

Втор колоквиум -решени

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Time left 0:07:29

Question 7
Answer saved
Marked out of 4.00

При SOA интеграцијата неопходно е препишување на кодот и реинтегрирање на постоечките функционалности при секој нов развој.

When using SOA integration, it is necessary to rewrite the code and reintegrate the existing functionalities with each new development project.

Select one:

True
 False

1.

False

2.

A, c, d

Lower computer costs, Improved performance, Reduced software costs, Instant software updates, Improved document format compatibility, Unlimited storage capacity, **Increased data reliability**, Universal document access, Latest version availability, **Easier group collaboration**, **Device independence**, Requires a constant Internet connection, Does not work well with low-speed connections, Features might be limited

3.

A, e

Quiz navigation

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Finish attempt ...
Time left 0:07:21

Question 9
Answer saved
Marked out of 4.00

ERP major features and modules / ERP главни карактеристики и модули 2

Select one or more:

a. Inventory and Procurement / Инвентар и набавки
 b. Supply Chain Management / Менаџмент на снабдувачки синџири
 c. Vector graphics / векторска графика
 d. IT Helpdesk / IT Поддршка
 e. Order Processing / Обработка на нарачки

Human resources, CRM, Finance and accounting, eCommerce, IT Helpdesk, upply Chain Management, **Order Processing, Inventory and Procurement**, Marketing automation, Professional Services Automation, Manufacturing

Quiz navigation

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Finish attempt ...

Time left 0:07:13

Question 11
Answer saved
Marked out of 6.00
[Flag question](#)

Со која од наведените акции можеме да направиме Deployment на една .NET Core апликација во Visual Studio / With which of the following actions can we Deploy a .NET Core application in Visual Studio?

Select one:

a. Distribute
 b. Export
 c. Publish
 d. Run & Deploy

[Clear my choice](#)

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4.

C

20/2021/L-38_30652 / Втор колоквиум / Second partial exam / Термин 2 / Term 2

Question 15
Not yet answered
Marked out of 6.00
[Flag question](#)

Кои од наведените параметри треба да бидат влезни параметри на Back-End акцијата за изведување на електронска наплата со помош на Stripe сервисот за електронски наплати / Which of the following parameters should be the input parameters of the Back-End action for performing electronic payment using Stripe?

Select one or more:

a. Email - преку кој се прави електронската наплата / Email - through which the electronic payment is made
 b. CustomerId - идентификациски број на корисникот / CustomerId - user identification number
 c. Token - за автентикација и авторизација / Token - for authentication and authorization
 d. Total Price - вкупната сума за наплата / Total Price - the total amount to be paid

5.

?

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Question 5
Not yet answered
Marked out of 4.00
[Flag question](#)

Hybrid cloud

A hybrid cloud environment consists of some portion of computing resources on-site (on-premise) and off-site (public cloud). By integrating public cloud services, users can leverage cloud solutions for specific functions that are too costly to maintain on-premise such as virtual server disaster recovery, backups and test/development environments.

Хибриден облак

Хибриден облак се состои од дел од компјутерските ресурси на самото место (на локација) и надвор од локацијата (јавен облак). Со интегрирање на јавни облачни услуги, корисниците можат да користат решенија за облак за специфични функции кои се премногу скапи за одржување на претходната просторија, како што се наплата на катастрофи на виртуелниот сервер, резервни копии и средини за тестирање / развој.

Select one:

True
 False

6.

True

Question 3
Not yet answered
Marked out of 4.00

Кое од следните НЕ е улога во SOA
Which of the following is NOT a role in SOA

Select one:

a. Requestor
 b. Consumer
 c. Registry or Broker
 d. Provider

7.
b

Улоги: Provider, Registry or Broker, Requestor

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Question 4
Not yet answered
Marked out of 4.00

Микросрвисите се апликациски, а SOA е интеграциски архитектурен стил.
Microservices are application, while SOA is integration architecture style.

Select one:

True
 False

8.
False

Question 7
Not yet answered
Marked out of 4.00

ERP major features and modules / ERP главни карактеристики и модули 3

Select one or more:

a. Professional Services Automation / Автоматизација на професионални услуги
 b. Vector animation / Векторска анимација
 c. Marketing automation / Маркетинг автоматизација
 d. Manufacturing / Производство

9. c,d
Human resources, CRM, Finance and accounting, eCommerce, IT Helpdesk, upply Chain Management, Order Processing, Inventory and Procurement, **Marketing automation**, Professional Services Automation, **Manufacturing**

Question 8
Not yet answered
Marked out of 4.00

What is ERP? / Што е ERP?

Select one or more:

- a. Combines all databases across departments into a single database that can be accessed by all employees. / Ги комбинира сите бази на податоци во одделите во единствена база на податоци до која можат да пристапат сите вработени.
- b. ERP solves all inter-personal issues in a company / ERP ги решава сите меѓучовечки проблеми во компанијата
- c. ERP automates the tasks involved in performing a business process / ERP ги автоматизира задачите вклучени во извршувањето на деловниот процес
- d. The practice of consolidating an enterprise's planning, manufacturing, sales and marketing efforts into one management system. / Практика на консолидирање на напорите за планирање, производство, продажба и маркетинг на претпријатието во еден систем за управување.

10.

A, c, d

стеми-2020/2021/L

Question 1
Not yet answered
Marked out of 4.00

ETL е комплексна комбинација од процеси и технологии и не се изведува само еднаш туку континуирано.

ETL is a complex combination of process and technology and is not a one-time event.

Select one:

- True
- False

11.

[◀ Термин 1 / Term 1](#)

◆

True

Question 8
Not yet answered
Marked out of 4.00

Major Reasons for an ERP system: / Главни причини за ERP систем:

Select one or more:

- a. To integrate financial data. / Интегрирање на финансиски податоци.
- b. To standardize HR information / Да се стандардизираат информациите за човечки ресурси
- c. To decrease productivity / Да се намали продуктивноста
- d. To standardize manufacturing processes. / Да се стандардизираат процесите на производство.

12.

A, b, d

Question 7
Not yet answered
Marked out of 4.00

ERP major features and modules / ERP главни карактеристики и модули 3

Select one or more:

- a. Professional Services Automation / Автоматизација на професионални услуги
- b. Marketing automation / Маркетинг автоматизација
- c. Vector animation / Векторска анимација
- d. Manufacturing / Производство

13.

A, b, d

14.

Question 6
Not yet answered
Marked out of 4.00
[Flag question](#)

Disadvantages of Cloud Computing / Недостатоци на Cloud Computing 2

Select one or more:

- a. Realtime access / Постојан пристап
- b. Stored data can be lost / Зачуваните податоци може да се изгубат
- c. Portability / Преносливост
- d. Stored data might not be secure / Зачуваните податоци можеби не се безбедни

B, d

Requires a constant Internet connection, Does not work well with low-speed connections,
Features might be limited, Can be slow, **Stored data might not be secure**, **Stored data can be lost**,
HPC Systems, General Concerns,

ation:
4 5 6
10 11 12
5
t...
:54

Question 5
Not yet answered
Marked out of 4.00
[Flag question](#)

What is the result in computing resources with the traditional infrastructure model and forecasted infrastructure demand? / Каков е резултатот во пресметување на ресурсите со традиционалниот инфраструктурен модел и предвидената побарувачка за инфраструктура?

Select one or more:

- a. Unacceptable deficit / Неприфатлив дефицит
- b. Ideal coverage / Идеално покртие
- c. Cold reserve / Ладна резерва
- d. Unacceptable surplus / Неприфатлив вишок

15.

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Time left 0:34:42

Question 2
Not yet answered
Marked out of 4.00
[Flag question](#)

Извор на големи податоци се исклучиво релационите табели во кои се чуваат оперативните податоци.
Data sources in Big Data are only the relational tables used for operational data storage.

Select one:
 True
 False

16.

False?

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of
tion

Кое од следните НЕ е типична зона за ETL на големи податоци.

Which of the following is NOT a typical big data ETL zone.

Select one:

- a. Danger Zone
- b. Raw Zone
- c. Curated Zone
- d. Cleaned Zone

17.

a

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Finish attempt ...
Time left 0:32:22

Question 5
Not yet
answered
Marked out of
4.00

Hybrid cloud

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Select one:
 True
 False

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18.

True

Question 8
Not yet
answered
Marked out of
4.00

Major Reasons for an ERP system: / Главни причини за ERP систем:

Select one or more:

- a. To integrate financial data. / Интегрирање на финансиски податоци.
- b. To standardize HR information / Да се стандардизираат информациите за човечки ресурси
- c. To decrease productivity / Да се намали продуктивноста
- d. To standardize manufacturing processes. / Да се стандардизираат процесите на производство.

19.

A, b, d

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Finish attempt ...
Time left 0:39:39

Question 2
Not yet answered
Marked out of 4.00
Flag question

Дименсионните табли съдържат исклучиво ключеви и не трябва да съдържат атрибути.
Dimension tables contain only keys and shouldn't contain attributes.

Select one:
 True
 False

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◀ BBB-8

Jump to...



20.

false

Интегрирани системи-2020/2021/L

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15						

Finish attempt ...
Time left 0:36:43

Question 7
Not yet answered
Marked out of 4.00
Flag question

IaaS is the delivery of technology infrastructure as an on demand scalable service

Select one:
 True
 False

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◀ BBB-8

Jump to...



21.

True

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Finish attempt ...
Time left 0:36:29

Question 8
Not yet answered
Marked out of 4.00
Flag question

SaaS is a software delivery methodology that provides licensed multi-tenant access to software and its functions remotely as a Web-based service / SaaS е методология за испорака на софтуер што обезбедува лицензиран мулти-закупец пристап до софтуер и неговите функции од далечина како веб-базирана услуга

Select one:
 True
 False

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◀ BBB-8

Jump to...



22.

true

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Quiz navigation



[Finish attempt ...](#)

Time left 0:20:22

Question 1

Answer saved

Marked out of

4.00

Flag question

ETL алатките се корисни бидејќи не содржат функционалности за чистење на податоците.

ETL tools are useful because they don't contain cleaning functionality.

Select one:

- True
 False

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23.

false

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[Finish attempt ...](#)

Time left 0:19:52

Question 3

Answer saved

Marked out of

4.00

Flag question

Loose Coupling овозможува ефикасна интеракција помеѓу компонентите.

Loose Coupling enables efficient interaction between components.

Select one:

- True
 False

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24.

false

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Time left 0:19:47

Question 5

Not yet answered

Marked out of

4.00

Remove flag

In parallel there has been backlash against cloud computing: / Паралелно, имаше реакција против процесирање во облак:

Select one or more:

- a. Use of cloud computing means dependence on others and that could possibly limit flexibility and innovation / Употребата на компјутерски облак значи зависност од другите и тоа може да ги ограничи флексибилноста и иновативноста
- b. Security could prove to be a big issue / Безбедноста може да се покаже како големо прашање
- c. Do we need computing anywhere, anytime? / Дали ни треба пристап до компјутерски ресурси секогаш и секаде?
- d. What happens if the remote server goes down? / Што се случува ако оддалечениот сервер се расипе?

25.

a, b, d

1
saved
out of
question

Што е ETL?

What is ETL?

Select one:

- a. Environmental Technology Laboratory
- b. Extract, Transform, Load
- c. Early Termination Liability
- d. Electricity Transmission Line

[Clear my choice](#)

26.

B

2
saved
out of
question

Неконзистентните податоци како што е користењето на T/F или 1/0 за истиот тип на вредност се једноставни за корекција и не претставуваат дел од Dirty Data проблемите при ETL.
Inconsistent data such as using T/F or 1/0 for the same data value are easy to correct and don't belong to the group of Dirty Data problems in ETL.

Select one:

- True
- False

27.

B

3
saved
out of
question

Што е ESB во системската интеграција?

What is ESB in System Integration?

Select one:

- a. Easy Service Bus
- b. Electricity Supply Board
- c. Empire Strikes Back
- d. Enterprise Service Bus

[Clear my choice](#)

28.

D

4
saved
out of
question

Loose coupling не бара длабоки познавања за компонентите

Loose coupling doesn't require deep knowledge of the components

Select one:

- True
- False

29.

A

6
saved
out of
question

Business process modeling (BPM) in business process management and systems engineering is the activity of representing processes of an enterprise, so that the current process may be analyzed, improved, and automated. /

Моделирање на деловни процеси (БПМ) во управувањето со деловните процеси и инженерството на системите е активност на претставување на процесите на претпријатието, така што тековниот процес може да се анализира, подобри и автоматизира.

Select one:

- True
- False

30.

A

7
saved
out of
question

A hypervisor, a.k.a. a virtual machine manager/monitor (VMM), or virtualization manager, is a program that allows multiple operating systems to share a single hardware host / Хипервизор, управувач / монитор за виртуелна машина (VMM) или менаџер за виртуализација е програма што им овозможува на повеќе оперативни системи да споделуваат единствен хардверски домакин

Select one:

- True
- False

31.

A

1.

Кои од наведените параметри треба да бидат влезни параметри на Back-End акцијата за изведување на електронска наплата со помош на Stripe сервисот за електронски наплати / Which of the following parameters should be the input parameters of the Back-End action for performing electronic payment using Stripe?

Select one or more:

- a. Token - за автентикација и авторизација / Token - for authentication and authorization
- b. Total Price - вкупната сума за наплата / Total Price - the total amount to be paid
- c. CustomerId - идентификациски број на корисникот / CustomerId - user identification number
- d. Email - преку кој се прави електронската наплата / Email - through which the electronic payment is made

2.

Question 13
Not yet answered
Marked out of 6.00
Flag question

Нека е даден следниот C# модел / Consider the following C# model:

```
public class User
{
    public int Id { get; set; }
    public string FirstName { get; set; }
    public string LastName { get; set; }
    public string Address { get; set; }
    public string PhoneNumber { get; set; }
}
```

Кој од наведените блокови код претставува валиден начин на креирање на листа од инстанци од моделот User. Податоците за секоја од инстанците се преземаат од Excel датотека чија што патека се праќа како аргумент во функцијата / Which of the following blocks of code is a valid way to create a list of instances of the User model. The data for each instance is read from an Excel file whose path is sent as an argument to the function.

Пример од структурата на Excel датотеката е даден во продолжение / An example of an Excel file structure is given below.

	A	B	C	D	E	F	G	H
1	1	UserFirstName1	UserLastName1	UserAddress1	UserPhoneNumber1			
2	2	UserFirstName2	UserLastName2	UserAddress2	UserPhoneNumber2			
3	3	UserFirstName3	UserLastName3	UserAddress3	UserPhoneNumber3			
4								
5								

```
private List<User> getDataFromFile(string fileName)
{
    List<User> list = new List<User>();

    string filePath = $"{Directory.GetCurrentDirectory()}\\files\\{fileName}";

    System.Text.Encoding.RegisterProvider(System.Text.CodePagesEncodingProvider.Instance);

    using(var stream = System.IO.File.Open(filePath, FileMode.Open, FileAccess.Read))
    {
        using(var reader = ExcelReaderFactory.CreateReader(stream))
        {
            while(reader.Read())
            {
                list.Add(new User
                {
                    Id = reader.GetValue(0).ToString(),
                    FirstName = reader.GetValue(1).ToString(),
                    LastName = reader.GetValue(2).ToString(),
                    Address = reader.GetValue(3).ToString(),
                    PhoneNumber = reader.GetValue(4).ToString()
                });
            }
        }
    }
}
```

3.

Question 12

Not yet
answered

Marked out of
6.00

Flag question

Нека е даден следниот C# модел / Consider the following C# model:

```
public class Movie
{
    public int Id { get; set; }
    public string Title { get; set; }
    public List<string> Actors { get; set; }
}
```

Која од наведените претставува валидна имплементација на Index акцијата која што треба да направи export на податоците репрезентирани со овој модел во Word датотека / Which of the following is a valid implementation of the Index action that should export the data represented by this model in a Word file??

Во прилог е даден Word темплетот кој што се користи за генерирање на датотеката / The Word template used to generate a file is given below.

ID	Title	Authors
{{Id}}	{{Title}}	{{ActorList}}

Напомена: Export на Word датотеката се прави со користење на GemBox.Document библиотеката.

Note: Exporting a Word file is done using the GemBox.Document library.

Mislam

O b.

```
public class HomeController : Controller
{
    public IActionResult Index()
    {
        var templatePath = Path.Combine(Directory.GetCurrentDirectory(), "Template.docx");

        var result = new Book
        {
            Id = 1,
            Title = "Movie Name",
            Authors = new List<string>() {
                "Actor 1",
                "Actor 2",
                "Actor 3",
                "Actor 4"
            }
        };

        var document = DocumentModel.MapTemplate(templatePath, result);

        var stream = new MemoryStream();
        document.Save(stream, new DocxSaveOptions());

        return File(stream.ToArray(), new DocxSaveOptions().ContentType, "ExportData.docx");
    }
}
```

4.

Нека е дадена следната Index акција / Consider the following Index action:

```
public class HomeController : Controller
{
    public FileContentResult Index()
    {
        /*
         * Export Code Start
         *
         *
         *
         *
         * Export Code End
        */

        return File(products, contentType, fileName);
    }
}
```

Кои од наведените чекори потребно е да се преземат доколку сакаме да направиме export на податоците во Excel датотека (со помош на ClosedXML библиотеката) / Which of the following steps should be taken if you want to export data to an Excel file (using the ClosedXML library)?

Select one or more:

- a. Креирање на XlWorkbook и XlWorksheet, како и нивно пополнување со податоци / Creating XlWorkbook and XlWorksheet, as well as filling them with data
- b. Инсталација на ClosedXML библиотеката со користење на NuGet Package Manager / Install the ClosedXML library using NuGet Package Manager
- c. Зачувување на креираниот Workbook како „memory stream“ и креирање на FileContentResult инстанца / Saving the created workbook as a “memory stream” and create a FileContentResult instance
- d. Поврзување со сервис за автентикација и авторизација на корисници / Connecting to user authentication and authorization service

Question 10
Not yet
answered
Marked out of
6.00
 Flag question

Нека е даден следниот C# модел / Consider the following C# model:

```
public class Product
{
    public int Id { get; set; }

    public string ProductName { get; set; }

    public string ProductDescription { get; set; }

    public int ProductPrice { get; set; }

    public int Rating { get; set; }
}
```

Кои од следните претставува валидна имплементација на Index акцијата така што ќе се овозможи експорт на записите репрезентирани со овој модел во Excel датотека / Which of the following is a valid implementation of the Index action that will allow the export of records represented by this model in an Excel file.

Напомена: Експорт на Excel датотека се прави со помош на ClosedXML библиотеката.

Note: The export of an Excel file is done using the ClosedXML library.

5.

mislam

a.

```
public IActionResult Index()
{
    string contentType =
        "application/vnd.openxmlformats-officedocument.spreadsheetml.sheet";
    string filename = "authors.xlsx";
    List<Author> products = new List<Author>
    {
        new Author { Id = 1, ProductName = "Product 1",
            ProductDescription = "Description 1", ProductPrice = 100, Rating = 4 },
        new Author { Id = 2, ProductName = "Product 1",
            ProductDescription = "Description 2", ProductPrice = 150, Rating = 3 },
        new Author { Id = 3, ProductName = "Product 1",
            ProductDescription = "Description 3", ProductPrice = 200, Rating = 5 }
    };
    try
    {
        using (var workbook = new XSSFWorkbook())
        {
            IXLUWorksheet worksheet =
                workbook.Worksheets.Add("Authors");
            worksheet.Cell(1, 1).Value = "Id";
            worksheet.Cell(1, 2).Value = "ProductName";
            worksheet.Cell(1, 3).Value = "ProductDescription";
            worksheet.Cell(1, 4).Value = "ProductPrice";
            worksheet.Cell(1, 5).Value = "Rating";

            for (int index = 1; index < products.Count; index++)
            {
                worksheet.Cell(index + 1, 1).Value =
                    products[index - 1].Id;
                worksheet.Cell(index + 1, 2).Value =
                    products[index - 1].ProductName;
                worksheet.Cell(index + 1, 3).Value =
                    products[index - 1].ProductDescription;
                worksheet.Cell(index + 1, 4).Value =
                    products[index - 1].ProductPrice;
                worksheet.Cell(index + 1, 5).Value =
                    products[index - 1].Rating;
            }
            using (var stream = new MemoryStream())
            {
                workbook.SaveAs(stream);
                var content = stream.ToArray();
                return File(content, contentType, filename);
            }
        }
    }
```

6.

Question 9

Not yet
answered

Marked out of
6.00

Flag question

Со која од наведените акции можеме да направиме Deployment на една .NET Core апликација во Visual Studio / With which of the following actions can we Deploy a .NET Core application in Visual Studio?

Select one:

- a. Publish
- b. Distribute
- c. Export
- d. Run & Deploy

7.

Question 14

Not yet
answered

Marked out of
6.00

Flag question

Кој од наведените блокови код потребно е да се користи во погледот (view) на апликацијата со цел да се овозможат сите опции кога ги нуди Stripe сервисот за електронски наплати / Which of the following blocks of code should be used in the view of the application in order to provide all the options offered by the Stripe electronic payment service??

Select one:

- a.

```
<form method="post" asp-action="PayOrder" asp-controller="ShoppingCart">
  <article>
    <script src="https://checkout.stripe.com/checkout.js"></script>
    <button type="submit" class="stripe-button"></button>
  </article>
</form>
```
- b.

```
<form method="post" asp-action="PayOrder" asp-controller="ShoppingCart">
  <article>
    <script src="https://checkout.stripe.com/checkout.js"></script>
  </article>
</form>
```
- c.

```
<form method="post" asp-action="PayOrder" asp-controller="ShoppingCart">
  <article>
    <script src="https://checkout.stripe.com/checkout.js"
      class="stripe-button"
      data-key="@PublicKey"
      data-locale="auto"
      data-description="..."></script>
  </article>
</form>
```

8.

15

out of

question

Од која од наведените класи треба да се креираат инстанци во рамките на Back-End ацијата при изведување на електронска наплата со помош на Stripe сервисот за електронски наплати / From which of the following classes should we create an instance on the Back-End when performing electronic payment with the Stripe electronic payment service?

Select one or more:

- a. CustomerService
- b. StripeService
- c. PaymentService
- d. ChargeService

9.

