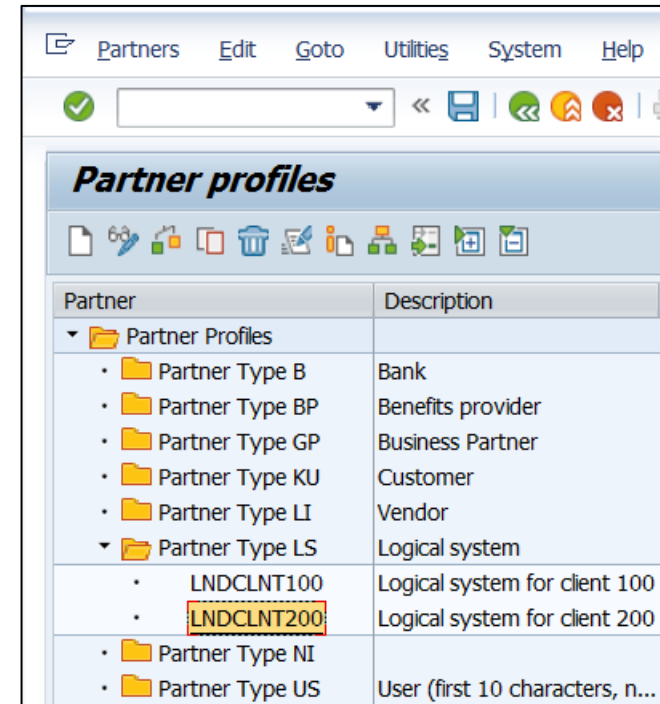
Partner Profiles



The partner profile contains parameters that define the electronic interchange of data with a partner via an IDoc interface.

In SAP, all partners systems involved in a distribution model have a profile. There exist several profile types such as customers profiles, vendors profiles,

In most cases partners profiles are created using a generic Logical System (LS).



TCODE WE20

Partner Profiles



A partner profile is used to determine a lot of important settings that will be involved in the data transfer. These settings vary depending on the role of the partner system (sender / receiver) and are defined per message type.

Partner profiles

Partner No. Logical system for client 200
Partn.Type Logical system

Post processing: permitted agent Classification Telephony

Ty. User
Agent TRAINER1
Lang. English

Outbound parmtrs.

Partner Role	Message type	M...	MessageFun...	Test	Receiver p...	I...	Pa...	Basic type
	MATMAS			<input type="checkbox"/>	ZVPORT5	U	1	MATMAS05
	SYNCH			<input type="checkbox"/>	ZVPORT5	U	100	SYNCHRON

Partner Profiles



Inbound parameter

Partner profiles

Partner: Partner Profiles

- Partner Type B Bank
- Partner Type BP Benefits provider
- Partner Type GP Business Partner
- Partner Type KU Customer
- Partner Type LI Vendor
- Partner Type LS Logical system
 - LNDCINT100** Logical system for client 100
- Partner Type NI User (first 10 chara
- Partner Type US

Partner No. LNDCINT100 Logical system for client 100

Partn.Type LS Logical system

Post processing: permitted agent Classification Telephony

Ty: US User

Agent TRAINER01 TRAINER01

Lang. EN English

Outbound paramtrs:

Partner Role	Message type	Message var...	MessageFun...	Test	Receiver p...	L...	Pa...	Basic type
				<input type="checkbox"/>				
				<input type="checkbox"/>				
				<input type="checkbox"/>				
				<input type="checkbox"/>				
				<input type="checkbox"/>				

Inbound paramtrs:

Partner Role	Message Type	Message var...	MessageFun...	Test	P...	Process code
	MATHAS			<input type="checkbox"/>		*MATH

Partner Profiles -Inbound



The following settings are specified in the inbound parameters :

- The Process code that invokes the posting function module and creates the document.
- Whether the IDoc should be triggered immediately or should be triggered by a background program.