1. Која од наведените претставува валидна имплементација на Index акцијата која што треба да направи export на податоците репрезентирани со овој модел во PDF датотека.

```

Нека е даден следниот C# модел / Consider the following C# model:
public class Author
{
    public int Id { get; set; }
    public string FirstName { get; set; }
    public string LastName { get; set; }
}

public class Book
{
    public int Id { get; set; }
    public string Title { get; set; }
    public List<Author> Authors { get; set; }
}

Која од наведените претставува валидна имплементација на Index акцијата која што треба да направи export на податоците репрезентирани со овој модел во PDF датотека / Which of the following is a valid implementation of the Index action that should export the data represented by this model in a PDF file?
Во првот е даден Word темплетот кој ишо се користи за генерирање на PDF датотека / The Word template used to generate a PDF file is given below.



| ID     | Title     | Authors         |
|--------|-----------|-----------------|
| ([Id]) | ([Title]) | ([AuthorsList]) |



Напомена: Експорт на PDF датотеката се прави со користење на GemBox.Document библиотеката.
Note: Exporting a PDF file is done using the GemBox.Document library.

Select one:
public class HomeController : Controller
{
    public IActionResult Index()
    {
        var templatePath = Path.Combine(Directory.GetCurrentDirectory(), "Template.docx");

        var result = new Book
        {
            Id = 1,
            Title = "Book Title",
            Authors = new List<Author>()
            {
                new Author
                {
                    Id = 1,
                    FirstName = "AuthorName 1",
                    LastName = "AuthorLastName 1"
                },
                new Author
                {
                    Id = 2,
                    FirstName = "AuthorName 2",
                    LastName = "AuthorLastName 2"
                }
            }
        };

        var document = DocumentModel.Load(templatePath);

        document.Content.Replace("{{id}}", result.Id);
        document.Content.Replace("{{title}}", result.Title);

        StringBuilder sb = new StringBuilder();

        foreach (var item in result.Authors)
        {
            sb.AppendLine(item.Id + " - " + item.FirstName + " - " + item.LastName);
        }

        document.Content.Replace("{{AuthorsList}}", sb.ToString());

        var stream = new MemoryStream();
        document.Save(stream, new PdfSaveOptions());
        return File(stream.ToArray(), new PdfSaveOptions().ContentType, "ExportData.pdf");
    }
}

```

2. Кој од следните претставува валидна имплементација на Index акцијата така што ќе овозможи export на записите репрезентирани со овој модел на Excel датотека

```

Нека е даден следниот C# модел / Consider the following C# model:
public class Author
{
    public int Id { get; set; }
    public string FirstName { get; set; }
    public string LastName { get; set; }
}

Кој од следните претставува валидна имплементација на Index акцијата така што ќе се овозможи експорт на записите репрезентирани со овој модел во Excel датотека / Which of the following is a valid implementation of the Index action that will allow the export of records represented by this model in an Excel file.
Напомена: Експорт на Excel датотека се прави со помош на ClosedXML библиотеката.
Note: The export of an Excel file is done using the ClosedXML library.

public class HomeController : Controller
{
    public IActionResult Index()
    {
        string contentType =
            "application/vnd.openxmlformats-officedocument.spreadsheetml.sheet";
        string fileName = "authors.xlsx";

        List<Author> authors = new List<Author>
        {
            new Author { Id = 1, FirstName = "Joydip", LastName = "Kanjilal" },
            new Author { Id = 2, FirstName = "Steve", LastName = "Smith" },
            new Author { Id = 3, FirstName = "Anand", LastName = "Harayashwamy" }
        };

        try
        {
            using (var workbook = new XSSFWorkbook())
            {
                IXLSheet worksheet =
                    workbook.Worksheets.Add("Authors");
                worksheet.Cell(1, 1).Value = "Id";
                worksheet.Cell(1, 2).Value = "FirstName";
                worksheet.Cell(1, 3).Value = "LastName";
                for (int index = 1; index < authors.Count; index++)
                {
                    worksheet.Cell(index + 1, 1).Value =
                        authors[index - 1].Id;
                    worksheet.Cell(index + 1, 2).Value =
                        authors[index - 1].FirstName;
                    worksheet.Cell(index + 1, 3).Value =
                        authors[index - 1].LastName;
                }
                using (var stream = new MemoryStream())
                {
                    workbook.SaveAs(stream);
                    var content = stream.ToArray();
                    return File(content, contentType, fileName);
                }
            }
        }
        catch (Exception ex)
        {
        }
    }
}

```

```

public class HomeController : Controller
{
    public IActionResult PayOrder(string stripeEmail, string stripeToken)
    {
        var totalPrice = 150;
        var customerService = new CustomerService();
        var chargeService = new ChargeService();

        var customer = customerService.Create(new CustomerCreateOptions {
            Email = stripeEmail,
            Source = stripeToken
        });

        var payment = chargeService.Create(new ChargeCreateOptions {
            Amount = (Convert.ToInt32(totalPrice) * 100),
            Description = "Payment description",
            Currency = "usd",
            Customer = customer.Id
        });

        if(payment.Status.Equals("succeeded"))
        {
            return RedirectToAction("Index", "Movies");
        }
    }

    return null;
}

```

3.

4. Кој од наведените кодови претставува валиден начин на креирање на листа од инстанци од моделот Author. Податоците за секоја од инстанците се преземаат од Excel датотека чија што патека се праќа како аргумент на функцијата.

	A	B	C	D	E	F	G	H	I
1		1	AuthorName1	AuthorLastName1					
2		2	AuthorName2	AuthorLastName2					
3		3	AuthorName3	AuthorLastName3					
4									
5									
6									

```

one:
private List<Author> getDataFromFile(string fileName)
{
    List<Author> authors = new List<Author>();

    string filePath = $"{Directory.GetCurrentDirectory()}\\files\\{(fileName)}";

    System.Text.Encoding.RegisterProvider(System.Text.CodePagesEncodingProvider.Instance);

    using(var stream = System.IO.File.Open(filePath, FileMode.Open, FileAccess.Read))
    {
        using(var reader = ExcelReaderFactory.CreateReader(stream))
        {
            while(reader.Read())
            {
                authors.Add(new Author
                {
                    Id = reader.GetValue(0).ToString(),
                    FirstName = reader.GetValue(1).ToString(),
                    LastName = reader.GetValue(2).ToString(),
                });
            }
        }
    }

    return authors;
}

```

5. Кој од наведените блокови код претставува валиден начин на креирање на листа од инсанци од моделот User. Податоците за секоја од инстанците се преземаат од Excel датотека чија што патека се праќа како аргумент во функцијата.

Код е даден следниот C# модел / Consider the following C# model:

```

public class User
{
    public int Id { get; set; }
    public string FirstName { get; set; }
    public string LastName { get; set; }
    public string Address { get; set; }
    public string PhoneNumber { get; set; }
}

```

Кој од наведените блокови код претставува валиден начин на креирање на листа од инстанци од моделот User. Податоците за секоја од инстанците се преземаат од Excel датотека чија што патека се праќа како аргумент во функцијата / Which of the following blocks of code is a valid way to create a list of instances of the User model. The data for each instance is read from an Excel file whose path is sent as an argument to the function.

	A	B	C	D	E	F	G	H	I
1		1	UserFirstName1	UserLastName1	UserAddress1	UserPhoneNumber1			
2		2	UserFirstName2	UserLastName2	UserAddress2	UserPhoneNumber2			
3		3	UserFirstName3	UserLastName3	UserAddress3	UserPhoneNumber3			
4									
5									

```

private List<User> getDataFromFile(string fileName)
{
    List<User> list = new List<User>();

    string filePath = $"{Directory.GetCurrentDirectory()}\\files\\{(fileName)}";

    System.Text.Encoding.RegisterProvider(System.Text.CodePagesEncodingProvider.Instance);

    using(var stream = System.IO.File.Open(filePath, FileMode.Open, FileAccess.Read))
    {
        using(var reader = ExcelReaderFactory.CreateReader(stream))
        {
            while(reader.Read())
            {
                list.Add(new User
                {
                    Id = reader.GetValue(0).ToString(),
                    FirstName = reader.GetValue(1).ToString(),
                    LastName = reader.GetValue(2).ToString(),
                    Address = reader.GetValue(3).ToString(),
                    PhoneNumber = reader.GetValue(4).ToString()
                });
            }
        }
    }

    return list;
}

```

6. Кои од следните претставува валидна имплементација на Index акцијата така што ќе овозможи export на записите репрезентирани со овој модел во Excel датотека.

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question

Нека е даден следниот C# модел / Consider the following C# model:

```
public class Author
{
    public int Id { get; set; }
    public string FirstName { get; set; }
    public string LastName { get; set; }
}
```

Кој од следните претставува валидна имплементација на Index акцијата така што ќе се овозможи export на записите репрезентирани со овој модел во Excel датотека / Which of the following is a valid implementation of the Index action that will allow the export of records represented by this model into an Excel file?

Напомена: Експорт на Excel датотека се прави со помош на ClosedXML библиотеката.
Note: The export of an Excel file is done using the ClosedXML library.

Select one:

a.

```
public class HomeController : Controller
{
    public IActionResult Index()
    {
        string contentType =
            "application/vnd.openxmlformats-officedocument.spreadsheetml.sheet";
        string fileName = "authors.xlsx";

        List<Author> authors = new List<Author>
        {
            new Author { Id = 1, FirstName = "Joydip", LastName = "Kanjilal" },
            new Author { Id = 2, FirstName = "Steve", LastName = "Smith" },
            new Author { Id = 3, FirstName = "Anand", LastName = "Narayaswamy" }
        };
    }

    try
    {
        using (var workbook = new XSSFWorkbook(authors))
        {
            using (var stream = new MemoryStream())
            {
                workbook.SaveAs(stream);
                var content = stream.ToArray();
                return File(content, contentType, fileName);
            }
        }
    }
    catch(Exception ex)
    {
        return Error();
    }
}

```

b.

```
public class HomeController : Controller
{
    public IActionResult Index()
    {
        string contentType =
            "application/vnd.openxmlformats-officedocument.spreadsheetml.sheet";
        string fileName = "authors.xlsx";

        List<Author> authors = new List<Author>
        {
            new Author { Id = 1, FirstName = "Joydip", LastName = "Kanjilal" },
            new Author { Id = 2, FirstName = "Steve", LastName = "Smith" },
            new Author { Id = 3, FirstName = "Anand", LastName = "Narayaswamy" }
        };

        try
        {
            using (var workbook = new XSSFWorkbook())
            {
                IXLSheet worksheet =
                    workbook.Worksheets.Add("Authors");
                worksheet.Cell(1, 1).Value = "Id";
                worksheet.Cell(1, 2).Value = "FirstName";
                worksheet.Cell(1, 3).Value = "LastName";
                for (int index = 1; index < authors.Count; index++)
                {
                    worksheet.Cell(index + 1, 1).Value =
                        authors[index - 1].Id;
                    worksheet.Cell(index + 1, 2).Value =
                        authors[index - 1].FirstName;
                    worksheet.Cell(index + 1, 3).Value =
                        authors[index - 1].LastName;
                }
                using (var stream = new MemoryStream())
                {
                    workbook.SaveAs(stream);
                    var content = stream.ToArray();
                    return File(content, contentType, fileName);
                }
            }
        }
    }
}

```

c.

```
public class HomeController : Controller
{
    public IActionResult Index()
    {
        string contentType =
            "application/vnd.openxmlformats-officedocument.spreadsheetml.sheet";
        string fileName = "authors.xlsx";

        List<Author> authors = new List<Author>
        {
            new Author { Id = 1, FirstName = "Joydip", LastName = "Kanjilal" },
            new Author { Id = 2, FirstName = "Steve", LastName = "Smith" },
            new Author { Id = 3, FirstName = "Anand", LastName = "Narayaswamy" }
        };

        try
        {
            using (var workbook = new XSSFWorkbook())
            {
                IXLSheet worksheet =
                    workbook.Worksheets.Add("Authors");
                worksheet.Cell(1, 1).Value = "Id";
                worksheet.Cell(1, 2).Value = "FirstName";
                worksheet.Cell(1, 3).Value = "LastName";
                for (int index = 1; index < authors.Count; index++)
                {
                    worksheet.Cell(index + 1, 1).Value =
                        authors[index - 1].Id;
                    worksheet.Cell(index + 1, 2).Value =
                        authors[index - 1].FirstName;
                    worksheet.Cell(index + 1, 3).Value =
                        authors[index - 1].LastName;
                }
                using (var stream = new MemoryStream())
                {
                    workbook.SaveAs(stream);
                    var content = stream.ToArray();
                    return File(content, contentType, fileName);
                }
            }
        }
    }
}

```

7. Кои од наведените претставува валидна имплементација на Index акцијата која што треба да направи експорт на податоците репрезентирани со овој модел во Word датотека.

Нека е даден следниот C# модел / Consider the following C# model:

```
public class Movie
{
    public int Id { get; set; }
    public string Title { get; set; }
    public List<string> Authors { get; set; }
}
```

Кој од наведените претставува валидна имплементација на Index акцијата која што треба да направи експорт на податоците репрезентирани со овој модел во Word датотека / Which of the following is a valid implementation of the Index action that should export the data represented by this model in a Word file??

Во прилог е даден Word темплт кој што се користи за генерирање на датотека / The Word template used to generate a file is given below.

ID	Title	Authors
[[Id]]	[[Title]]	[[ActorList]]

Напомена: Експорт на Word датотеката се прави со користење на GemBox.Document библиотеката.
Note: Exporting a Word file is done using the GemBox.Document library.

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```
public class HomeController : Controller
{
    public IActionResult Index()
    {
        var templatePath = Path.Combine(Directory.GetCurrentDirectory(), "Template.docx");

        var result = new Book
        {
            Id = 1,
            Title = "Movie Name",
            Authors = new List<string>()
            {
                "Actor 1",
                "Actor 2",
                "Actor 3",
                "Actor 4"
            }
        };

        var document = DocumentModel.MapTemplate(templatePath, result);

        var stream = new MemoryStream();

        document.Save(stream, new DocxSaveOptions());

        return File(stream.ToArray(), new DocxSaveOptions().ContentType, "ExportData.docx");
    }
}
```

8. Кои од следните претставува валидна имплементација на index акцијата така што ќе се овозможи export на записите репрезентирани со овој модел во Excel датотека.

```
public IActionResult Index()
{
    string contentType =
        "application/vnd.openxmlformats-officedocument.spreadsheetml.sheet";
    string filename = "authors.xlsx";
    List<Author> products = new List<Author>
    {
        new Author { Id = 1, ProductName = "Product 1",
            ProductDescription = "Description 1", ProductPrice = 100, Rating = 4 },
        new Author { Id = 2, ProductName = "Product 1",
            ProductDescription = "Description 2", ProductPrice = 150, Rating = 3 },
        new Author { Id = 3, ProductName = "Product 1",
            ProductDescription = "Description 3", ProductPrice = 200, Rating = 5 }
    };
}

try
{
    using (var workbook = new XSSFWorkbook())
    {
        IXLWorksheet worksheet =
            workbook.Worksheets.Add("Authors");
        worksheet.Cell(1, 1).Value = "Id";
        worksheet.Cell(1, 2).Value = "ProductName";
        worksheet.Cell(1, 3).Value = "ProductDescription";
        worksheet.Cell(1, 4).Value = "ProductPrice";
        worksheet.Cell(1, 5).Value = "Rating";

        for (int index = 1; index <= products.Count; index++)
        {
            worksheet.Cell(index + 1, 1).Value =
                products[index - 1].Id;
            worksheet.Cell(index + 1, 2).Value =
                products[index - 1].ProductName;
            worksheet.Cell(index + 1, 3).Value =
                products[index - 1].ProductDescription;
            worksheet.Cell(index + 1, 4).Value =
                products[index - 1].ProductPrice;
            worksheet.Cell(index + 1, 5).Value =
                products[index - 1].Rating;
        }
        using (var stream = new MemoryStream())
        {
            workbook.Save(stream);
            var content = stream.ToArray();
            return File(content, contentType, filename);
        }
    }
}
```

Нека е даден следниот C# модел / Consider the following C# model:

```
public class Product
{
    public int Id { get; set; }

    public string ProductName { get; set; }

    public string ProductDescription { get; set; }

    public int ProductPrice { get; set; }

    public int Rating { get; set; }
}
```

Кои од следните претставува валидна имплементација на Index акцијата тако што ќе се овозможи export на записите репрезентирани со овој модел во Excel датотека / Which of the following is a valid implementation of the Index action that will allow the export of records represented by this model in an Excel file.

Напомена: Export на Excel датотека се прави со помош на ClosedXML библиотеката.
Note: The export of an Excel file is done using the ClosedXML library.

9.
10.

Има неколку грешни одговори

Прв колоквиум

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3-нивоовска архитектура: Middleware е ниво на индиректност помеѓу клиентите и другите слоеви. Кои се функциите на Middleware? / 3-tier architecture: Middleware is a level of indirection between clients and other layers. What are the aims of the Middleware?

Select one or more:

- a. Ги опфаќа логиката за интеграција и логиката за глобална апликација / Encapsulates integration logic and global application logic
- b. Генерира дизајн на предната страна / Generates frontend design
- c. Лоцира ресурси, пристапува до нив и интегрира резултати (посредува помеѓу логиката на апликацијата / слоевите за пристап до податоци) / Locates resources, accesses them, and integrates results (mediates between application logic/data access layers)
- d. Го поедноставува дизајнот на клиентските апликации со намалување на бројот на интерфејси / Simplifies the design of client applications by reducing the number of interfaces

D, A, C

2
d
out of
question

Кои се недостатоците на едно-нивоовската архитектура каде сите слоеви се споени во монолитен ентитет

/

What are the disadvantages of a 1-tier architecture when all layers are bundled in a monolithic entity

Select one or more:

- a. Intertwined code hindering maintenance
- b. Limited scalability due to restrictions in the number of processors
- c. Oftentimes the code is platform specific, limiting portability
- d. Difficult code optimization

B, C, A

3
saved
out of
question

Интеграција од точка до точка - Технички, интеграцијата од точка до точка не е системска интеграција, туку е едноставна врска. Функциите на овие врски се прилично ограничени бидејќи најдобро се користи за поврзување на еден систем или софтвер со друг.

Point-to-Point Integration - Technically, point-to-point integration is not a system integration, but rather a simple connection. The functions of these connections are quite limited as it is best used for linking one system or software to another.

Select one:

- True
- False

A

4
saved
out of
question

Вертикална интеграција / Vertical Integration

Секој подсистем е поврзан со други со слични функции, што создава цилиндрична или „силос“ структура со едноставни процеси на дното, постепено напредувајќи во сложени процеси. Методот на вертикална интеграција е одличен за деловните субјекти на кои им требаат системи поврзани за да обезбедат една функција

Each subsystem is connected to others with similar functions, which creates a cylindrical, or "silo," structure with simple processes at the bottom, gradually progressing to complex processes. The vertical integration method is excellent for businesses that need systems linked to provide one function

Select one:

- True
- False

A

5
saved
out of
question

Процесот на интеграција на податоците го изведува податочен архитект. Процесот ги подобрува работните текови во компанијата, но не ја подобрува соработката и не ги соединува различните ентитети и системи внатре во организацијата / The process of data integration is performed by the data architect. It improves the workflows in the company, but doesn't necessarily improve the collaboration and unification of entities and systems within the organization.

Select one:

- True
- False

B

6
saved
out of
question

Податочните езера може да содржат структурирани и неструктурисани податоци/Data lakes can contain both unstructured and structured data.

Select one:

- a. Неточно/False
- b. Точно/True

[Clear my choice](#)

B

7
saved
out of
question

Управувањето со податоците гарантира дека организацијата ги има обезбедено потребната структура, системот за управување и клиентите, за да се овозможи трансформација на податоците?/Data Governance ensures that the organization has the Structure, Management System and Customers in place to enable data transformation?

Select one:

- True
- False

A

8
saved
out of
question

За вистински да биде ефективен дел од бизнисот, архитектот на податоци треба да ги разбере одговорите на овие прашања/To truly be an effective part of the business, the data architect should understand the answers to these questions:

Select one or more:

- a. Која е нашата фундаментална дејност како бизнис? / What is the thing we should be doing as business fundamentally?
- b. Како ќе го распоредиме нашето решение?/How are we going to deploy our solution?
- c. Која е целта на нашето деловно работење?/What is our business operation's goal?
- d. Што се обидуваме да постигнеме како ентитет?/What are we trying to accomplish as an entity?
- e. Која боја треба да биде интерфејсот со складиштето за податоци?/What colour should the interface to the Data Warehouse be?

D, A, C

9
saved
out of
question

Кои се предностите на пристапот за користење на складиште на податоци за интеграција на податоци? / What are the advantages of data warehousing approach for data integration?

Select one or more:

- a. Врши салишување на трансакции на брз и сигурен начин / Performs writing and transactions in a fast and reliable manner
- b. Информациите се копираат во складиштето / Information is copied at warehouse
- c. Високи перформанси на бањата / High query performance
- d. Се користи како резервна копија за базите на оперативни податоци / Is used as a backup for the operational data bases
- e. Не се меша со локалната обработка на податоци / Doesn't interfere with local processing at data sources

High query performance

Doesn't interfere with local processing at sources

Information copied at warehouse

----OVA SE SITE PREDNOSTI----

10
saved
out of
question

Кое од наведените **не е** проблем при интеграција на податоци: / Which of the following is **not** a data integration issue:

Select one:

- a. Ист податок / различно име // Same Data / Different Name
- b. Исто име / различен податок // Same Name / Different Data
- c. Ист податок / Различни клучеви // Same Data / Different Keys
- d. Податоци кои ги има само на едно место и никаде на друго место // Data found in only one store and nowhere else
- e. Сите горенаведени се проблеми при интеграција на податоците // All of the above are data integration issues.

[Clear my choice](#)

E

11

saved

out of

question

Кои од наведените претставуваат валидни начини за пренос на податоци од контролер (controller) до поглед (view) / Which of the following are valid ways to transfer data from controller to view?

Select one or more:

- a. Со користење на „cookies”/ Using a cookies
- b. Со користење на модел објект / Using model object
- c. Со користење на сесиска променлива / Using a session variable
- d. Со користење на ViewData / Using ViewData

D, C

Нека е даден C# модел како на сликата / Consider the following C# model:

```
3 references | 0 changes | 0 authors, 0 changes
public class Book
{
    2 references | 0 changes | 0 authors, 0 changes
    public string Name { get; set; }
    2 references | 0 changes | 0 authors, 0 changes
    public double Price { get; set; }

    1 reference | 0 changes | 0 authors, 0 changes
    public Book(string name, double price)
    {
        Name = name;
        Price = price;
    }
}

3 references | 0 changes | 0 authors, 0 changes
public class Library
{
    2 references | 0 changes | 0 authors, 0 changes
    public string Name { get; set; }
    2 references | 0 changes | 0 authors, 0 changes
    public string Address { get; set; }
    3 references | 0 changes | 0 authors, 0 changes
    public List<Book> Books { get; set; }
}
```

Кои од наведените блокови код претставуваат валиден начин за приказ на податоците претставени со дадениот модел / Which of the following blocks of code is a valid way to display the data presented with the given model?

Select one or more:

<input checked="" type="checkbox"/> a.	<pre>@model EShopAdminApplication.Models.Library <html> <body> <h1> Name: @Model.Name </h1> <p> Address: @Model.Address </p> <p>Available Books:</p> @for (int i = 0; i < Model.Books.Count; i++) { @Model.Books[i].Name - @Model.Books[i].Price } </body> </html></pre>	<input type="checkbox"/> c.	<pre>@model EShopAdminApplication.Models.Library <html> <body> <h1> Name: @Model.Name </h1> <p> Address: @Model.Address </p> <p>Available Books:</p> @Model.Book.Name - @Model.Book.Price </body> </html></pre>
<input checked="" type="checkbox"/> b.	<pre>@model EShopAdminApplication.Models.Library <html> <body> <h1> Name: @Model.Name </h1> <p> Address: @Model.Address </p> <p>Available Books:</p> @foreach (var book in Model.Books) { @book.Name - @book.Price } </body> </html></pre>	<input type="checkbox"/> d.	<pre>@model EShopAdminApplication.Models.Library <html> <body> <h1> Name: @Model.Name </h1> <p> Address: @Model.Address </p> <p>Available Books:</p> @for (var book in Model.Books) { @book.Name - @book.Price } </body> </html></pre>

A, B

- 13
saved
out of
five flag

Кои од наведените акции потребно е да се превземат доколку се направи промена во некој модел и истите промени сакаме да ги аплицираме во соодветната табела во базата на податоци / Which of the following actions needs to be taken we change a model and we want to apply the same changes in the appropriate table in the database?

Select one or more:

- a. Remove-Migration TestMigration
- b. Add-Migration TestMigration
- c. Update-Database
- d. Enable-Migrations

A, B, C

- 14
saved
out of
one question

Нека е даден следниот C# модел / Consider the following C# model

```
public class Student
{
    0 references | 0 changes | 0 authors, 0 changes
    public string FirstName { get; set; }
    0 references | 0 changes | 0 authors, 0 changes
    public string LastName { get; set; }
    0 references | 0 changes | 0 authors, 0 changes
    public string Index { get; set; }
}
```

Кој од наведените изрази е потребно да го користиме доколку сите 3 свойства на моделот треба да се задолжителни / Which of the following expressions do we need to use if all 3 properties of the model need to be mandatory?

Select one:

- a. [Necessary]
- b. Ниту едно од наведените / None of the listed
- c. [Required]
- d. [Mandatory]

[Clear my choice](#)

C

- 15
aved
out of
one question

Кое од наведените тврдења е точно / Which of the following is TRUE?

Select one:

- a. Методот кој што репрезентира акција мора да биде јавен (public) во класата наменета за контролер / Action method must be public method in a controller class.
- b. Методот кој што репрезентира акција може да биде заштитен (protected) во класата наменета за контролер / Action method can be protected method in a controller class.
- c. Методот кој што репрезентира акција може да биде приватен (private) во класата наменета за контролер / Action method can be private method in a controller class.
- d. Методот кој што репрезентира акција може да биде статички (static) во класата наменета за контролер / Action method can be static method in a controller class.

[Clear my choice](#)

A

16

solved

out of

question

Нека е даден C# модел како на сликата / Consider the following C# model:

```
3 references | 0 changes | 0 authors, 0 changes
public class Book
{
    2 references | 0 changes | 0 authors, 0 changes
    public string Name { get; set; }
    2 references | 0 changes | 0 authors, 0 changes
    public double Price { get; set; }

    1 reference | 0 changes | 0 authors, 0 changes
    public Book(string name, double price)
    {
        Name = name;
        Price = price;
    }
}

3 references | 0 changes | 0 authors, 0 changes
public class Library
{
    2 references | 0 changes | 0 authors, 0 changes
    public string Name { get; set; }
    2 references | 0 changes | 0 authors, 0 changes
    public string Address { get; set; }
    3 references | 0 changes | 0 authors, 0 changes
    public List<Book> Books { get; set; }
}
```

Кои од наведените блокови код претставува валидна акција која враќа поглед(view) со податоци за наведениот модел / Which of the following blocks of code is a valid action that returns a view with data for the specified model?

Select one or more:

```
public IActionResult Index()
{
    var item = new Library();
    item.Name = "Library Name";
    item.Address = "Library Address";
    item.Books = new List<Book>();

    a. for (int i = 0; i < 10; i++)
    {
        item.Books.Add(new Book("BookName" + (i + 1), 100 + i));
    }

    return View(item);
}
```

```
public IActionResult Details()
{
    b. return View(new ErrorViewModel {
        RequestId = Activity.Current?.Id ?? HttpContext.TraceIdentifier
    });
}
```

```
public IActionResult Index()
{
    var item = new Library();

    c. return View(item);
}
```

```
public IActionResult Index()
d. {
    return View(item);
}
```

A

17
saved
out of
question

Кои од наведените претставуваат предности кои се добиваат при користење на „Onion Architecture” / Which of the following are the benefits of using „Onion Architecture”?

Select one or more:

- a. Сите наведени / All listed
- b. Овозможува развој на „loosely coupled“ апликации / Provides development of "loosely coupled" applications
- c. Овозможува подобра одржливост на софтверот / Provides better software maintainability
- d. Овозможува развој на монолитни апликации / Provides development of monolithic applications

B, C

18
d
out of
question

Доколку имаме апликација изградена по принципот на „Onion Architecture”, на кој слој припаѓа дадениот код? / If we have an application built on the principle of “Onion Architecture”, which layer should contain the given code?

```
public class Student
{
    0 references | 0 changes | 0 authors, 0 changes
    public string FirstName { get; set; }
    0 references | 0 changes | 0 authors, 0 changes
    public string LastName { get; set; }
    0 references | 0 changes | 0 authors, 0 changes
    public string Index { get; set; }
}
```

Select one:

- a. Service Layer
- b. Domain Entities Layer
- c. Repository Layer
- d. Web/UI Layer

B

19
saved
out of
question

Што претставува Middleware / What is Middleware?

Select one:

- a. Компонента што ги распоредува сите испратени барања / A component that schedules all sent requests
- b. Ниту едно од наведените / None of the listed
- c. Компонента што се извршува на секое испратено барање / A component that executes on each sent request
- d. Компонента која што овозможува поврзување со база на податоци / A component that provides a connection to a database

[Clear my choice](#)

B

20
saved
out of
question

Кои од наведените акции потребно е да се извршат доколку сакаме да овозможиме користење на NLog библиотеката во нашата апликација / Which of the following actions need to be performed if we want to enable the use of the NLog library in our application?

Select one or more:

- a. Поставување на иницијална NLog конфигурација / Set up the initial NLog configuration
- b. Инсталација на NLog Target библиотеката од „NuGet Package Manager“ / Install the latest NLog Target from NuGet Package Manager
- c. Инсталација на NLog библиотеката од „NuGet Package Manager“ / Install the latest NLog from NuGet Package Manager
- d. Сите наведени / All listed

A, C

Втор колоквиум

1
saved
out of
question

Што е ETL?

What is ETL?

Select one:

- a. Environmental Technology Laboratory
- b. Extract, Transform, Load
- c. Early Termination Liability
- d. Electricity Transmission Line

[Clear my choice](#)

B

2
saved
out of
question

Неконсистентните податоци како што е користењето на T/F или 1/0 за истиот тип на вредност се едноставни за корекција и не претставуваат дел од Dirty Data проблемите при ETL.
Inconsistent data such as using T/F or 1/0 for the same data value are easy to correct and don't belong to the group of Dirty Data problems in ETL.

Select one:

- True
- False

B

3
saved
out of
done flag

Што е ESB во системската интеграција?

What is ESB in System Integration?

Select one:

- a. Easy Service Bus
- b. Electricity Supply Board
- c. Empire Strikes Back
- d. Enterprise Service Bus

[Clear my choice](#)

D

4
saved
out of
question

Loose coupling не бара длабоки познавања за компонентите
Loose coupling doesn't require deep knowledge of the components

Select one:

- True
- False

A

5
saved
out of
question

ERP major features and modules / ERP главни карактеристики и модули 2

Select one or more:

- a. Inventory and Procurement / Инвентар и набавки
- b. IT Helpdesk / IT Поддршка
- c. Order Processing / Обработка на нарачки
- d. Supply Chain Management / Менаџмент на снабдувачки синџери
- e. Vector graphics / векторска графика

Human Resources

CRM

Finance and accounting

eCommerce

IT Helpdesk

Supply chain management

Order processing

Inventory and procurement

Marketing automation

Professional Services Automation

Manufacturing

--OVA SE SITE--

6
Saved
out of
question

Business process modeling (BPM) in business process management and systems engineering is the activity of representing processes of an enterprise, so that the current process may be analyzed, improved, and automated. /
Моделирање на деловни процеси (БПМ) во управувањето со деловните процеси и инженерството на системите е активност на претставување на процесите на претпријатието, така што тековниот процес може да се анализира, подобри и автоматизира.



Select one:
 True
 False

A

7
Saved
out of
question

A hypervisor, a.k.a. a virtual machine manager/monitor (VMM), or virtualization manager, is a program that allows multiple operating systems to share a single hardware host / Хипервизор, управувач / монитор за виртуелна машина (VMM) или менаџер за виртуализација е програма што им овозможува на повеќе оперативни системи да споделуваат единствен хардверски домакин

Select one:
 True
 False

A

8
Saved
out of
question

Advantages of Cloud Computing / Предности на Cloud Computing 3

Select one or more:
 a. Latest version availability / Достапност на најнова верзија
 b. Device independence / Независност на уредот
 c. Easier group collaboration / Погодна групна соработка
 d. Increased data reliability / Зголемена веродостојност на податоците
 e. Reduced data security / Намалена безбедност на податоците

Instant software updates

Improved document format compatibility

Unlimited storage capacity

Increased data reliability

Universal document access

Latest version availability

Easier group collaboration

Device independence

--OVA SE SITE--

9
saved
out of
question

Со која од наведените акции можеме да направиме Deployment на една .NET Core апликација во Visual Studio / With which of the following actions can we deploy a .NET Core application in Visual Studio?

Select one:

- a. Compile
- b. Publish
- c. Deploy
- d. CleanUp

[Clear my choice](#)

B

10
saved
out of
question

Нека е дадена следната Index акција / Consider the following Index action:

```
public class HomeController : Controller
{
    public _____ Index()
    {
        /*
         * Export Code Start
         *
         *
         *
         *
         * Export Code End
        */

        return File(products, contentType, fileName);
    }
}
```

Кој од наведените може да биде типот кој што го враќа акцијата (return type), доколку сакаме да направиме export на Excel датотека / Which of the following can be the return type of the action if you want to export data to an Excel file?

I
Select one or more:

- a. IActionResult
- b. File
- c. FileContentResult
- d. FileResult

A

Нека е даден следниот C# модел / Consider the following C# model:

```
public class Author
{
    public int Id { get; set; }
    public string FirstName { get; set; }
    public string LastName { get; set; }
}
```

Кои од следните претставува валидна имплементација на Index акцијата така што ќе се овозможи експорт на записите репрезентирани со овој модел во Excel датотека / Which of the following is a valid implementation of the Index action that will allow the export of records represented by this model in an Excel file.

Напомена: Експорт на Excel датотека се прави со помош на ClosedXML библиотеката.
Note: The export of an Excel file is done using the ClosedXML library.

Select one:

a.

```
public class HomeController : Controller
{
    public IActionResult Index()
    {
        string contentType =
            "application/vnd.openxmlformats-officedocument.spreadsheetml.sheet";
        string fileName = "authors.xlsx";

        List<Author> authors = new List<Author>
        {
            new Author { Id = 1, FirstName = "Joydip", LastName = "Kanjilal" },
            new Author { Id = 2, FirstName = "Steve", LastName = "Smith" },
            new Author { Id = 3, FirstName = "Anand", LastName = "Narayaswamy" }
        };

        try
        {
            using (var workbook = new XLWorkbook(authors))
            {
                using (var stream = new MemoryStream())
                {
                    workbook.SaveAs(stream);
                    var content = stream.ToArray();
                    return File(content, contentType, fileName);
                }
            }
        catch(Exception ex)
        {
            return Error();
        }
    }
}
```

b.

```
public class HomeController : Controller
{
    public IActionResult Index()
    {
        string contentType =
            "application/vnd.openxmlformats-officedocument.spreadsheetml.sheet";
        string fileName = "authors.xlsx";

        List<Author> authors = new List<Author>
        {
            new Author { Id = 1, FirstName = "Joydip", LastName = "Kanjilal" },
            new Author { Id = 2, FirstName = "Steve", LastName = "Smith" },
            new Author { Id = 3, FirstName = "Anand", LastName = "Narayaswamy" }
        };

        return File(authors, contentType, fileName);
    }
}
```

c.

```
public class HomeController : Controller
{
    public IActionResult Index()
    {
        string contentType =
            "application/vnd.openxmlformats-officedocument.spreadsheetml.sheet";
        string fileName = "authors.xlsx";

        List<Author> authors = new List<Author>
        {
            new Author { Id = 1, FirstName = "Joydip", LastName = "Kanjilal" },
            new Author { Id = 2, FirstName = "Steve", LastName = "Smith" },
            new Author { Id = 3, FirstName = "Anand", LastName = "Narayaswamy" }
        };

        try
        {
            using (var workbook = new XLWorkbook())
            {
                IXLWorksheet worksheet =
                    workbook.Worksheets.Add("Authors");
                worksheet.Cell(1, 1).Value = "Id";
                worksheet.Cell(1, 2).Value = "FirstName";
                worksheet.Cell(1, 3).Value = "LastName";
                for (int index = 1; index <= authors.Count; index++)
                {
                    worksheet.Cell(index + 1, 1).Value =
                        authors[index - 1].Id;
                    worksheet.Cell(index + 1, 2).Value =
                        authors[index - 1].FirstName;
                    worksheet.Cell(index + 1, 3).Value =
                        authors[index - 1].LastName;
                }
                using (var stream = new MemoryStream())
                {
                    workbook.SaveAs(stream);
                    var content = stream.ToArray();
                    return File(content, contentType, fileName);
                }
            }
        catch(Exception ex)
        {
            return Error();
        }
    }
}
```

d.

```
public class HomeController : Controller
{
    public IActionResult Index()
    {
        string contentType =
            "application/vnd.openxmlformats-officedocument.spreadsheetml.sheet";
        string fileName = "authors.xlsx";

        List<Author> authors = new List<Author>
        {
            new Author { Id = 1, FirstName = "Joydip", LastName = "Kanjilal" },
            new Author { Id = 2, FirstName = "Steve", LastName = "Smith" },
            new Author { Id = 3, FirstName = "Anand", LastName = "Narayaswamy" }
        };

        try
        {
            using (var stream = new MemoryStream(authors))
            {
                authors.SaveAs(stream);
                var content = stream.ToArray();
                return File(content, contentType, fileName);
            }
        }
        catch(Exception ex)
        {
            return Error();
        }
    }
}
```

Нека е даден следниот C# модел / Consider the following C# model:

```
public class Author
{
    public int Id { get; set; }
    public string FirstName { get; set; }
    public string LastName { get; set; }
}

public class Book
{
    public int Id { get; set; }
    public string Title { get; set; }
    public List<Author> Authors { get; set; }
}
```

Која од наведените претставува валидна имплементација на Index акцијата која што треба да направи изпорт на податоците репрезентирани со овој модел во PDF датотека / Which of the following is a valid implementation of the Index action that should export the data represented by this model in a PDF file??

Во прилог е даден Word темплтот кој што се користи за генерирање на PDF датотеката / The Word template used to generate a PDF file is given below.

ID	Title	Authors
{{id}}	{{Title}}	{{AuthorsList}}

Напомена: Изпорт на PDF датотеката се прави со користење на GemBox.Document библиотеката.

Note: Exporting a PDF file is done using the GemBox.Document library.

Select one:

```
④ a.
public class HomeController : Controller
{
    public IActionResult Index()
    {
        var templatePath = Path.Combine(Directory.GetCurrentDirectory(), "Template.docx");

        var result = new Book
        {
            Id = 1,
            Title = "Book Title",
            Authors = new List<Author>()
            {
                new Author
                {
                    Id = 1,
                    FirstName = "AuthorName 1",
                    LastName = "AuthorLastName 1"
                },
                new Author
                {
                    Id = 2,
                    FirstName = "AuthorName 2",
                    LastName = "AuthorLastName 2"
                }
            }
        };

        var document = DocumentModel.Load(templatePath);

        document.Content.Replace("{{id}}", result.Id);
        document.Content.Replace("{{Title}}", result.Title);

        StringBuilder sb = new StringBuilder();

        foreach (var item in result.Authors)
        {
            sb.AppendLine(item.Id + " - " + item.FirstName + " - " + item.LastName);
        }

        document.Content.Replace("{{AuthorsList}}", sb.ToString());

        var stream = new MemoryStream();
        document.Save(stream, new PdfSaveOptions());

        return File(stream.ToArray(), new PdfSaveOptions().ContentType, "ExportData.pdf");
    }
}
```

④ b.
public class HomeController : Controller

```
{
    public IActionResult Index()
    {
        var templatePath = Path.Combine(Directory.GetCurrentDirectory(), "Template.docx");

        var result = new Book
        {
            Id = 1,
            Title = "Book Title",
            Authors = new List<Author>()
            {
                new Author
                {
                    Id = 1,
                    FirstName = "AuthorName 1",
                    LastName = "AuthorLastName 1"
                },
                new Author
                {
                    Id = 2,
                    FirstName = "AuthorName 2",
                    LastName = "AuthorLastName 2"
                }
            }
        };

        var document = DocumentModel.MapTemplate(templatePath, result);

        var stream = new MemoryStream();
        document.Save(stream, new PdfSaveOptions());

        return File(stream.ToArray(), new PdfSaveOptions().ContentType, "ExportData.pdf");
    }
}
```

O c.

```
public class HomeController : Controller
{
    public IActionResult Index()
    {
        var templatePath = Path.Combine(Directory.GetCurrentDirectory(), "Template.docx");

        var result = new Book
        {
            Id = 1,
            Title = "Book Title",
            Authors = new List<Author>()
            {
                new Author
                {
                    Id = 1,
                    FirstName = "AuthorName 1",
                    LastName = "AuthorLastName 1"
                },
                new Author
                {
                    Id = 2,
                    FirstName = "AuthorName 2",
                    LastName = "AuthorLastName 2"
                }
            }
        };

        var stream = new MemoryStream();
        document.Save(stream, result);

        return File(stream.ToArray(), new PdfSaveOptions().ContentType, "ExportData.pdf");
    }
}
```

O d.

```
public class HomeController : Controller
{
    public IActionResult Index()
    {
        string contentType =
            "application/vnd.openxmlformats-officedocument.spreadsheetml.sheet";
        string fileName = "authors.xlsx";

        List<Author> authors = new List<Author>
        {
            new Author { Id = 1, FirstName = "Joydip", LastName = "Kanjilal" },
            new Author { Id = 2, FirstName = "Steve", LastName = "Smith" },
            new Author { Id = 3, FirstName = "Anand", LastName = "Narayaswamy" }
        };

        try
        {
            using (var stream = new MemoryStream(authors))
            {
                authors.SaveAs(stream);
                var content = stream.ToArray();
                return File(content, contentType, fileName);
            }
        }
        catch (Exception ex)
        {
            return Error();
        }
    }
}
```

Нека е даден следниот C# модел / Consider the following C# model:

```
public class Author
{
    public int Id { get; set; }
    public string FirstName { get; set; }
    public string LastName { get; set; }
}
```

Кој од наведените блокови код претставува валиден начин на креирање на листа од инстанци од моделот Author. Податоците за секоја од инстанците се преземаат од Excel датотека чија што патека се прда како аргумент во функцијата / Which of the following blocks of code is a valid way to create a list of instances of the Author model. The data for each instance is read from an Excel file whose path is sent as an argument to the function.

Пример од структурата на Excel датотеката е даден во продолжение / An example of an Excel file structure is given below.

	A	B	C	D	E	F	G	H	I
1		1	AuthorName1	AuthorLastName1					
2		2	AuthorName2	AuthorLastName2					
3		3	AuthorName3	AuthorLastName3					
4									
5									
6									

Select one:

```
private List<Author> getDataFromFile(string fileName)
{
    List<Author> authors = new List<Author>();

    string filePath = $"{Directory.GetCurrentDirectory()}\\files\\{fileName}";

    System.Text.Encoding.RegisterProvider(System.Text.CodePagesEncodingProvider.Instance);

    using(var stream = System.IO.File.Open(filePath, FileMode.Open, FileAccess.Read))
    {
        using(var reader = ExcelReaderFactory.CreateReader(stream))
        {
            while(reader.Read())
            {
                authors.Add(new Author
                {
                    Id = reader.GetValue(0).ToString(),
                    FirstName = reader.GetValue(1).ToString(),
                    LastName = reader.GetValue(2).ToString(),
                });
            }
        }
    }

    return authors;
}

private List<Author> getDataFromFile(string fileName)
{
    List<Author> authors = new List<Author>();

    string filePath = $"{Directory.GetCurrentDirectory()}\\files\\{fileName}";

    System.Text.Encoding.RegisterProvider(System.Text.CodePagesEncodingProvider.Instance);

    ModelMapper mapper = new ModelMapper();
    mapper.Map(filePath, authors);

    return authors;
}
```

a.

```
private List<Author> getDataFromFile(string fileName)
{
    List<Author> authors = new List<Author>();

    string filePath = $"{Directory.GetCurrentDirectory()}\\files\\{fileName}";

    System.Text.Encoding.RegisterProvider(System.Text.CodePagesEncodingProvider.Instance);

    using(var reader = ExcelReaderFactory.CreateReader(filePath))
    {
        while(reader.Read())
        {
            authors.Add(new Author
            {
                Id = reader.GetValue(0).ToString(),
                FirstName = reader.GetValue(1).ToString(),
                LastName = reader.GetValue(2).ToString(),
            });
        }
    }

    return authors;
}
```

b.

c.

d.

```
private List<Author> getDataFromFile(string fileName)
{
    List<Author> authors = new List<Author>();

    string filePath = $"{Directory.GetCurrentDirectory()}\\files\\{fileName}";

    System.Text.Encoding.RegisterProvider(System.Text.CodePagesEncodingProvider.Instance);

    while(new File(filePath).Read())
    {
        authors.Add(new Author
        {
            Id = reader.GetValue(0).ToString(),
            FirstName = reader.GetValue(1).ToString(),
            LastName = reader.GetValue(2).ToString(),
        });
    }

    return authors;
}
```

14

Saved
out of

Select one:

- a.

```
<form method="post" asp-action="PayOrder" asp-controller="ShoppingCart">
  <article>
    <script src="https://checkout.stripe.com/checkout.js"></script>
  </article>
</form>
```
- b.

```
<form method="post" asp-action="PayOrder" asp-controller="ShoppingCart">
  <article>
    <script src="https://checkout.stripe.com/checkout.js"
      class="stripe-button"
      data-key="@PublicKey"
      data-locale="auto"
      data-description="EShop Application Payment"
      data-amount="@{(Price* 100)}"
      data-label="Pay @TotalPrice$">

    </script>
  </article>
</form>
```
- c.

```
<form method="post" asp-action="PayOrder" asp-controller="ShoppingCart">
  <article>
    <script src="https://checkout.stripe.com/checkout.js"></script>
    <button type="submit" class="stripe-button"></button>
  </article>
</form>
```
- d.