Partner profiles: Inbound parameters

Partner No. Logical system for client 100
Partn.Type Logical system
Partner Role

Message type Material master
Message code
Message function ☐ Test

Inbound options | Post processing: permitted agent | Telephony

Process code MATMAS: Material master data
☐ Cancel Processing After Syntax Error

Processing by Function Module
☐ Trigger by background program
☒ Trigger Immediately

Display View "Process codes, inbound": Details

68 ◀ ▶ 📄 Var. List ➡

Process code
Description

Identification

Option ALE
☒ Processing with ALE service
☐ Processing w/o ALE service

Processing type
☐ Processing by task
☒ Processing by function module
☐ Processing by process



Process Codes are used to identify the function module or API (Application Programming Interface) to be invoked for subsequent processing (Outbound or Inbound) of the business application.

Outbound process code - Outbound process code under Message Control, generated the IDoc in the IDoc Interface. The process code determines the relevant function module. (TCode – WE41)

Inbound process Code - names the function module or workflow which reads the IDoc data and transfers the data to the application document. (TCode – WE42)

Outbound process codes are stored in table TEDE1, while inbound process codes are stored in TEDE2

Partner Profile – Outbound



For a receiver partner system (outbound parameters are filled in), following settings are specified in the partner profile:

The receiver port to which the data will be sent.

The sending method: one IDoc at a time or by packets.

The IDoc type that will be sent to that partner. For a given message type, the IDoc type sent may vary depending on the receiver system.

Partner profiles: Outbound parameters

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Partner No. Logical system for client 200
Partn.Type Logical system
Partner Role

☐ Message Type Material master
Message code
Message function ☐ Test

Outbound Options **Message Control** **Post Processing: Permitted Agent** **Telephony**

Receiver port ☐ Transactional RFC Port Created by Vandana K
Pack. Size
☐ Queue Processing

Output Mode
☒ Pass IDoc Immediately ☐ Collect IDocs Output Mode 2

IDoc Type
Basic type Enhancement: Distribution of ...
Extension
View
☐ Cancel Processing After Syntax Error
Seg. release in IDoc type Segment Appl. Rel.

List IDoc using WE09, We can search with the help of Segment / Field values

Program Edit Goto System Help

IDoc Search for Business Content

Data Source...

Criteria for Search in Control Records

Created At	00:00:00	to	24:00:00	[Icon]
Created On	18.02.2017	to	27.02.2017	[Icon]
Last Changed At	00:00:00	to	24:00:00	[Icon]
Last Changed On		to		[Icon]
Direction (1=Outb., 2=Inb.)		to		[Icon]
IDoc Number		to		[Icon]
Current Status		to		[Icon]
Basic Type		to		[Icon]
Enhancement		to		[Icon]
Logical Message		to		[Icon]
Port of Sender		to		[Icon]
Partner Type of Sender		to		[Icon]
Partner Number of Sender		to		[Icon]
Port of Receiver		to		[Icon]
Partner Type of Receiver		to		[Icon]
Partner Number of Receiver		to		[Icon]

Fast Search Mode

☒ Max. One Segment per IDoc

Criteria for Search in Data Records

Search in Segment ...	
Search in Field ...	
for Value ...	
and Search in Field ...	
for Value ...	

[illegible]

Demo: IDoc Monitoring using WE09



Demo: IDoc Monitoring using WE02



Inbound and Outbound Status



Outbound IDocs:	
Status	Description of Status
03, 12, 38	IDoc successfully transferred
02, 04, 05, 25 26, 29	Processing error
30	Waiting status (still processing...)
>=50	Inbound IDoc (not relevant in this context)
Other	Not relevant in this context
Inbound IDocs:	
Status	Description of Status
53	IDoc successfully updated by application
64	Waiting status (still processing...)
<50	Outbound IDoc (not relevant in this context)
51, 56, 60, 61, 63, 65	Inbound error
Other	Not relevant in this context



Status Monitor for ALE Messages can be seen using TCode – BD87

If any error is seen in IDoc processing status in ALE layer, we can rectify the error and reprocess the communication idoc rather than triggering the application transaction repeatedly .

Demo: ALE Monitoring using BD87





- You can use the test tool to generate an IDoc manually and send the IDoc for either inbound or outbound processing.

Demo: WE19





- TCode WE60 is used for Documentation for IDoc types.

Demo: WE60





- Tcode WEDI is the workbench for EDI development.