```
<article>
  <script src="https://checkout.stripe.com/checkout.js"
    class="stripe-button"
    data-key="@PublicKey"
    data-locale="auto"
    data-description="EShop Application Payment"
    data-amount="@{(Price* 100)}"
    data-label="Pay @TotalPrice$">

  </script>
</article>
```

15

Saved
out of

question

Од која од наведените класи треба да се креираат инстанци во рамките на Back-End акцијата при изведување на електронска наплата со помош на Stripe сервисот за електронски наплати / From which of the following classes should we create an instance on the Back-End when performing electronic payment with the Stripe electronic payment service?

Select one or more:

- a. CustomerService
- b. PaymentService
- c. StripeService
- d. ChargeService

Втор колоквиум – Интегрирани Системи

1. When using SOA integration, it is necessary to rewrite the code and reintegrate the existing functionalities with each new development project.

FALSE

2. Advantages of Cloud Computing 3

Lower computer costs, improved performance, reduced software costs, instant software updates, improved document format capability, unlimited storage capacity, increased data reliability, universal document access, latest version availability, easier group collaboration, device independent

3. ERP major features and modules 2

HR, CRM, Finance and accounting, eCommerce, IT Helpdesk, Supply Chain Management, Order Processing, Inventory and Procurement, Marketing automation, Professional Services Automation, Manufacturing

4. With which of the following actions can we Deploy a .Net Core Application in VS?

Publish

5. Which of the following parameters should be the input parameters of the Back-End action for performing electronic payment using Stripe?

Email, Token

6. A hybrid cloud environment consists of some portion of computing resources on-site and off-site. By integrating public cloud services, users can leverage cloud solutions for specific functions that are too costly to maintain on premise such as virtual server disaster recovery, backups and test/development environments.

TRUE

7. Which of the following is NOT a role in SOA?

(Requestor, Consumer, Registry or Broker, Provider)

8. Micro services are application, while SOA is integration architecture style.

TRUE

9. What is ERP?

Enterprise Resource Planning – process to manage and integrate important parts of business, implement resource planning by integrating all of the processes needed to run their companies with a single system, finance, manufacturing, HR, supply chain, services, procurement, and others, can also integrate planning, purchasing inventory, sales, marketing, finance, human resources, and more.

10. ETL is a complex combination of process and technology and is not a one-time event.

TRUE

11. Major reasons for an ERP system?

To integrate financial data, to standardize manufacturing processes, to standardize HR information

12. Disadvantages of Cloud Computing 2

Requires a constant Internet Connection, does not work well with low-speed connections, features might be limited, can be slow, stored data might not be secure, stored data can be lost, HPC systems

13. What is the result in computing resources with the traditional infrastructure model and forecasted infrastructure demand?
- Unacceptable surplus, unacceptable deficit
14. Data sources in Big Data are only the relational tables used for operational data storage
- FALSE (Relational databases, log files, Real-time data sources/IoT devices)
15. Which of the following is NOT a typical big data ETL zone?
- Danger Zone, Raw Zone, Curated Zone, Cleaned Zone
16. Dimension tables contain only keys and should not contain attributes.
- FALSE (Surrogate key, normal key, attributes)
17. IaaS is the delivery of technology infrastructure as an on demand scalable service.
- TRUE
18. SaaS is a software delivery methodology that provides licensed multi-tenant access to software and its functions remotely as a Web-based service.
- TRUE
19. ETL tools are useful because they do not contain cleaning functionality.
- FALSE
20. Loose Coupling enables efficient interaction between components.
- FALSE
21. In parallel there has been backlash against cloud computing:
- Use of cloud computing means dependence on others and that could possibly limit flexibility and innovation, security could prove to be a big issue, There are also issues relating to policy and access
22. What is ETL?
- Set of process that includes extraction, transformation and loading data
23. Inconsistent data such as using T/F or 1/0 for the same data value are easy to correct and don't belong to the group of Dirty Data problems in ETL.
- FALSE
24. What is ESB in System Integration?
- Enterprise service bus, software architecture that connects all services together over a bus
25. Loose Coupling does not require deep knowledge of the components
- TRUE
26. Business process modeling(BPM) in business process management and systems engineering is the activity of representing processes of an enterprise, so that the current process may be analyzed, improved and automated.
- TRUE
27. Од која од наведените класи треба да се креира инстанци во рамките на Back-end акција при изведување на електронска наплата со помош на Stripe сервисот за електронски наплати?
- CustomerService, StripeService, PaymentService, ChargeService
28. Which of the following steps should be taken if you want to export data to an Excel file (using the ClosedXML library)?
- Creating XLWorkbook and IXLWorksheet, as well as filling them with data, Install the ClosedCML library using NuGet Package Manager, Saving the created workbook as "memory stream" and create FileContentResult instance, Connecting to user authentication and authorization

29. A hypervisor, a.k.a. a virtual machine manager/monitor (VMM), or a virtualization manager, is a program that allows multiple operating systems to share a single hardware host.

TRUE

30. Which of the following can be the return type of the action if you want to export data to an Excel file?

FileContentResult, IActionResult, FileResult, File

Queston 14
Not yet answered
Marked out of 1.00
Flag question

Кои од наведените блокови код потребно е да се користи во погледот (view) на апликацијата со цел да се овозможат опции за плаќање со Stripe сервисот за електронски наплати / Which of the following blocks of code should be used in the view of the application in order to provide the options offered by the Stripe electronic payment service??

Select one:

O a.

```
<form method="post" asp-action="PayOrder" asp-controller="ShoppingCart">
    <article>
        <script src="https://checkout.stripe.com/checkout.js"></script>
        <button type="submit" class="stripe-button"></button>
    </article>
</form>
```

O b.

```
<form method="post" asp-action="PayOrder" asp-controller="ShoppingCart">
    <article>
        <script src="https://checkout.stripe.com/checkout.js"></script>
    </article>
</form>
```

O c.

```
<form method="post" asp-action="PayOrder" asp-controller="ShoppingCart">
    <article>
        <script src="https://checkout.stripe.com/checkout.js"
            class="stripe-button"
            data-key="@PublicKey"
            data-locale="auto"
            data-document="...></script>
    </article>
</form>
```

31.

Queston 10
Not yet answered
Marked out of 1.00
Flag question

Нека е даден следниот C# модел / Consider the following C# model:

```
public class Product
{
    public int Id { get; set; }

    public string ProductName { get; set; }

    public string ProductDescription { get; set; }

    public int ProductPrice { get; set; }

    public int Rating { get; set; }
}
```

Кои од следните представуваат валидна реализација на index акцијата така што ќе се овозможи експорт на записите репрезентирани со овој модел во Excel датотека / Which of the following is a valid implementation of the index action that will allow the export of records represented by this model in an Excel file.

Напомена: Експорт на Excel датотека се прави со помош на ClosedXML библиотеката.
Note: The export of an Excel file is done using the ClosedXML library.

32.

```
    public IActionResult Index()
    {
        string contentType =
            "application/vnd.openxmlformats-officedocument.spreadsheetml.sheet";
        string fileName = "authors.xlsx";
        List<Author> products = new List<Author>
        {
            new Author { Id = 1, ProductName = "Product 1",
                ProductDescription = "Description 1", ProductPrice = 100, Rating = 4
            },
            new Author { Id = 2, ProductName = "Product 1",
                ProductDescription = "Description 2", ProductPrice = 150, Rating = 3
            },
            new Author { Id = 3, ProductName = "Product 1",
                ProductDescription = "Description 3", ProductPrice = 200, Rating = 5
            }
        };
        try
        {
            using (var workbook = new XSSFWorkbook())
            {
                IXLWorksheet worksheet =
                    workbook.Worksheets.Add("Authors");
                worksheet.Cell(1, 1).Value = "Id";
                worksheet.Cell(1, 2).Value = "ProductName";
                worksheet.Cell(1, 3).Value = "ProductDescription";
                worksheet.Cell(1, 4).Value = "ProductPrice";
                worksheet.Cell(1, 5).Value = "Rating";

                for (int index = 1; index <= products.Count; index++)
                {
                    worksheet.Cell(index + 1, 1).Value =
                        products[index - 1].Id;
                    worksheet.Cell(index + 1, 2).Value =
                        products[index - 1].ProductName;
                    worksheet.Cell(index + 1, 3).Value =
                        products[index - 1].ProductDescription;
                    worksheet.Cell(index + 1, 4).Value =
                        products[index - 1].ProductPrice;
                    worksheet.Cell(index + 1, 5).Value =
                        products[index - 1].Rating;
                }
                using (var stream = new MemoryStream())
                {
                    workbook.SaveAs(stream);
                    var content = stream.ToArray();
                    return File(content, contentType, fileName);
                }
            }
        
```

O a.

33.

private List<User> getDataFromFile(string fileName)
{

 List<User> list = new List<User>();

 string filePath = \$"{Directory.GetCurrentDirectory()}\\files\\{fileName}";

 System.Text.Encoding.RegisterProvider(System.Text.CodePagesEncodingProvider.Instance);

 using(var stream = System.IO.File.Open(filePath, FileMode.Open, FileAccess.Read))
 {
 using(var reader = ExcelReaderFactory.CreateReader(stream))
 {
 while(reader.Read())
 {
 list.Add(new User
 {
 Id = reader.GetValue(0).ToString(),
 FirstName = reader.GetValue(1).ToString(),
 LastName = reader.GetValue(2).ToString(),
 Address = reader.GetValue(3).ToString(),
 PhoneNumber = reader.GetValue(4).ToString()
 });
 }
 }
 }
}

Втор колоквиум

-решени

1. При SOA интеграцијата неопходно е препишување на кодот и реинтегрирање на постоечките функционалности при секој нов развој
False
2. Предности на Cloud Computing 3:
Lower computer costs, Improved performance, Reduced software costs, Instant software updates, Improved document format compatibility, Unlimited storage capacity, Increased data reliability, Universal document access, Latest version availability, Easier group collaboration, Device independence
3. Недостатоци на Cloud Computing 3:
Requires a constant Internet connection, Does not work well with low-speed connections, Features might be limited, Can be slow, Stored data might not be secure, Stored data can be lost, HPC Systems, General Concerns(each cloud uses different protocols and different APIS),
4. ERP главни карактеристики и модули:
Human resources, CRM, Finance and accounting, eCommerce, IT Helpdesk, Supply Chain Management, Order Processing, Inventory and Procurement, Marketing automation, Professional Service Automation, Manufacturing
5. Со која од наведените акции можеме да направиме Deployment на една .NET Core апликација во Visual Studio
 - a. Distribute
 - b. Export
 - c. Publish**
 - d. Run and Deploy
6. Кои од наведените параметри треба да бидат влезни параметри на Back-End акцијата за изведување на електронска наплата со помош на Stripe сервисот за електронски наплати
 - a. Email – преку кој се прави електронска наплата
 - b. CustomerId – идентификациски број на корисникот
 - c. Token – за идентификација и авторизација**
 - d. Total Price – вкупната сума за наплата
7. Хибриден облак се состои од дел од компјутерските ресури на самото место (на локација) и надвор од локацијата (јавен облак). Со интегрирање на јавни облачни услуги, корисниците можат да користат решенија за облак за специфични функции кои се премногу скапи за одржување на предходната просторија, како што се наплата на катастрофа на виртуелниот сервер, резервни копии и средини за тестирање.
Точно
8. Public cloud - **Public cloud (off-site and remote) describes cloud computing where resources are dynamically provisioned on an on-demand, self-service basis over the Internet, via web applications/web services, open API, from a third-party provider who bills on a utility computing basis.**
9. Private cloud- **A private cloud environment is often the first step for a corporation prior to adopting a public cloud initiative. Corporations have discovered the benefits of consolidating shared services on virtualized hardware deployed from a primary datacenter to serve local and remote users.**
10. Community cloud - **A community cloud is formed when several organizations with similar requirements share common infrastructure. Costs are spread over fewer users than a public cloud but more than a single tenant**
11. Hybrid cloud - **A hybrid cloud environment consists of some portion of computing resources on-site (on-premise) and off-site (public cloud). By integrating public cloud services, users can leverage cloud solutions for specific functions that are too costly to maintain on-premise such as virtual server disaster recovery, backups and test/development environments.**
12. Кое од следните НЕ е улога во SOA
 - a. Requestor -> discovers and invokes software assets provided by one or more providers
 - b. Consumer**

- c. Provider -> owner of the service
 - d. Registry or Broker -> manages the repositories of information on providers and their assets
13. Кои од следните е улога во SOA
- a. Requestor
 - b. Consumer
 - c. Registry or Broker
 - d. Provider
14. SOA Интеракции: Publishing, Finding, Binding
15. Микросервисите се апликациски, а SOA интеграциски архитектурен стил
- a. True
 - b. False
16. Што е ERP?
- a. Ги комбинира сите бази на податоци во одделите во единствена база на податоци до која можат да пристапат сите вработени.
 - b. ЕРП ги решава сите меѓучовечки проблеми во компанијата
 - c. ЕРП ги автоматизира задачите вклучени во извршувањето на деловниот процес
 - d. Практика на косолидирање на напорите за планирање, производство, продажба и маркетинг на претпријатието во еден систем за управување
17. ETL е комплексна комбинација од процеси и технологии и не се изведува само еднаш туку континуирано
- a. Точно
 - b. Неточно
18. Главни причини за ERP системи:
- a. Интегрирање на финансиски податоци
 - b. Да се стандардизираат информациите за човечки ресурси
 - c. Да се намали продуктивноста
 - d. Да се стандардизираат процесите на производството
19. ? Каков е резултатот во пресметување на ресурсите со традиционалниот инфраструктурен модел и предвидената побарувачка за инфраструктура
- a. Неприфатлив дефицит
 - b. Идеално покритие
 - c. Ладна резерва
 - d. Неприфатлив вишок + Acceptable surplus
20. Извор на големи податоци се исклучиво релационите табели во кои се чуваат оперативните податоци
- a. True
 - b. False -> Applications data stores such as Relation databases, static files produced by applications such as web server log files and real-time data sources like IoT devices
21. Кое од следните HE е типична зона за ETL на големи податоци
- a. Danger Zone
 - b. Raw Zone
 - c. Curated Zone
 - d. Cleaned Zone
22. Димензионите табели содржат исклучиво клучеви и не треба да содржат атрибути
- a. Точно
 - b. Неточно (Dimension tables have a surrogate key, Normal key and attributes)
23. IaaS is the delivery of technology infrastructure as an on demand scalable service
- a. True
 - b. False

24. SaaS е методологија за испорака на софтвер што обезбедува лиценциран мулти-закупец пристап до софтвер и неговите функции од далечина како веб-базирана услуга.
- Точно
 - Неточно
25. PaaS provides all of the facilities required to support the complete life cycle of building and delivering web applications and services entirely from the Internet.
26. ETL алатките се корисни бидејќи не содржат функционалности за чистење на податоците
- Точно
 - Неточно (These tools have cleaning functionality.)
27. Предности на ETL алатките: The single greatest advantage of an ETL tool is that it provides a visual flow of the system's logic. It also provides attractive, self documentation. These tools provide monitoring the ETL system. Manual coding is also useable in ETL tools. Finding data dependencies will be easier if needed after or before any change. These tools have cleaning functionality. Performance may be better in some situations. Using an ETL tool will be easier for inexperienced developer
28. Недостатоци на ETL алатките: Software licensing cost is the most important disadvantage (more than 1000\$ per user per month...) There is uncertainty in many ETL teams. They may use only few features of the Tools. Finding experienced ETL team is difficult. Sometimes, flexibility is limited. They have some limits and experience is needed. Developers may resist to use a new tool
29. Loose Coupling овозможува ефикасна интеракција помеѓу компонентите
- Точно
 - Неточно
30. Loose Coupling: Less efficient interaction, Not very detailed, No deep knowledge required
31. Tight Coupling: Efficient interaction, Compressed communication, Requires deep knowledge, inflexible
32. Паралелно, имаше реакција против процесирање во облак:
- Употребата на компјутерски облак значи зависност од другите и тоа може да ги ограничи флексибилноста и иновативноста
 - Безбедноста може да се покаже како големо прашање
 - Дали ни треба пристап до компјутерски ресурси секогаш и секаде?
 - Што се случува ако оддалечениот сервер се расипе?
33. Што е ETL? – Extract Transform Load
34. Неконзистентните податоци како што е користењето на T/F или 1/0 за истиот тип на вредност се едноставни за корекција и не претставуваат дел од Dirty Data проблемите при ETL.
- True
 - False
35. Што е ESB во системската интеграција? – Enterprise Service Bus
36. Loose coupling не бара длабоки познавања за компонентите
- True
 - False
37. Моделирање на деловни процеси (БПМ) во управувањето со деловните процеси и инженерството на системите е активност на претставување на процесите на претпријатието така што тековниот процес може да се анализира, подобри и автоматизира.
- True
 - False
38. Хипервизор, управувач/монитор за виртуелна машина (VMM) или менаџер за виртуализација е програма што им овозможува на повеќе оперативни системи да споделуваат единствен хардверски домаќин
- True
 - Flase

39. Микросервисите се апликациски, а SOA е интеграциски архитектурен стил
- True
 - False
40. Од која од наведените класи треба да се креира инстанци во рамките на Back-End акција при изведување на електронска наплата со помош на Stripe сервисот за електронски наплати?
- CustomerService
 - StripeService
 - PaymentService
 - ChargeService
41. Димензионалните табели содржат исклучиво клучеви и не треба да содржат атрибути
- True
 - False
42. Приватен облак е често првиот чекор за корпорацијата пред да се донесе одлука за јавен облак. Корпорациите ги консолидираат услугите на вируелизиран хардвер поставен во примарен центар за податоци за да им служат на локалните и оддалечените корисници.
- True
 - False
43. COTS системите ја зголемуваат потребата од кодирање, дебагирање, тестирање и проверка на кодот.
- True
 - False
44. Бенефиции од ERP: Higher productivity, Deeper insights, Accelerated reporting, Lower risk, Simpler IT, Improved agility
45. Чекорот на трансформација при ETL не ги менува податоците
- True
 - False
46. Складиштето на податоци ги има следниве карактеристики: Subject-oriented, Integrated, Time-variant, Non-volatile
47. Кои се предностите на пристапот за користење на складиште на податоци за интеграција на податоци?
- High query performance, Doesn't interfere with local processing at data sources, Information copied at warehouse, has caught on in industry
48. Складилиштето на податоци обично се моделира со користење на: Свездеста шема
49. Употребата на облак дава голем број можности: It enables services to be used without any understanding of their infrastructure, works using economies of scale, Data and services are stored remotely but accessible from anywhere, It potentially lowers the outlay expense for start up companies, as they would no longer need to buy their own software or servers, Cost would be by on-demand pricing, Vendors and Service providers claim costs by establishing an ongoing revenue stream.
50. ERP системите бараат организациите да се фокусираат на деловните процеси наспроти на функциите?
- True
 - False
51. Каков е резултатот во пресметување на ресурсите со традиционалниот инфраструктурен модел и предвидената побарувачка за инфраструктура:
- Unacceptable deficit
 - Ideal coverage
 - Cold reserve
 - Unacceptable surplus

- Public class User -> using над while
- Public class Movie -> доле што пишува var stream(); document.Save(stream, new DocxSaveOptions());

3. Кои од наведените чекори потребно е да се преземат доколку сакаме да направиме export на податоците во Excel датотека со помош на ClosedXML библиотеката
4. Public class Product -> сите да се во еден try и да има само по еден using var
5. Кој од наведените блокови код потребно се да се користи во погледот (view) -> **мора да има form I povekje kod**

ИС База – втор колоквиум

1. Кое од следните НЕ е типична зона за ETL на големи податоци
 - a. Danger Zone
 - b. Raw Zone
 - c. Curated Zone
 - d. Cleaned Zone
2. Извор на големи податоци се исклучиво релационите табели во кои се чуваат оперативните податоци
 - a. True
 - b. False -> Applications data stores such as Relation databases, static files produced by applications such as web server log files and real-time data sources like IoT devices
3. Кое од следните НЕ е улога во SOA
 - a. Requestor -> discovers and invokes software assets provided by one or more providers
 - b. Consumer
 - c. Provider -> owner of the service
 - d. Registry or Broker -> manages the repositories of information on providers and their assets
4. Каков е резултатот во пресметување на ресурсите со традиционалниот инфраструктурен модел и предвидената побарувачка за инфраструктура?
 - a. Unacceptable deficit/ Неприфатлив дефицит