Demo: WEDI



Summary of TCodes



- **SALE (Building Road) and is part of distribution layer in ALE**
- **Logical Systems** (TCode – SALE)
- **Clients (Appln.Systems) involved in data exchange** (TCode – SALE)
- **RFC Connections** (TCode – SM59)
- **Distribution Model** (TCode – BD64)
- **Message Type** (TCode – WE81)
- **Partners & Partner Profiles** (TCode – WE20)
- **Ports** (TCode – WE21)
- **IDOC Type** (TCode – WE30)
- **IDOC Segment** (TCode – WE31)
- **Messages / Message Type** (TCode – WE81)
- **IDOC + Message Type** (TCode – WE82)
- **IDOC Monitoring** (TCode – WE02)
- **ALE Monitoring** (TCode – BD87)
- **Testing Tool** (TCode – WE19)
- **Documentation** (TCode – WE60)
- **Area Menu** (Tcode - WEDI)

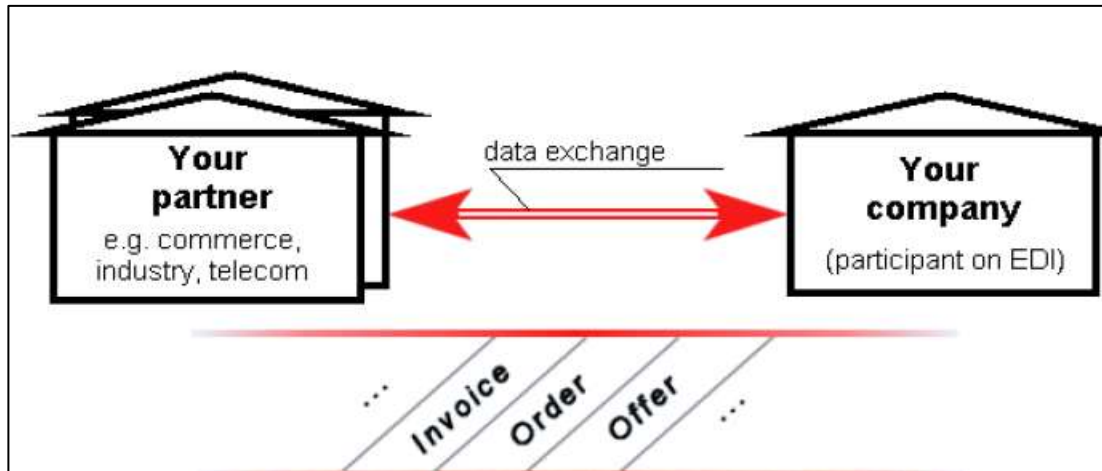


- The IDoc Interface supports three types of data flow with the external system.
- Outbound processing - Idocs are transferred to a receiving system from the SAP System.
- Inbound processing - Idocs are transferred to the SAP System from a sender system.
- Status processing - The follow-on system confirms the processing status of outbound Idocs to the SAP System.