 - b. Ideal coverage/ Идеално покритие
 - c. Cold reserve/ Ладна резерва
 - d. Unacceptable surplus/ Неприфатлив вишок + Acceptable surplus
5. Недостатоци на Cloud Computing?
 - a. Realtime access/ Постојан пристап
 - b. Stored data can be lost/ Зачуваните податоци може да се изгубат
 - c. Portability/ Преносливост
 - d. Stored data might not be secure/ Зачуваните податоци можеби не се безбедни

+ Requires a constant Internet connection, Does not work well with low-speed connections, Features might be limited, can be slow, HPC Systems and each cloud systems uses different protocols and different APIs
6. ERP главни карактеристики и модули
 - a. Professional Services Automation/ Автоматизација на професионални услуги
 - b. Marketing automation/ Маркетинг автоматизација

c. Vector animation/ Векторска анимација

d. Manufacturing/ Производство

+ Supply chain management, Internet of Things, Project Management, Customer Relationship management, Service management, Sales and marketing, Human Resource management, Asset management, Business intelligence, Big data analytics, Financial management

7. Главни причини за EPR систем:

a. To integrate financial data/ Интегрирање на финансиски податоци

b. To standardize HR information/ Да се стандардизираат информациите за човечки ресурси

c. To decrease productivity/ Да се намали продуктивноста

d. To standardize manufacturing processes/ Да се стандардизират процесите на производство

8. Со која од наведените акции можеме да направиме Deployment на една .Net Core апликација во Visual Studio?

a. Publish

b. Distribute

c. Export

d. Run and Deploy

9. Кои од наведените параметри треба да бидат влезни параметри на Back-End акција за изведување на електронска наплата со помош на Stripe сервисот за електронски наплати?

a. Token – за автентикација и авторизација

b. Total price – вкупната сума за наплата

c. CustomerId – идентификациски број на корисникот

d. Email – преку кој се прави електронска наплата

10. ETL е комплексна комбинација од процеси и технологии и не се изведува само еднаш туку континуирано

a. True

b. False

11. Што е ERP?

a. Combines all databases across departments into a single database that can be accessed by all employees/ Ги комбинира сите бази на податоци во одделите во единствена база на податоци до која можат да пристапат сите вработени

b. ERP solves all inter-personal issues in a company/ ERP ги решава сите меѓучовечки проблеми во компанијата

c. ERP automates the tasks involved in performing a business process/ ERP ги автоматизира задачите вклучени во извршувањето на деловниот процес

d. The practice of consolidating an enterprise's planning, manufacturing, sales and marketing efforts into one management system./ Практика на консолидирање на напорите за планирање, производство, продажба и маркетинг на претпоставките во еден систем за управување.

12. Микросервисите се апликациски, а SOA е интеграциски архитектурен стил

a. True

b. False

13. Хибриден облак

Хибриден облак се состои од дел од компјутерските ресурси на самото место (на локација) и надвор од локацијата (јавен облак). Со интегрирање на јавни облачни услуги, корисниците можат да користат решенија за облак за специфични функции кои се премногу скапи за одржување на претходната просторија, како што се наплата на катастрофи на виртуелен сервер, резервни копии и средини за тестирање/развој.

a. True

b. False

14. ETL алатките се корисни бидејќи не содржат функционалности за чистење на податоците

a. True

b. False

15. Паралелно, имаше реакција против процесирање во облак:

a. Use of cloud computing means dependence on others and that could possibly limit flexibility and innovation/ Употребата на компјутерски облак значи зависност од другите и тоа може да ги ограничи флексибилноста и иновативноста

b. Security could prove to be a big issue/ Безбедноста може да се покаже како големо прашање

c. Do we need computing anywhere, anytime? / Дали ни треба пристап до компјутерските ресурси секогаш и секаде?

d. What happens if the remote server goes down? Што се случува ако оддалечениот сервер се расипе?

+ There are also issues relating to policy and access

16. Што е ETL?

a. Early Termination Liability

b. Environmental Technology Laboratory

c. Electricity Transmission Line

d. Extract, Transform, Load

17. Loose Coupling овозможува ефикасна интеракција помеѓу компонентите

a. True

b. False -> it's tight coupling

18. Од која од наведените класи треба да се креира инстанци во рамките на Back-End акција при изведување на електронска наплата со помош на Stripe сервисот за електронски наплати?

- a. CustomerService
- b. StripeService
- c. PaymentService
- d. ChargeService

19. Што е ESB во системската интеграција?

- a. Empire Strikes Back
- b. Enterprise Service Bus**
- c. Easy Service Bus
- d. Electricity Supply Board

20. Димензионалните табели содржат исклучиво клучеви и не треба да содржат атрибути

- a. True
- b. False**

21. Моделирање на деловни процеси (БПМ) во управувањето со деловните процеси и инженерство на системите е активност на претставување на процесите на претпријатието, така што тековниот процес може да се анализира, подобри и автоматизира.

- a. True**
- b. False

22. IaaS is the delivery of technology infrastructure as an on demand scalable service

- a. True**
- b. False

23. SaaS е методологија за испорака на софтвер што обезбедува лиценциран мулти-закупец пристап до софтвер и неговите функции од далечина како веб-базирана услуга

- a. True**
- b. False



Универзитет „Св. Кирил и Методиј“ во Скопје
ФАКУЛТЕТ ЗА ИНФОРМАТИЧКИ НАУКИ И
КОМПЈУТЕРСКО ИНЖЕНЕРСТВО

ФАКУЛТЕТ ЗА ИНФОРМАТИЧКИ НАУКИ И КОМПЈУТЕРСКО ИНЖЕНЕРСТВО

Enterprise Resource Planning Systems Business Process Models

Ivan Chorbev

What is ERP?

- The practice of consolidating an enterprise's planning, manufacturing, sales and marketing efforts into one management system.¹
- Combines all databases across departments into a single database that can be accessed by all employees.²
- ERP automates the tasks involved in performing a business process.¹

Sources:

1. <http://www.cio.com/summaries/enterprise/erp/index.html>, viewed September 19, 2002

2. CIO Enterprise Magazine, May 15, 1999.

What is ERP (Enterprise Resource Planning)?

- **Enterprise resource planning (ERP)** is a process used by companies to manage and integrate the important parts of their businesses.
 - Many ERP software applications are important to companies because they help them implement resource planning by integrating all of the processes needed to run their companies with a single system.
- An ERP software system can also integrate planning, purchasing inventory, sales, marketing, finance, human resources, and more.
- The simplest way to define ERP is to think about all the core processes needed to run a company: finance, manufacturing, HR, supply chain, services, procurement, and others.
 - At its most basic level, ERP integrates these processes **into a single system.**

ERP modules

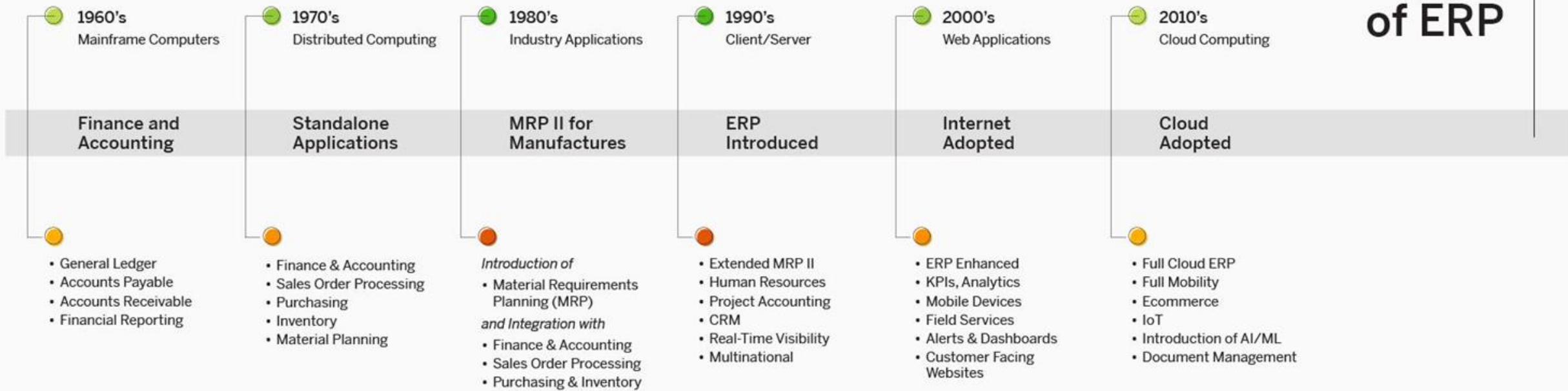


A Brief History of ERP

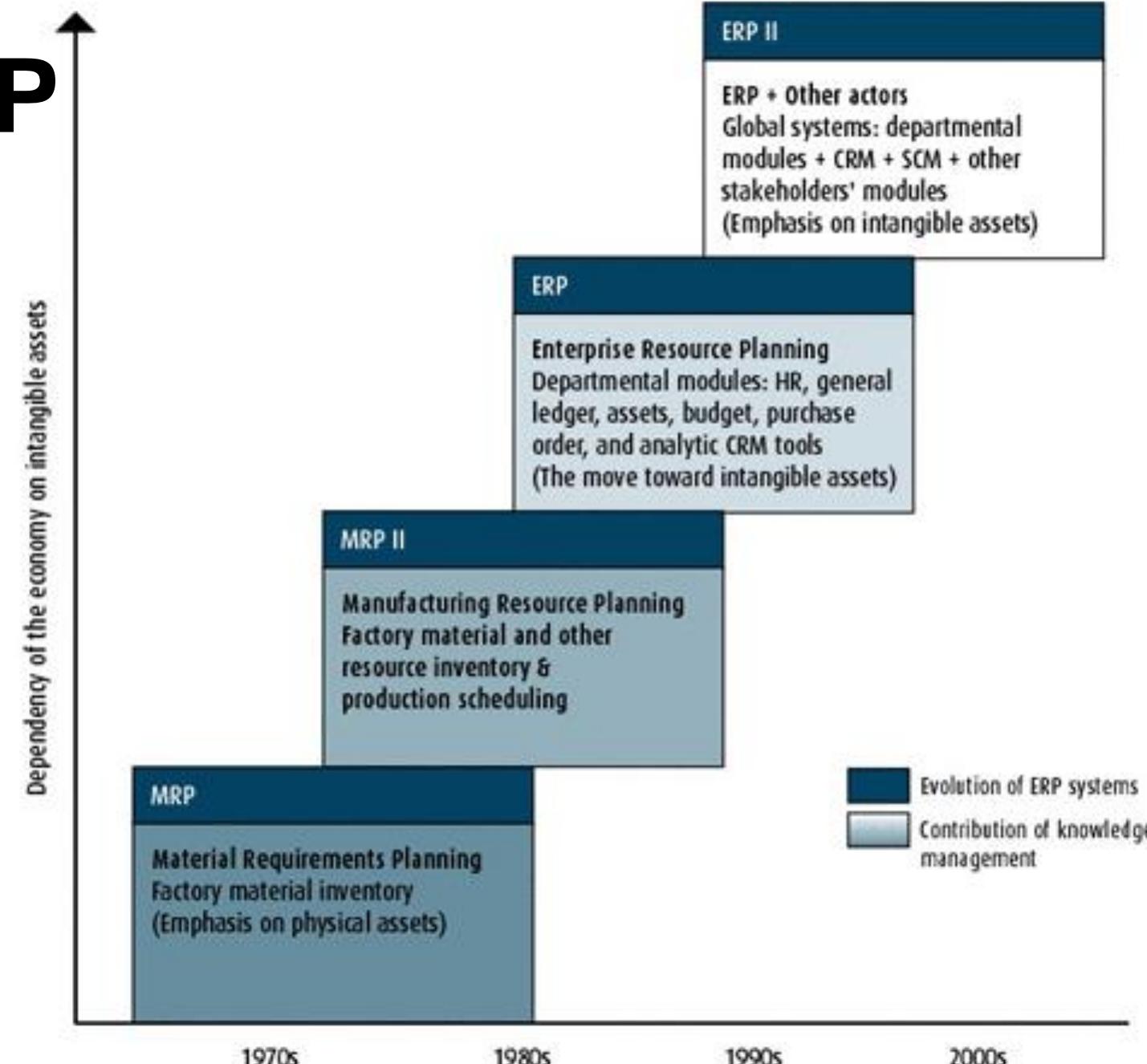
- ❖ **1960s :** Computerized business applications were born in the accounting and finance world in the using mainframe computers. These pioneering applications were faster and more accurate than manual processes – but were expensive, limited in functionality, and still slow. Before long, these applications spawned the development of dedicated, standalone solutions such as sales order processing and manufacturing requirements planning (**MRP**).
- ❖ **1980s:** competition in the manufacturing sector was exploding and new tools were required. New **MRP II** software integrated accounting and finance, sales, purchasing, inventory, and manufacturing planning and scheduling – providing the manufacturer with an integrated system.
- ❖ **1990s:** **ERP was introduced.** ERP transformed the technology sector by serving a broader range of industries and by combining MRP II, human resources, project accounting, and end-user reporting.
- ❖ **2000s:** The introduction of browser-based software paved the way for cloud ERP, a breakthrough that has expanded both the reach and the functionality of ERP solutions.
- ❖ **Today:** in the era of digital transformation – businesses are increasingly relying on artificial intelligence and other innovations to automate their business processes and stay competitive.

A Brief History of ERP

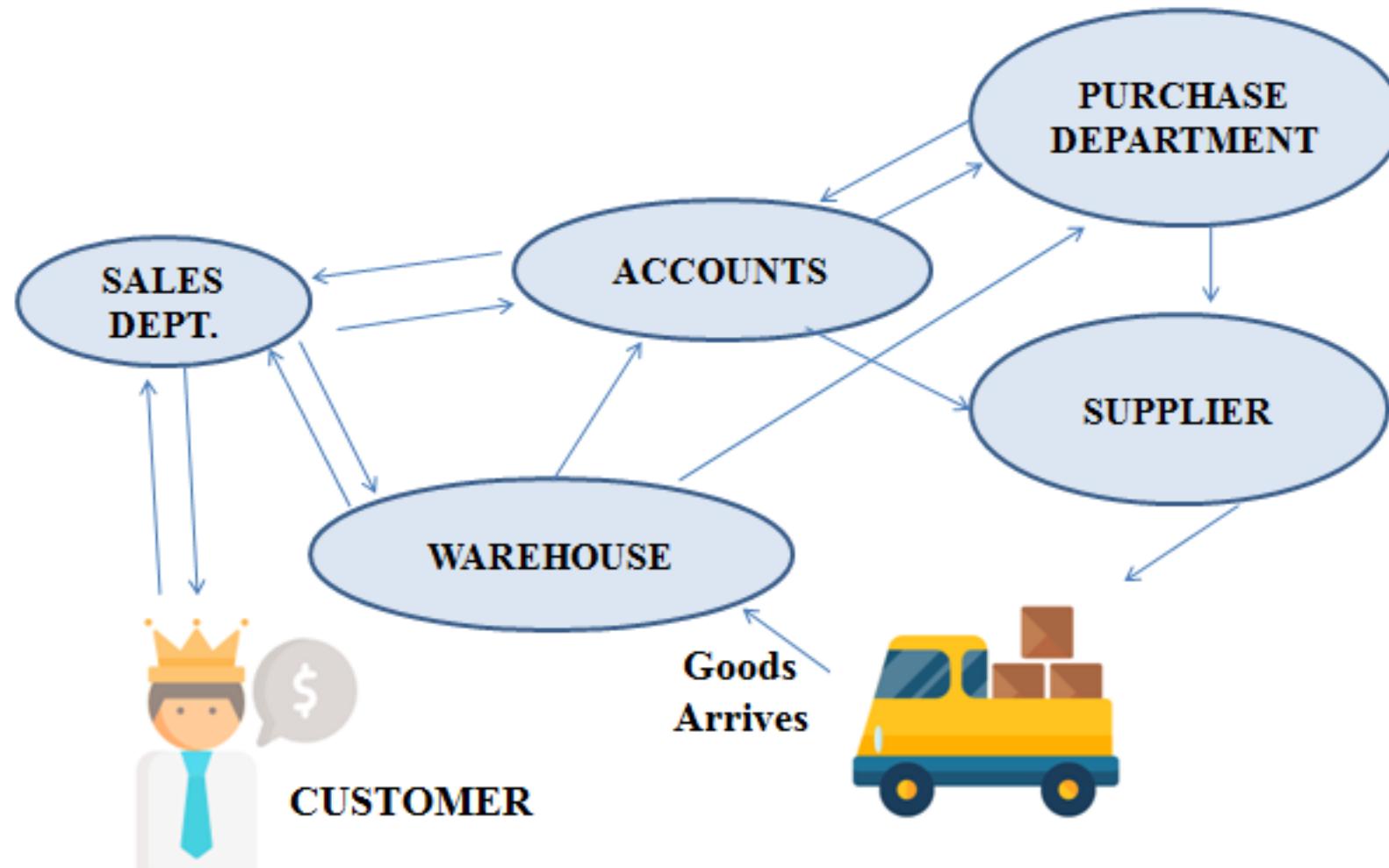
The History of ERP



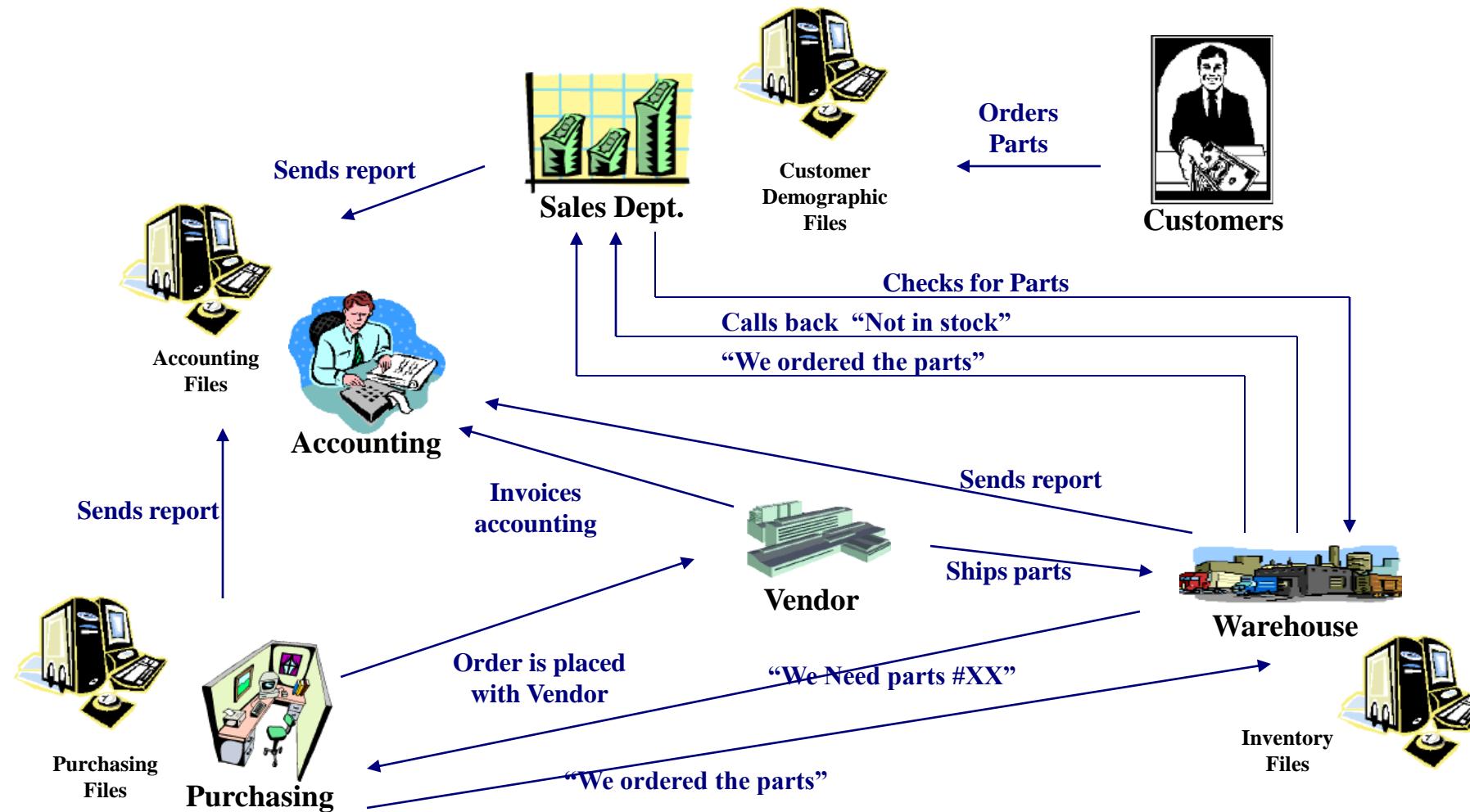
Evolution of ERP



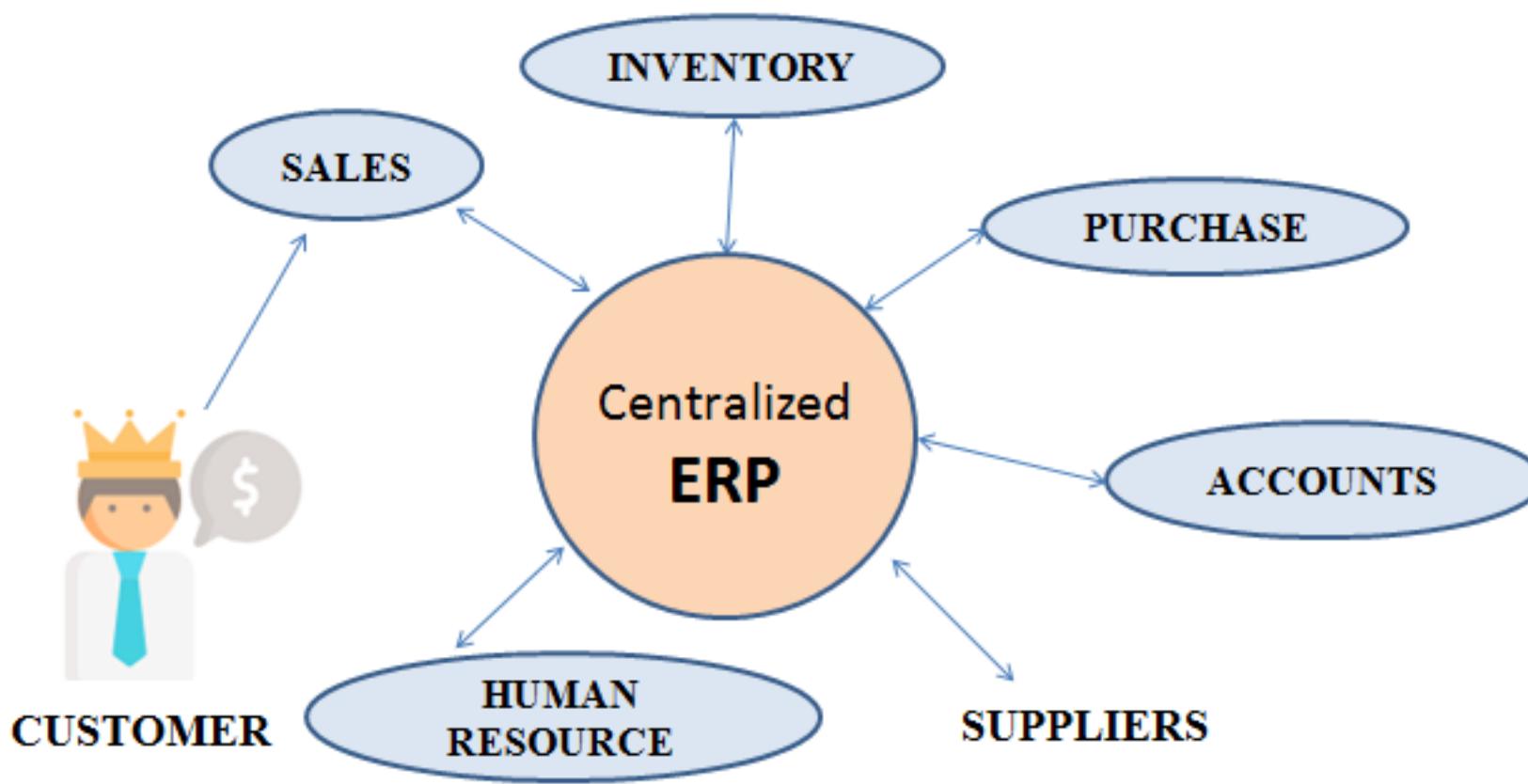
Before ERP



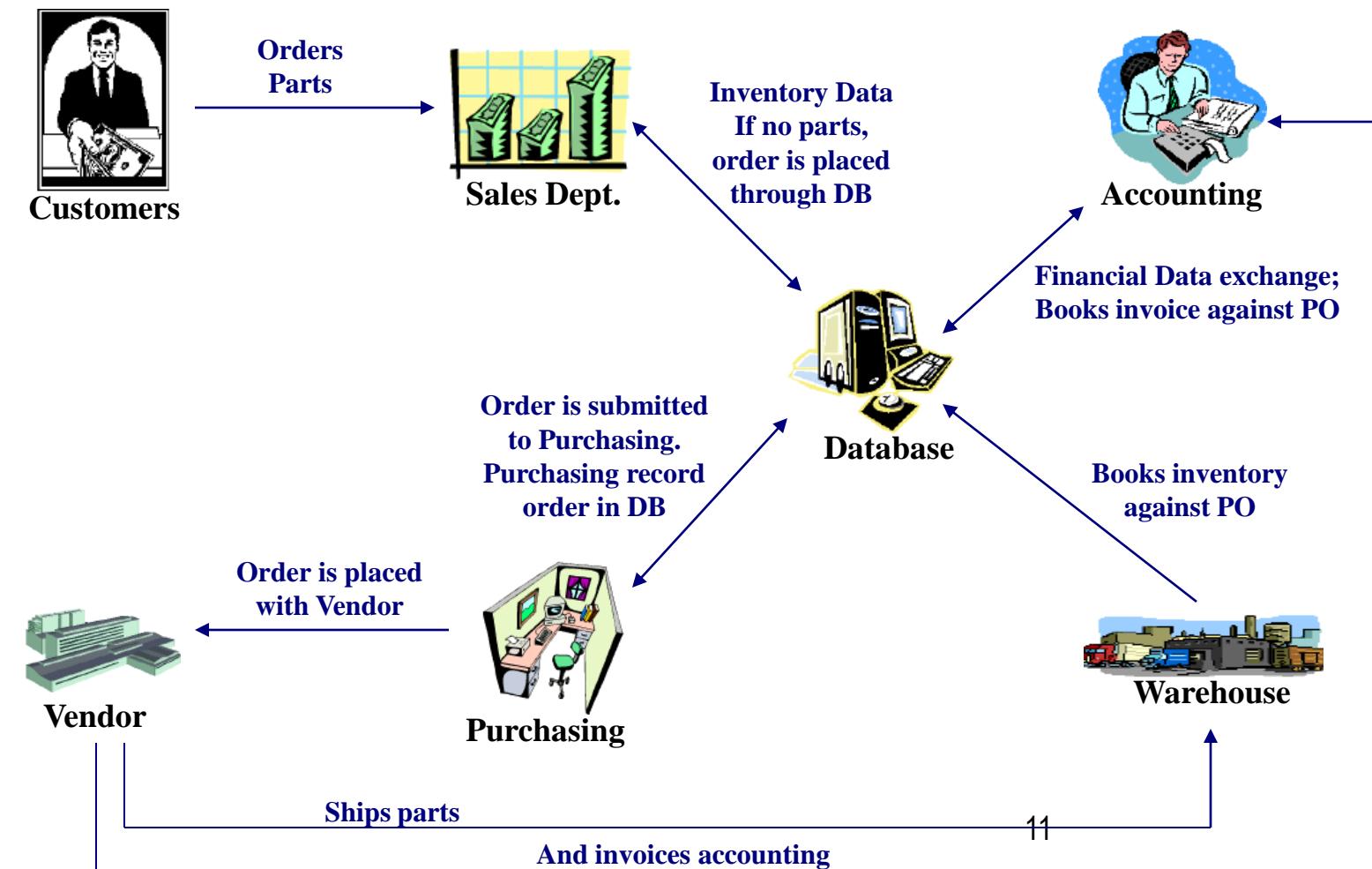
An ERP Example: Before ERP



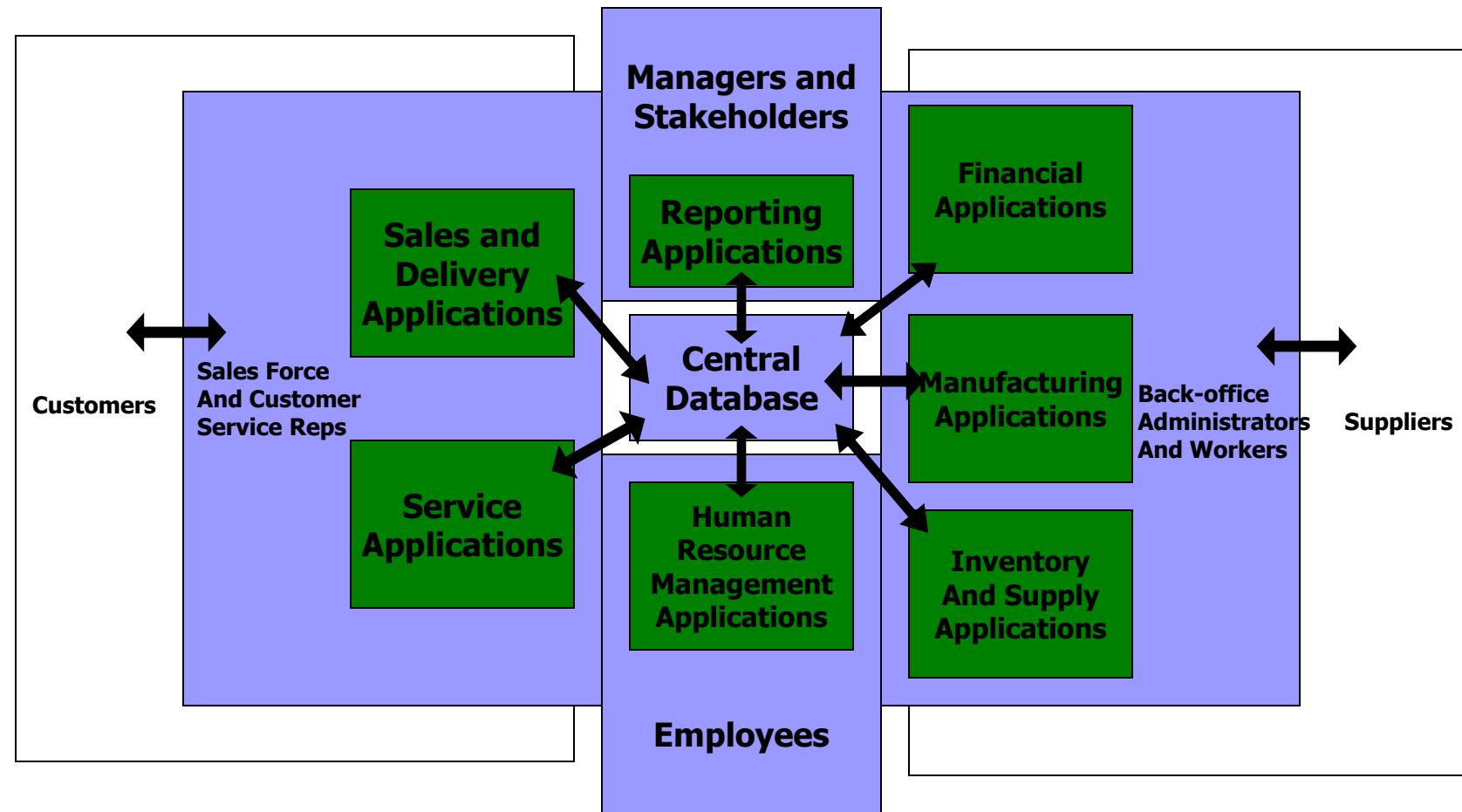
After ERP



An ERP Example: After ERP



How Do ERP Systems Work?



Source: Davenport, Thomas, "Putting the Enterprise into the Enterprise System", Harvard Business Review, July-Aug. 1998.

How Does an ERP System Work?

The main purpose of an ERP system is to increase organizational efficiency of an organization by managing and improving how company resources are utilized. Improving and/or reducing the number of resources necessary without sacrificing quality and performance are keys to effectively improving business growth and profitability.

ERP systems typically cover all aspects of business operations and commonly provide:

- An integrated system
- Common database
- Real-time operation
- Support for all applications/components
- Common user interface across application/components
- On-premise, cloud hosted, or SaaS deployment

ERP software has the ability to collect and compare metrics across departments and provide a number of different reports based on roles or specific user preferences. The data collected makes finding and reporting on data faster and gives a complete view of business performance with complete insights on how resources are being spent.

ERP synchronizes reporting and automation by reducing the need to maintain separate databases and spreadsheets that would have to be manually merged to generate reports. This combined data collection and reporting offers valuable insight, such as where to cut costs and streamline processes, providing the information to make real-time business decisions.

Types of ERP :Cloud vs On-Premise vs Hybrid

There are three main types of ERP systems that function with different deployment model options. The most common types of ERP systems include cloud ERP, on-premise ERP, and hybrid ERP.

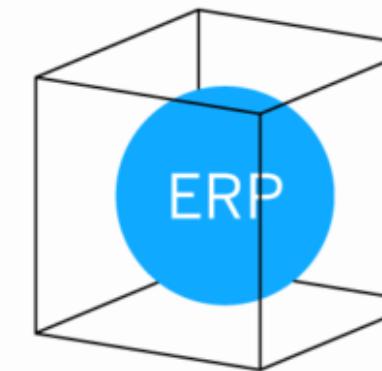
- ❖ **On-Premise ERP** software is implemented on site and maintained in physical office space within an organization, hosted on the company's own computers and servers for full control, support and ownership of the entire system once implemented.
- ❖ **Cloud-based ERP** software is a web-based solution, known as Software as a Service (**SaaS**), where an organization accesses and stores data on any device with an internet connection, usually through the purchase of a subscription. Continual support, updates, training, and flexible customizations supported by the software provider.
- ❖ “**Hybrid**” **ERP** software refers to a combined implementation of cloud-based and on-premise ERP system solutions. The combination of hosting and deployment services vary by provider. These models can provide ERP users the flexibility to migrate between delivery models, or integrate benefits not available existing implementation.

Different ERP vendors support different deployment model options. Combinations of options, often referred to as “hybrid” deployment may offer a combination of hosting and deployment services. These models can provide ERP users flexibility migrate between delivery models, or integrate benefits not available existing implementation.

Cloud vs On-Premise vs Hybrid



Cloud ERP



On-premise ERP



Hybrid ERP

Why ERP?

3 Major Reasons:

- To integrate financial data.
- To standardize manufacturing processes.
- To standardize HR information.

ERP Project and Time

- Real transformational ERP efforts will usually run between 1 to 3 years, on average.
- Short implementations (3 to 6 months):
 - small companies,
 - implementation limited to a small area of the company, or
 - the company only used the financial pieces of the ERP system.
- The important thing is not to focus on how long it will take but to understand why you need ERP and how you will use it to improve your business.

Total Cost of Ownership of ERP

Total cost of ownership (TCO) is a model developed by Gartner Group to analyze the direct and indirect costs of owning and using hardware and software. TCO essentially helps a company determine whether it wins or loses from specific technology implementations.

- Metagroup study among 63 companies surveyed showed that:
 - the average TCO was \$15 million (the highest was \$300 million and lowest was \$400k),
 - the average TCO per user was \$53,320.

Total Cost of Ownership of ERP

- It also found that:
 - it took 8 months after the system was in to see any benefits,
 - but that the median annual savings from the system was \$1.6 million per year.

Hidden Costs of ERP

- Training
- Integration and testing
- Data conversion
- Data analysis
- Consultants
- Replacing best and brightest staff after implementation
- Implementation teams can never stop
- Waiting for ROI
- Post-ERP depression

Benefits of ERP Systems

- Improving integration, flexibility
- Fewer errors
- Improved speed and efficiency
- More complete access to information
- Lower total costs in the complete supply chain
- Shorten throughput times
- Sustained involvement and commitment of the top management

Benefits of ERP Systems (cont'd)

- Reduce stock to a minimum
- Enlarge product assortment
- Improve product quality
- Provide more reliable delivery dates and higher service to the customer
- Efficiently coordinate global demand, supply and production

Risks with ERP Implementation

- Expensive (can costs 100 thousands to millions of dollars)
- Time-consuming (can take months to years)
- Great risk for the organization
- Transfer of Knowledge
- Acceptance with the company

Benefits of ERP

- ❖ **Higher productivity:** Streamline and automate your core business processes to help everyone in your organization do more with fewer resources.
- ❖ **Deeper insights:** Eliminate information silos, gain a single source of truth, and get fast answers to mission-critical business questions.
- ❖ **Accelerated reporting:** Fast-track business and financial reporting and easily share results. Act on insights and improve performance in real time.
- ❖ **Lower risk:** Maximize business visibility and control, ensure compliance with regulatory requirements, and predict and prevent risk.
- ❖ **Simpler IT:** By using integrated ERP applications that share a database, you can simplify IT and give everyone an easier way to work.
- ❖ **Improved agility:** With efficient operations and ready access to real-time data, you can quickly identify and react to new opportunities.



ERP solution providers

& SAP
& Oracle
& Microsoft Dynamics
& IFS Applications
& Infor
& Epicor
& Acumatica
& SYSPRO
& IQMS
& Salesforce



ERP major features and modules

- & Human resources
- & CRM
- & Finance and accounting
- & eCommerce
- & IT Helpdesk
- & Supply Chain Management
- & Order Processing
- & Inventory and Procurement
- & Marketing automation
- & Professional Services Automation
- & Manufacturing

Extended ERP Components

■ Extended ERP components include:

□ Business intelligence

- Tools to help analyze your business information and better understand it so that you can better understand the business.

□ Customer relationship management

□ Supply chain management

□ E-business

- ***E-logistics*** – manages the transportation and storage of goods
- ***E-procurement*** – the business-to-business (B2B) purchase and sale of supplies and services over the Internet

ERP - Human Resources HR

A human resource management (HRM) or human capital management (HCM) module usually encompasses all the features of workforce management application and offers additional capabilities. HRM could be viewed as CRM for employees. This popular module has detailed records on all employees and stores documents like performance reviews, job descriptions and offer letters. **It tracks not only hours worked but also paid time off (PTO)/sick days and benefits information.**

Since the **HRM module stores a vast amount of information on every employee** across the organization, it eliminates a lot of duplicate or inaccurate data that many organizations store in various spreadsheets.

ERP - CRM

The customer relationship management (CRM) module stores all customer and prospect information. That includes the company's communication history with a person—the date and time of calls and emails, for example—and their purchase history. A CRM improves customer service because staffers can easily access all the information they need when working with a customer.

Many businesses also use CRM to manage sales leads and opportunities. It can track communication with prospects and suggest which customers should be targeted for certain promotions or cross-sell opportunities. **More robust CRM modules may support customer segmentation** (enabling more targeted marketing) and advanced contact managers and reporting tools.

ERP - Finance and accounting

The finance and accounting module is the **most important ERP module** because it allows businesses to understand their current financial state and future outlook. Key features of this module include tracking accounts payable (AP) and accounts receivable (AR) and managing the general ledger. It also creates and stores crucial financial documents like balance sheets, payment receipts and tax statements.

The **finance module can automate tasks** related to billing, vendor payments and account reconciliation, helping the accounting department close the books in a timely manner and comply with current revenue recognition standards. It also has the data that financial planning and analysis employees need to prepare key reports, including profit and loss (P&L) statements and board reports, and run scenario plans.

EPR - eCommerce

Certain ERP vendors offer an ecommerce module for businesses that want to sell online. This module allows companies to quickly launch a business-to-business (B2B) or business-to-consumer (B2C) ecommerce website. Leading commerce applications include user-friendly tools that allow employees to easily add new items, update product content (item descriptions, titles, specs, images, etc.) and change the look and feel of the website.

When the ecommerce application is integrated with other ERP applications, all payment, order and inventory information feeds [from the ecommerce module] into the shared database. That ensures all transactions are added to the ledger, out-of-stock items are removed from the site and orders ship on time.

EPR - IT helpdesk

IT helpdesk modules keep company technology running smoothly. With integrated IT and ERP systems, IT team can field questions and bugs from across the company, prioritize those jobs, and quickly follow up with stakeholders. These tools help IT departments track the ROI (Return on Investment) they bring to the team, their financial benefit to the company, and the impact of technology and software upgrades.

EPR - Order processing

While work order software alone brings continuity to the sales and service sectors of a company, integrating order processing software directly with an ERP gives business analysts insight into inefficiencies and improvements across the sales cycle.

EPR - Inventory and Procurement

Similar to the issues that supply chain management software solves, inventory and procurement software helps companies **manage their warehouse and stockroom inventories**. These tools ensure that companies keep the right amount of product in stock to cover seasonal and expected surges in demand. These tools, when connected with an ERP, **help companies forecast product supply needs** and ensure the right staff, shelf space, and logistical coverage.

EPR - Marketing Automation

Like with ecommerce, certain software providers have developed a marketing automation module. A marketing module **manages marketing campaigns** across digital channels like email, web, social media and SMS. It **can automate email sends based on campaign rules** and has advanced customer segmentation features, so customers only receive relevant messages.

Marketing automation software, whether part of the ERP system or a separate solution, can provide detailed reports on the performance of campaigns to shape future marketing plans and spend. These applications increase leads, customer loyalty and, over time, sales.

EPR - Professional Services Automation

A professional services automation (PSA) module, also called a service resource management module, allows an organization to **plan and manage projects**. Services-based businesses often use this module.

The application **tracks the status of projects, managing human and capital resources throughout, and allows managers to approve expenses and timesheets**. It facilitates collaboration between teams by keeping all related documents in a shared place. Additionally, the PSA module can automatically prepare and send bills to clients based on rules around the billing cycle.

ERP - Manufacturing

The earliest version of ERP, material requirements planning (MRP) systems, were designed for manufacturers, **and manufacturing remains a key piece of ERP.**

Today, ERP systems typically have a production management or manufacturing execution system (MES). The manufacturing module **helps manufacturers plan production** and make sure they have everything they need for planned production runs, like raw materials and machinery capacity.

During the manufacturing process, it can update the status of goods-in-progress and help companies track actual output against forecasted production. It also provides a real-time picture of the shop floor, capturing real-time information on items in progress and finished goods. It can calculate the average time to produce an item and then compare supply with forecasted demand to plan adequate production

Risks with ERP implementation

- & Expensive (can cost 100 thousands to millions of dollars)
- & Time consuming(can take months to years)
- & Great risk for the organization
- & Transfer of knowledge
- & Acceptance with the company

Before ERP & and after ERP

- ❖ Stand alone system
 - ❖ Lack of coordination among business functions (manufacturing & sales)
 - ❖ Non integrated data : Data have different meaning
 - ❖ Systems are maintained on a procedural basis
 - ❖ Redundant data and inconsistent information
 - ❖ Difficult to manage
-
- ❖ Integrated system
 - ❖ Support coordination among business functions
 - ❖ Integrated data : data have the same meaning across multiple functions
 - ❖ Changes affect multiple functions or Systems
 - ❖ Common interfaces across systems

Major phases of ERP implementation

- ❖ **Initiation** - develop business case, project scope and implementation strategy
- ❖ **Planning** - establish implementation team, determine goals and objectives, establish metrics
- ❖ **Analysis and process design** - analyze and improve existing processes, map new processes to be adopted by the system
- ❖ **Realization** - install base system, customization, adn test the system
- ❖ **Transition** - replace the formal system with the new system, data conversion
- ❖ **Operation** - monitor and improve system performance, provide continued training and technical support

Business process models

What is a business process?

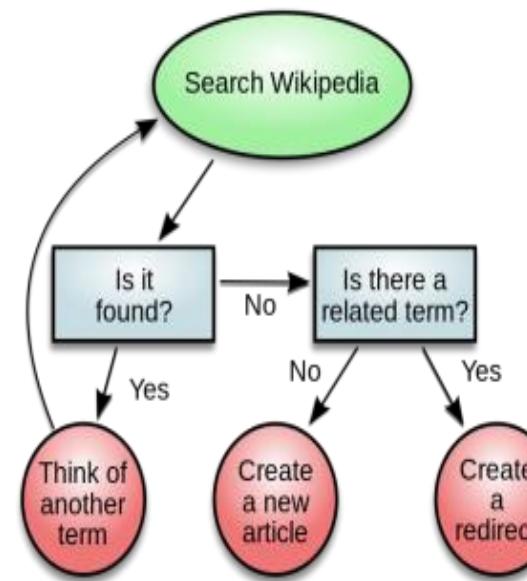
- A process is a series of tasks that are completed in order to accomplish a goal.
- A business process, therefore, is a process that is focused on achieving a goal for a business.
- Processes are something that businesses go through every day in order to accomplish their mission.
- The better their processes, the more effective the business.

Documenting a Process

- The simplest way to document a process is to simply create a list.
- How to create an account on eBay, might look like this:
 1. Go to ebay.com.
 2. Click on “register.”
 3. Enter your contact information in the “Tell us about you” box.
 4. Choose your user ID and password.
 5. Agree to User Agreement and Privacy Policy by clicking on “Submit.”

Documenting a Process

- A list is not good enough for some processes. Below is a process diagram to determine if a new term should be added to Wikipedia.



Managing Business Process Documentation

- The requirement to manage process documentation has been one of the driving forces behind the creation of the *document management system*.
- A document management system stores and tracks documents and supports the following functions:
 - Versions and timestamps.
 - Approvals and workflows.
 - Communication.
- A document management system will notify the appropriate people when a change to a document is approved.

What is Business Process Modeling (BPM)?

Business process modeling (BPM) in business process management and systems engineering is the activity of representing processes of an enterprise, so that the current process may be analyzed, improved, and automated.

BPM is typically performed by