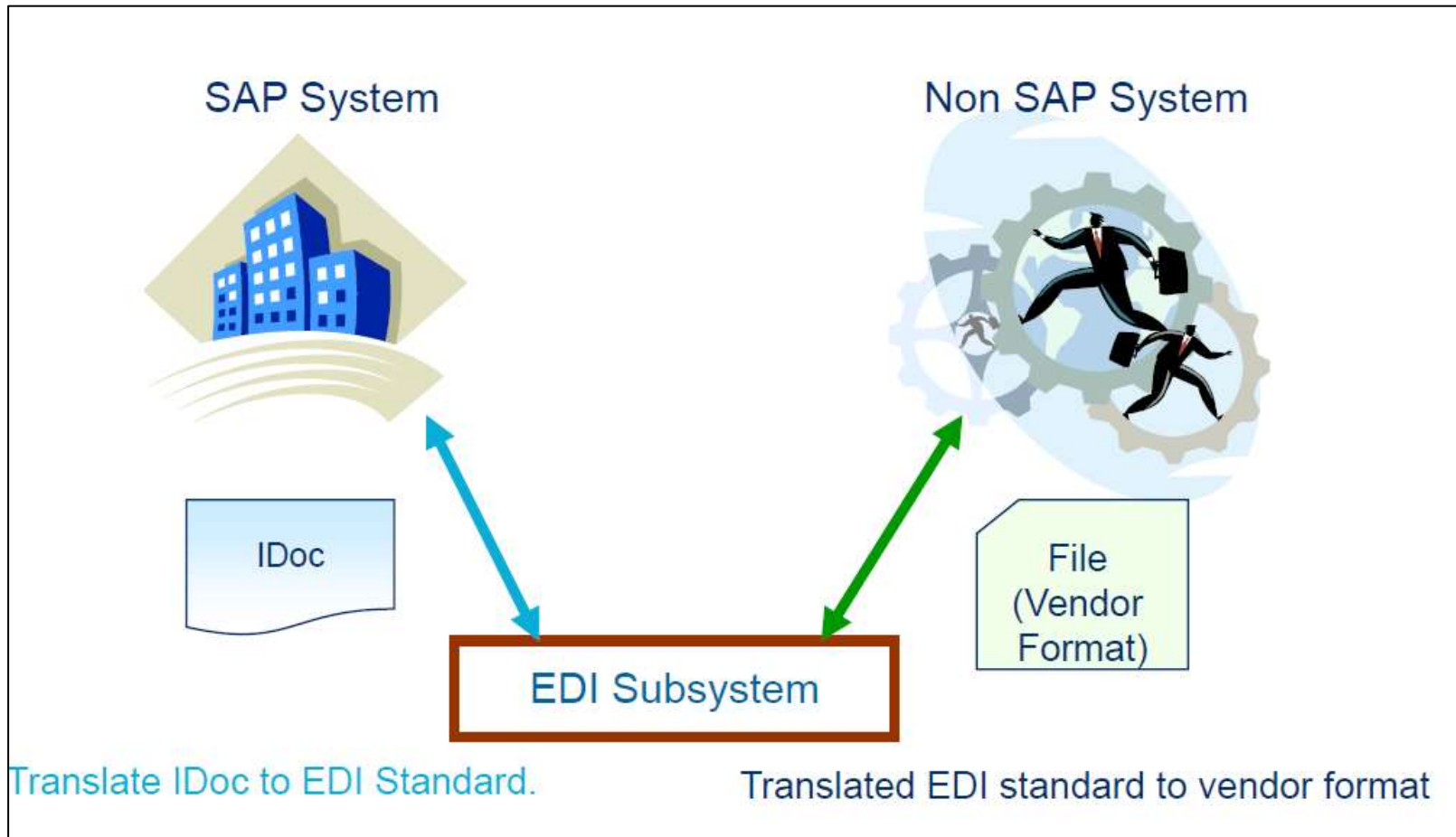
Typical EDI Scenario



- What does EDI mean ?
- EDI (Electronic Data Interchange) means exchange of business documents among companies using electronic communication systems. Trading partners - The parties who exchange EDI transmissions.



EDI (Electronic Data Interchange)



EDI (Electronic Data Interchange)



- EDI is a standard format for exchanging business data between any 2 systems on different networks .
- In case of SAP , Idocs from SAP can be converted to EDI format. This is useful and is widely used for communication with customers and vendors (non-SAP) who do not understand Idoc format .
- EDI subsystem is needed for communication between 2 systems. This translates the data into standard EDI format that is understood by receiver / sender system.
- EDI uses either ANSI X12 or EDIFACT as standard formats in the data exchange.
- In SAP communicating partners are not defined as logical systems for EDI. They have partner types like KU-Customer, LI-Vendor etc...which uses a file port.



- The main difference occurs at the communication Level.
- EDI process transmits IDocs to an EDI subsystem using flat file format.
- The ALE process transmits IDocs to an SAP system via memory using Asynchronous communication. No need for subsystem.

Summary



In this lesson, you have learnt:

- The concept of ALE and IDocs.
- IDoc structure and its role in Data communication
- Basic Outbound Processing of IDoc.
- Basic Inbound Processing of IDoc.
- What is EDI



Review Question



Question 1: The _____ is used for Documentation for IDoc types.

Question 2: _____ is TCode that is used for all ALE customizing .