- ¤ business analysts, who provide expertise in the modeling discipline,
- ¤ subject matter experts, who have specialized knowledge of the processes being modeled;
- ¤ or more commonly by a team comprising both.

Business process modelling isn't a new concept. However, when implemented effectively it can help optimise business process and identify any challenges in your established systems.

Business process modelling gives you the opportunity to map out all of the steps in your business process, giving you a visual reference so that you can better understand, analyse and improve workflows.

Benefits

Business process modeling is a highly effective technique that offers organizations a broad range of benefits. Some of these benefits include:

- ❖ **Identifies areas for improvement.** The primary use of business process modeling is to provide stakeholders with a better understanding of the way that a process works with an eye towards implementing improvements.
- ❖ **Transparency.** A business process model shows how tasks are expected to be performed, who is accountable for them, and how a process contributes to the achievement of a business objective. This serves an important role in increasing trust and accountability throughout an organization.
- ❖ **Agility and flexibility.** Business objectives and strategies can change in an instant (think COVID-19). With business process modeling stakeholders can immediately identify and implement improvements consistent with new objectives.
- ❖ **Standardization across departments.** Many processes in an organization, particularly in larger ones, involve similar steps and tasks. For example, purchase order requests are often submitted at the unit level rather than the enterprise level. Using process models, stakeholders can identify best practices across units to implement efficient procedures throughout the organization.

Business process modeling can also help you group similar processes together and anticipate how they should operate. The primary objective of business process modeling tools is to analyze how things are right now and simulate how they should be carried out to achieve better results.

Types of business process models

- ❖ Business Process Modeling Notation (BPMN)
- ❖ UML Diagrams
- ❖ Flowcharts
- ❖ Gantt Charts
- ❖ Workflows
- ❖ Simulation
- ❖ Data Flow Diagrams
- ❖ Role Activity Diagrams
- ❖ Role Interaction Diagrams
- ❖ Integrated Definition for Function Modeling
- ❖ Object oriented methods
- ❖ Coloured Petri nets

1. Business Process Modeling Notation (BPMN)

BPMN diagrams are business process modeling tools that were developed by the Business Process Management Initiative (BPMI). The technique is like UML diagrams and is a standardized method for creating flowcharts – a step by step diagram of a process. Thus, when creating a process model, you use the elements specified under the BPMN methodology.

Business process modelling notation (BPMN) is comprised of symbols that are used as a representation of tasks and workflows. Any symbols can be used in your business process, but using standardised ones allows you to collaborate with outside analysts more easily, and it spares you from having to invent your own visual language.

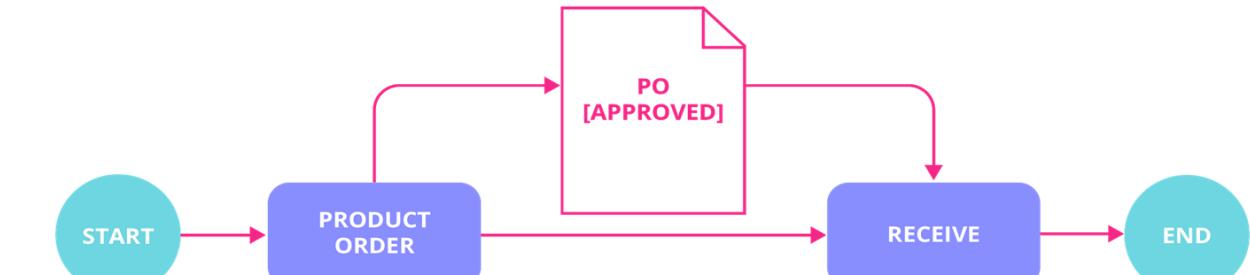
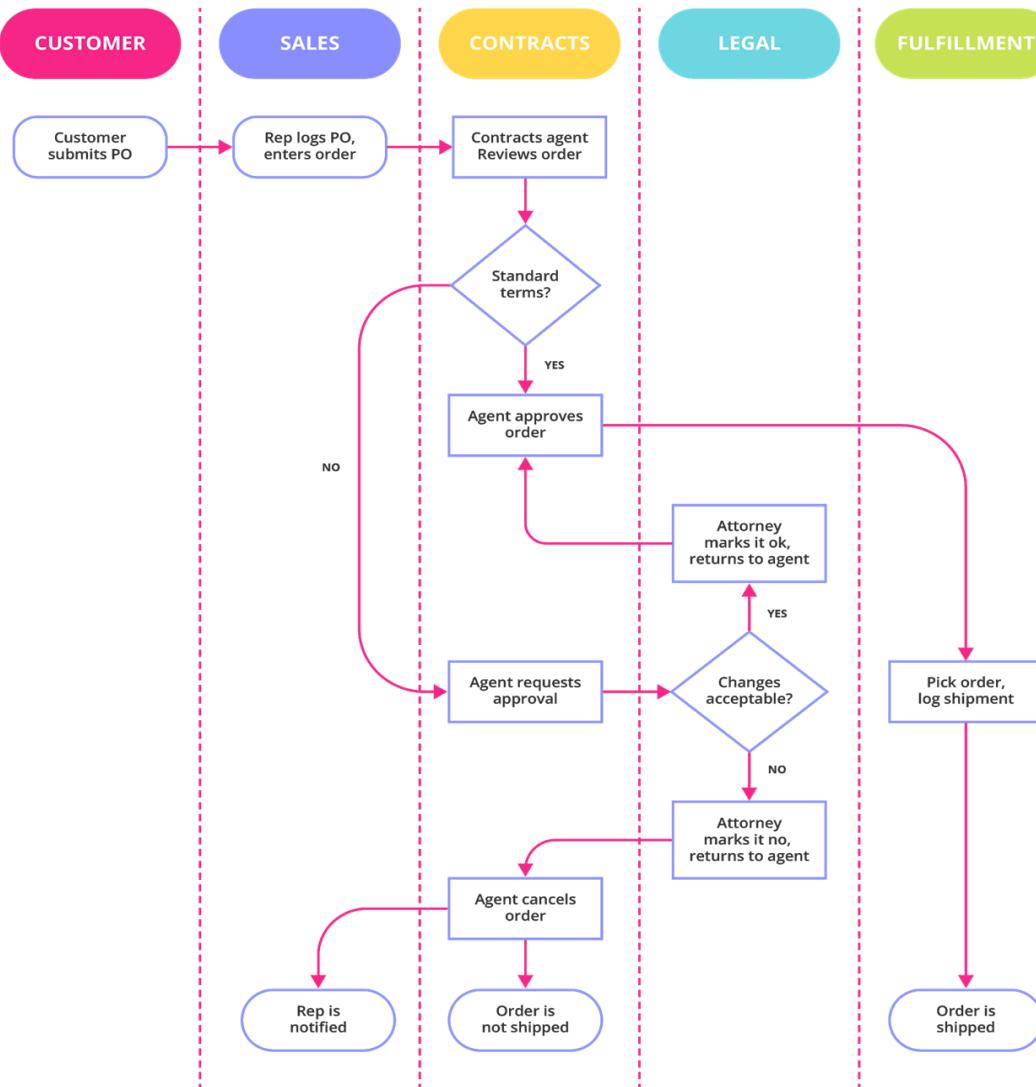
BPMN 2.0 has become something of a standard syntax used by process analysts and those who create business modeling tools. It is a relatively simple usage of lines, arrows, and geometric shapes that all communicate the flow and nuances of the process. A process consultant can look at a BPMN 2.0 model and know exactly how it should function.

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BPBMN symbols fall into the following categories:

- & Flow objects. Shows the flow of the process and are represented as follows:
 -  Circles. Events are displayed inside of circular shapes
 -  Rectangles. Activities fit into rectangular boxes
 -  Diamonds. Control points or gateways are represented as diamond shapes
- & Connecting objects. Used to show how tasks are connected, and in what sequence they occur
 -  Solid lines. Shows task transfers
 -  Dashed lines. Shows messages
- & Swim lanes. These make provision for subprocesses that share responsibilities and how they interact. The swimlanes are the people or departments that the subprocess impacts on
- & Artifacts. Used if you have additional information that isn't a sequence flow or message flow, but that will further explain the process
 -  Dotted lines. These point to the flow object that the extra information expands on
 -  Squares outlined with dots and dashes. These group related elements in the diagram
 -  Square bracket. Text annotations are added here

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Source: Brandall, B. (Apr, 2017). 'BPMN tutorial: quick-start guide to business process model and notation'. Retrieved from Process.st.

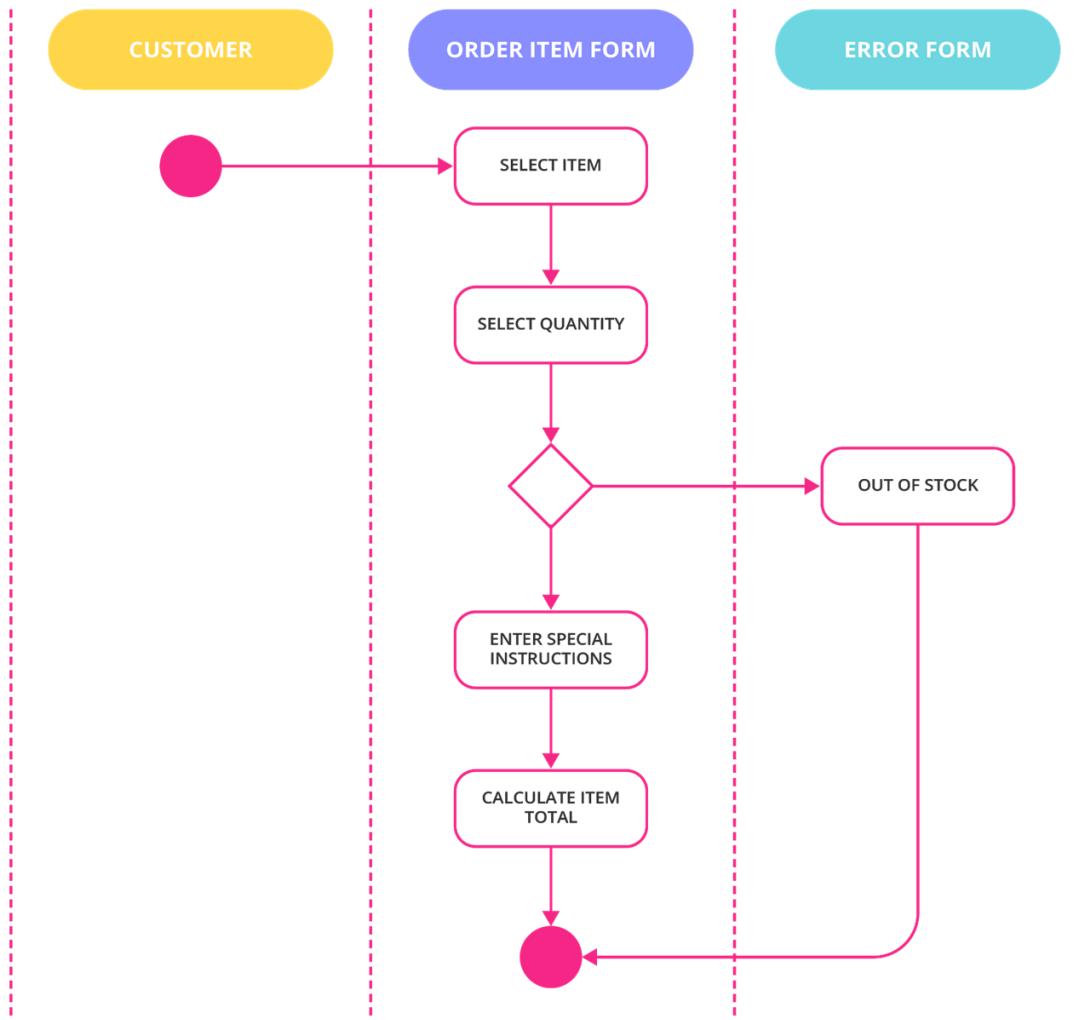
2. UML Diagrams

UML is a developmental modeling language that is used to provide a standardized way to visually represent a system. Diagrams include a system's actors, actions, roles, and classes and help to gain a better understanding of or to document a system. UML was created in 1994 and its rapid rise in popularity led to it being published as an approved ISO standard in 2005.

Unified modelling language (UML) is a more modern approach to modelling and documenting processes. UML was initially developed by software developers, but has been successfully used in business process modelling, with a more object-oriented approach to its 14 UML diagram types.

It is being widely used in businesses and according to experts, UML is an object-oriented representation chart whereas BPMN is process-oriented.

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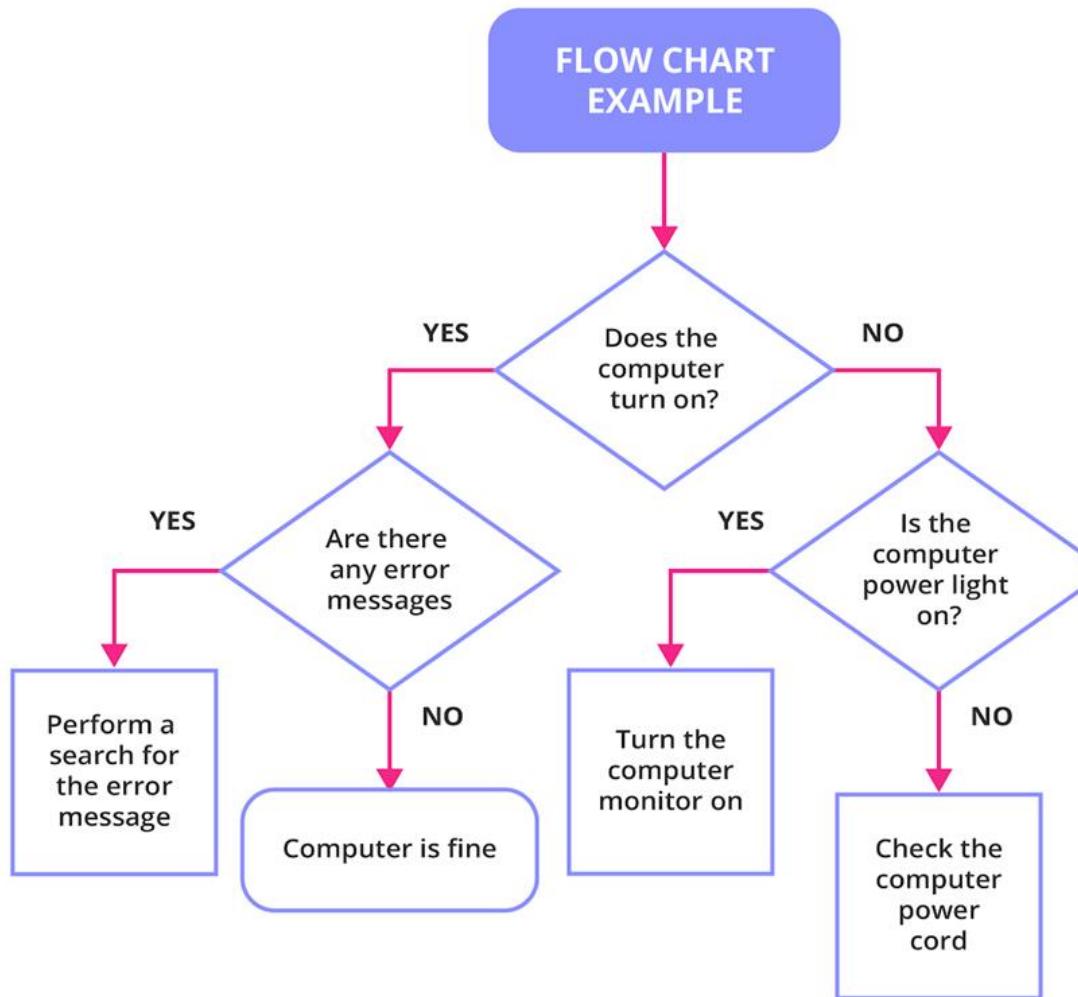
Source: (Sep, 2018). 'Business process modeling techniques with examples'. Retrieved from Creately.

3. Flowcharts

Flowcharts explain complex process flows in a simple yet effective way. They illustrate process steps in their sequential order, going from inputs to actual process to outputs. In fact, flowcharts provide the basic framework for BPMN to display advanced process flows.

This is a graphic representation of something that is manufactured or produced, which gives people involved in the project or process a single reference point. Flow charts use basic shapes and arrows to define relationships, such as processes, decisions, or data.

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BASIC FLOW CHART SHAPES

Cross-functional flowchart shapes

	Process		Decision
	Subprocess		Start/End
	Document		Data
<hr/>			
	Database		External Data
	Custom 1		Custom 2
	Custom 3		Custom 4
	On-page reference		Off-page reference

Source: (Nov, 2017). 'What is a flowchart'. Retrieved from Computer Hope.

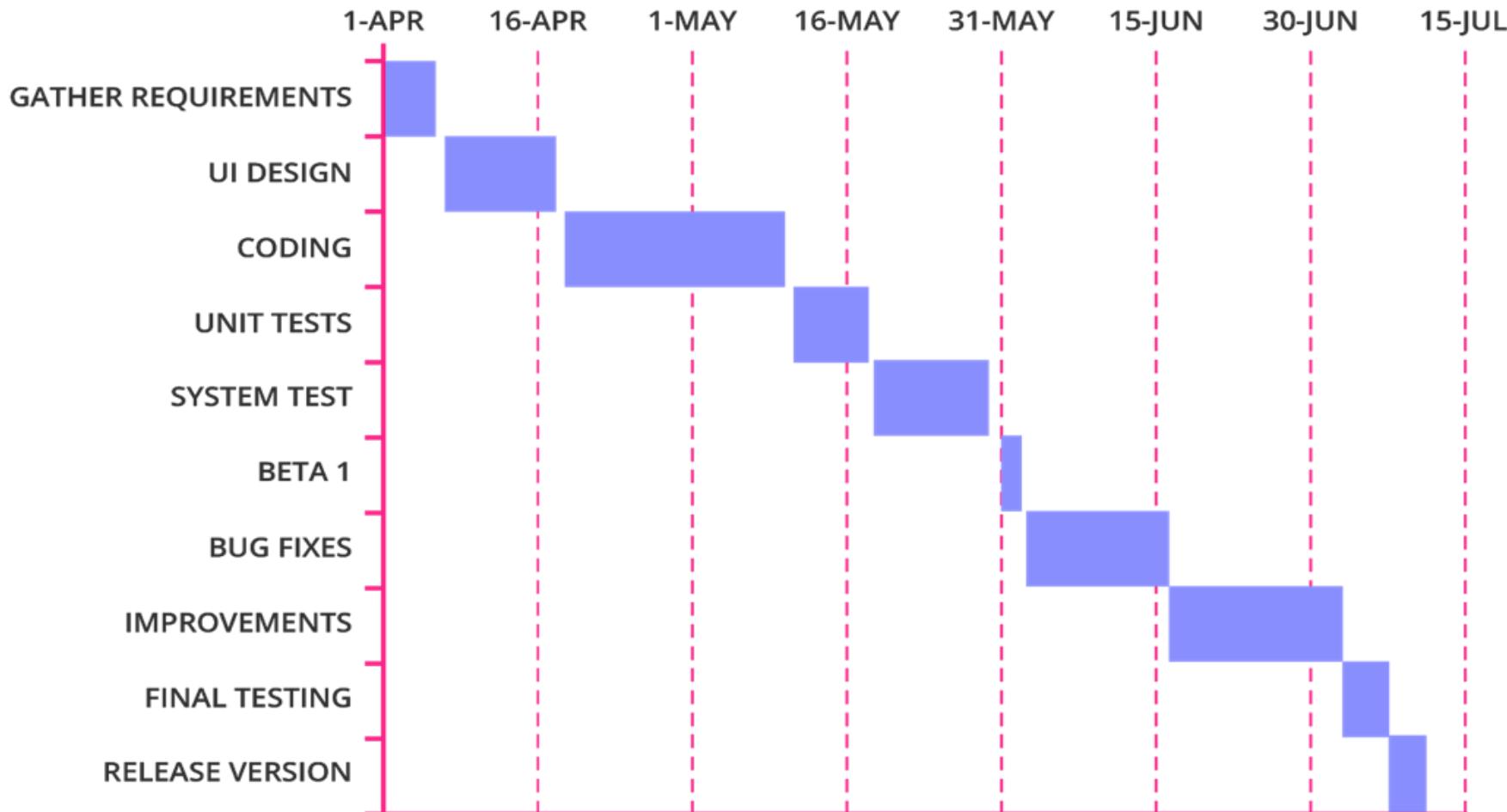
4. Gantt Charts

In the late 19th century, Gantt charts were the gold standard, and are often the go-to business process model for companies preparing for projects with distinct timelines, or that have time-sensitive processes that need to be captured and tracked. Gantt charts make it easy for people involved in different parts of a process to see when they are meant to start work, and by when each task should be complete, and to check whether all the subprocesses are on schedule.

Gantt charts are simplistic diagrams that provide a visualization of the overall time taken to complete a task or process. More specifically, Gantt charts can show the start and end times/dates of a process, the required tasks, and how long each took to complete.

Rather than showing the steps sequentially, Gantt charts are able to show the entire process using ‘time taken’ as one of the main axes. It does a better job of showing the overall time taken to complete a project than other options.

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Source: Cheusheva, S. (Feb, 2018). 'How to make a Gantt chart in Excel'. Retrieved from Ablebits.

5. Workflow Technique

Workflow is a flow of tasks between computer applications or people in an organization. Two or more members of a workgroup to reach a common goal can define a workflow as well as any task performed in series or in parallel. The work flow is more than a technique to model a process. It is a method to analyze and improve a process, including its modeling.

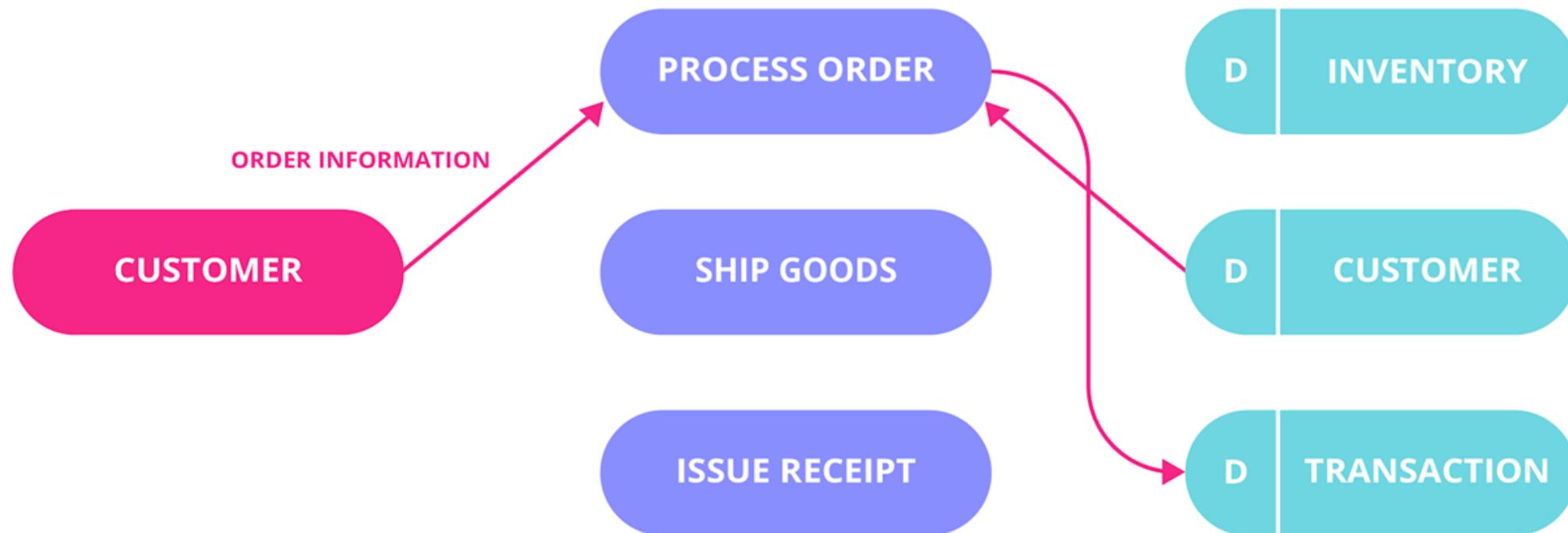
The workflow development process uses workflow models to capture the relevant information of the processes. This process comprises four stages: Information Gathering, Business Process Modelling, Workflow Modelling, Implementation and Verification & Execution.

6. Data Flow Diagrams

Data flow diagrams (DFDs) show how data enters a system from external sources, how data moves internally within the system, and how the data is stored. DFD symbols vary slightly, but are mostly based on the same principles:

- ❖ Squares. These show external entities, which are either the source of data, or the destination
- ❖ Rounded rectangles. These represent processes that receive data as input, interact with it, and then produce an output
- ❖ Arrows. These show the flow of data, either as electronic data or physical items
- ❖ Open-ended rectangles. This represents data stores, and include electronic stores like databases or XML files, as well as physical stores, such as filing cabinets or stacks of paper

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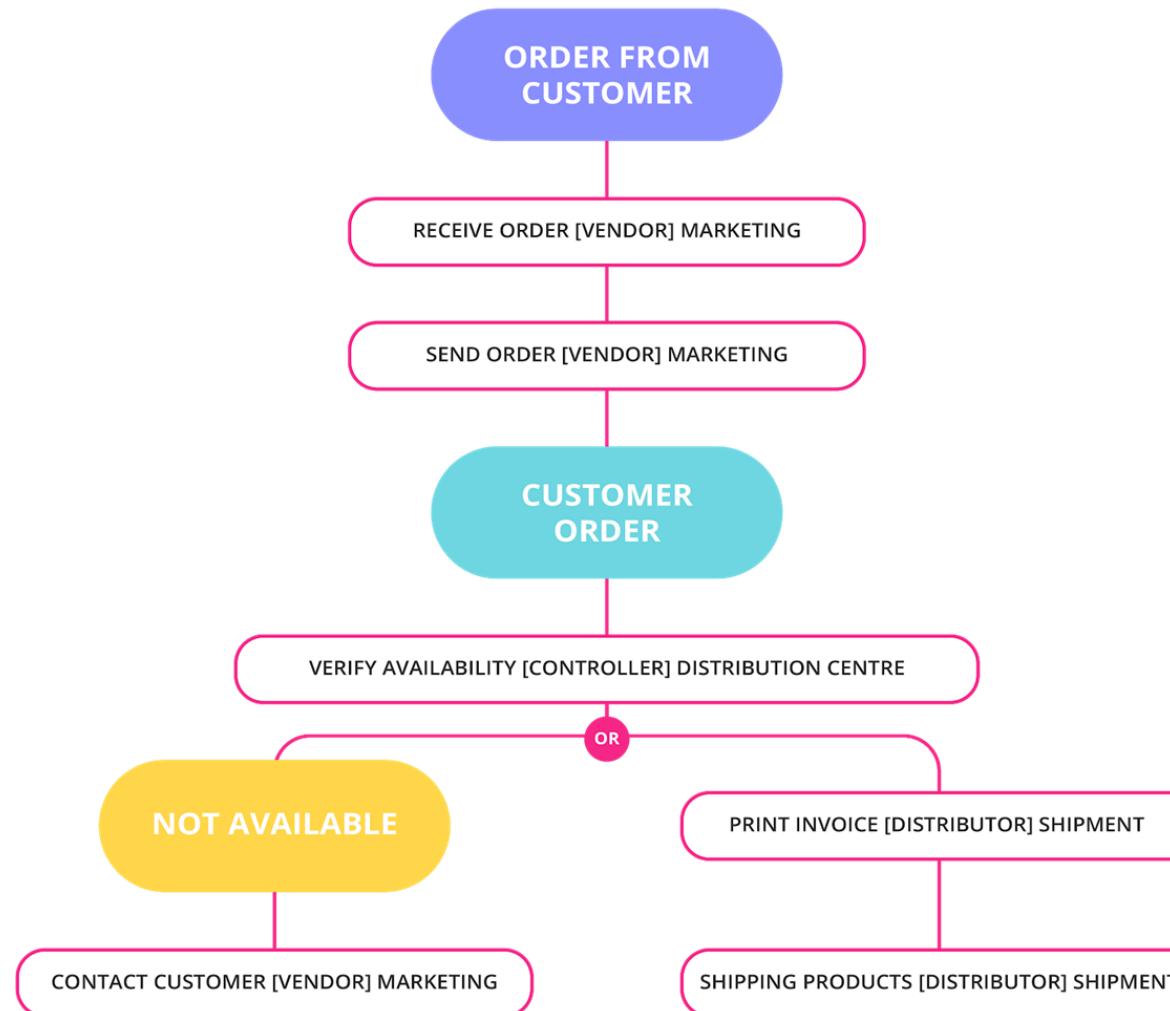
Source: (Nd). 'What is a data flow diagram (DFD)? How to draw DFD?'. Retrieved from Visual Paradigm. Accessed 22 April 2019.

7. Role Activity Diagrams

Role activity diagrams (RADs) are used to map out the intangible roles or ideas of behaviour that are desired within the company. These can often be functions within the business, systems in IT, or customer and supplier roles. RADs are easy to read and understand, and often provide a different perspective on a process, which helps support communication.

A RAD shows the roles that play a part in the process, and their component actions and interactions, together with external events and the logic that determines which actions are carried out when. So, it shows the activity of roles in the process and how they collaborate.

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8. Role Interaction Diagrams

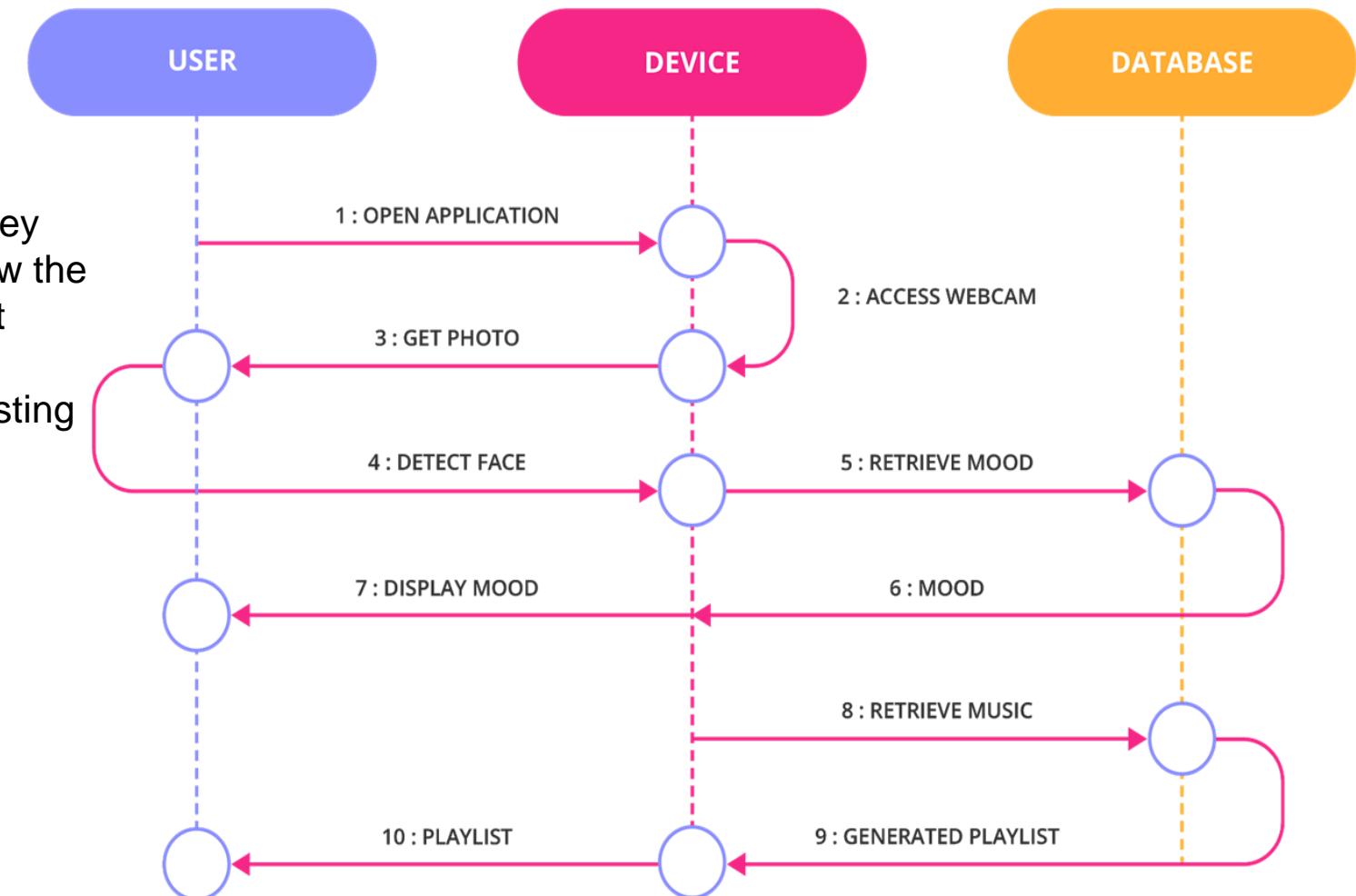
Interaction diagrams are business process models that graphically illustrate the interaction of various processes with each other within a system. Interaction diagrams come in two forms: sequence diagrams and collaboration diagrams. There are two types of interaction diagrams typically used to capture the various aspects of interaction in a system:

- ❖ Sequence diagrams
- ❖ Collaboration diagram

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Sequence diagrams

A sequence diagram shows the interaction between objects in the sequence in which they take place. Sequence diagrams describe how the objects function within a system, and in what order, and are often used to document and understand what is required for new and existing systems

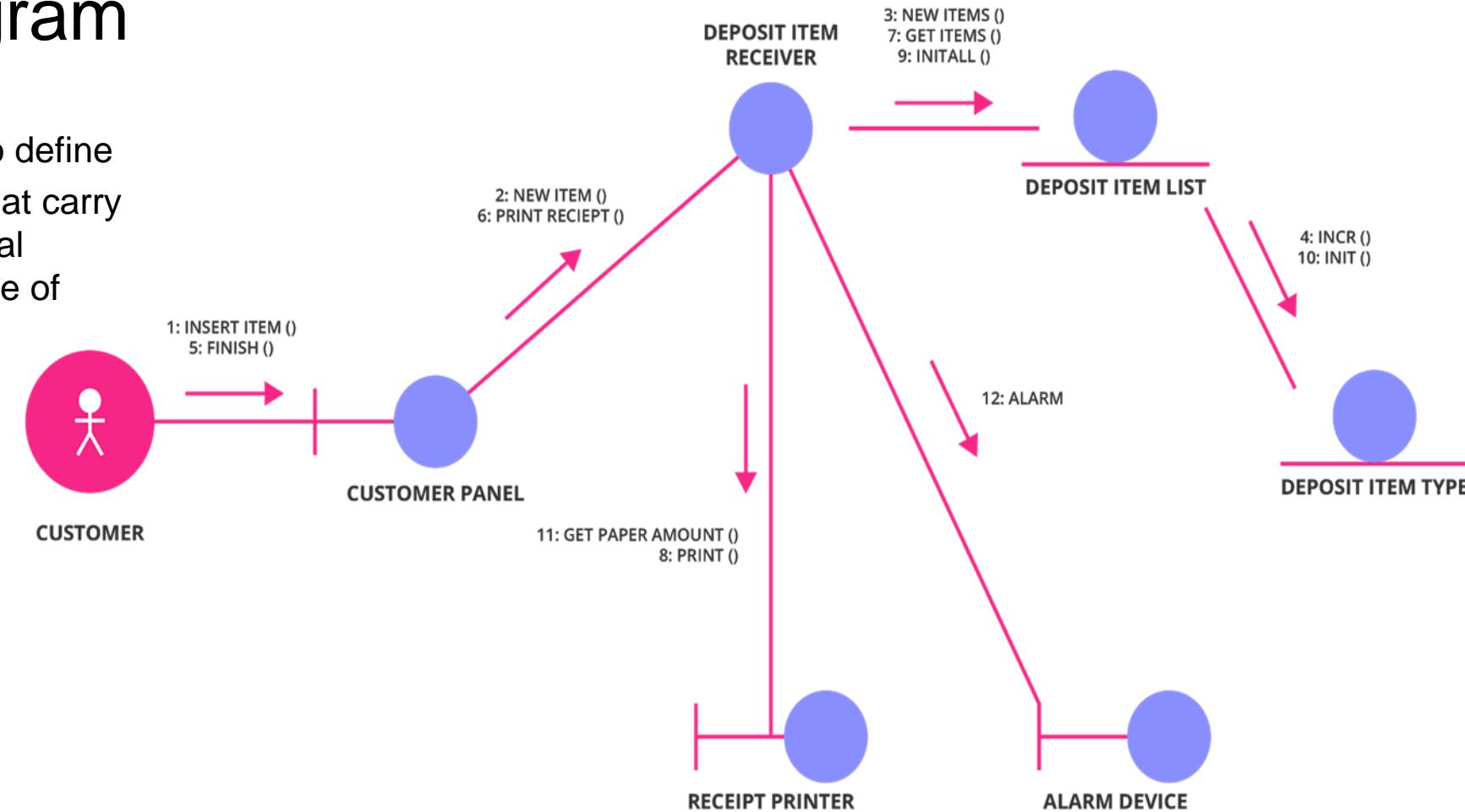


Source: Jain, A. (Nd). 'Unified modeling language (UML) | Sequence diagrams'. Retrieved from GeeksforGeeks. Accessed 22 April 2019.

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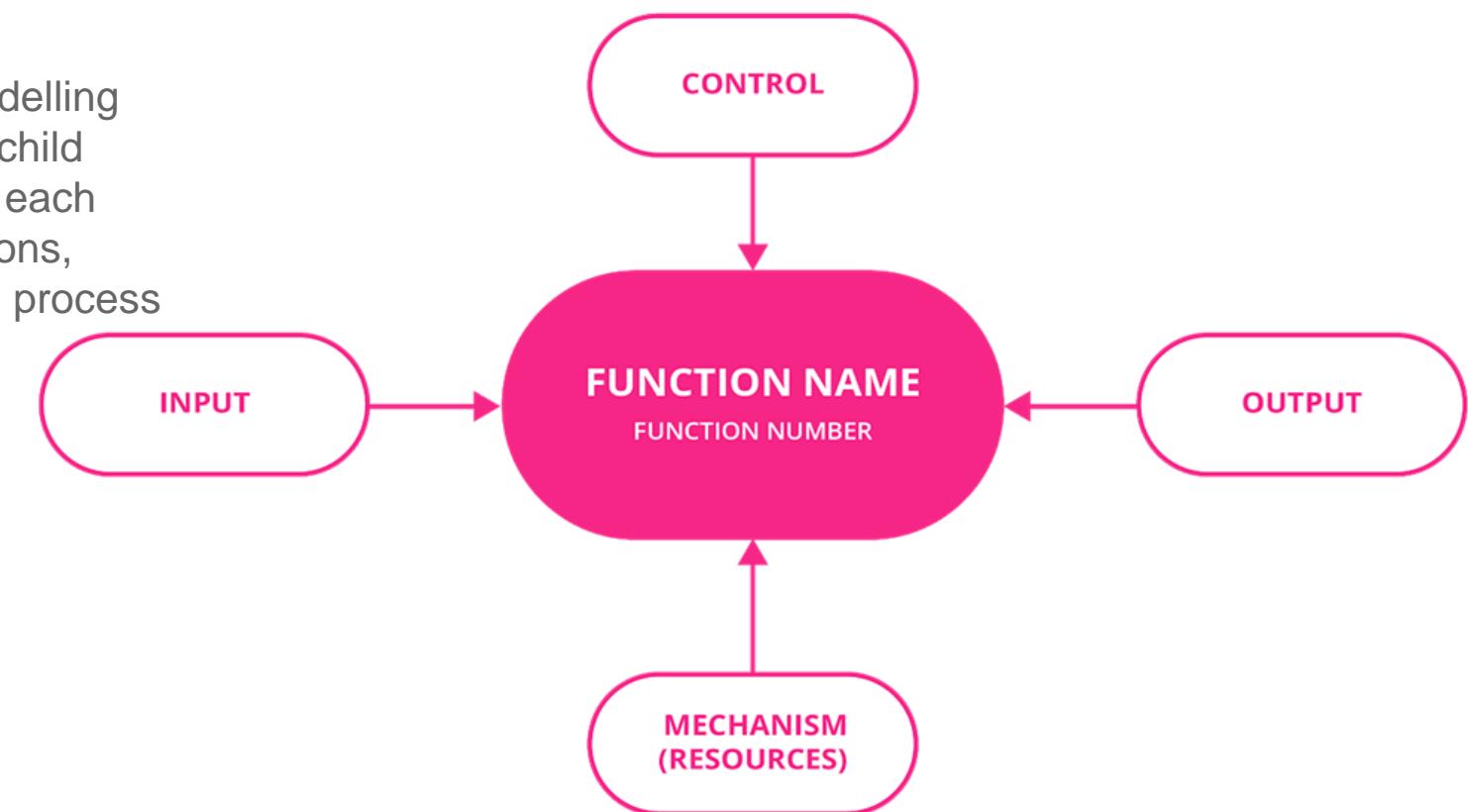
Collaboration diagram

Collaboration diagrams are used to define and clarify the roles of the objects that carry out a certain flow of events in a visual format, and serve as the main source of information when determining class responsibilities and interfaces



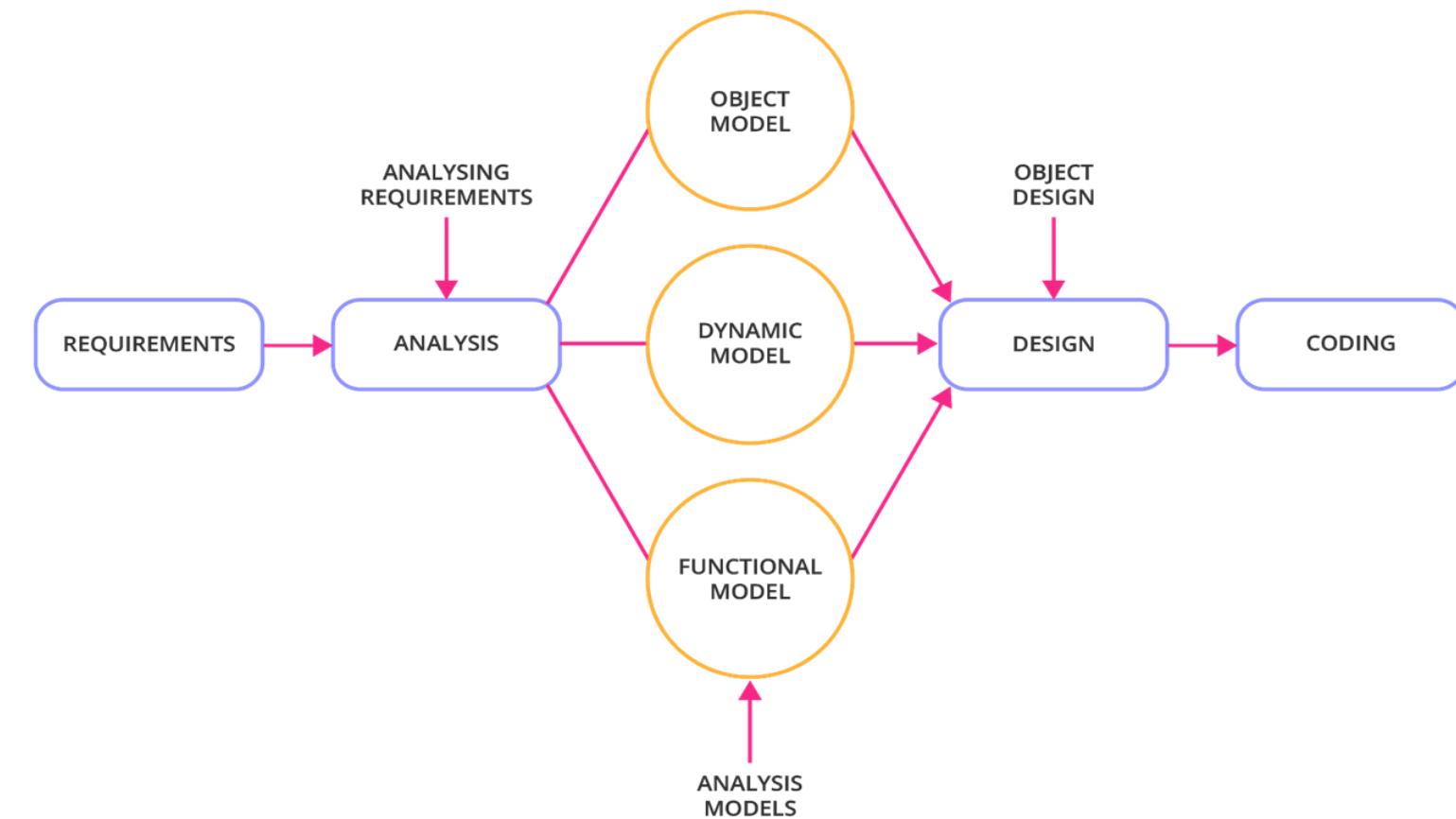
9. Integrated Definition for Function Modeling

Integrated definition (IDEF) for function modelling displays when parent activities give rise to child diagrams. There are 15 forms of IDEF and each addresses a different type of flow for functions, information, data, simulation model design, process description capture, and so on.



10. Object oriented methods

The object oriented method of business process modelling is more than just modelling with objects: it encompasses message-passing, encapsulation (where internal detail is hidden), inheritance from class to subclass, and polymorphism (where the same procedure can operate on different data types).



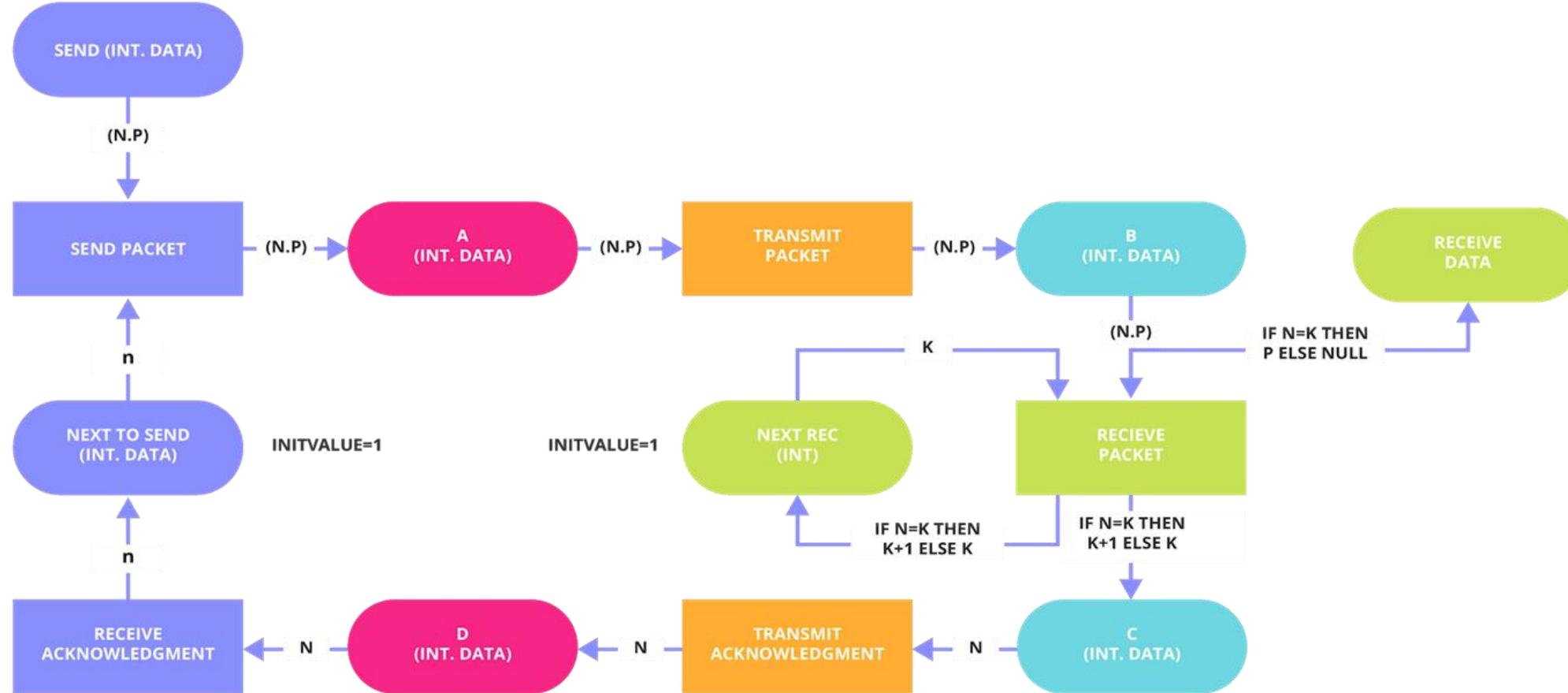
11. Coloured Petri nets

Traditionally a modeling technique in mathematics, petri-nets are also useful for modeling business processes. Petri-nets classify or color-code complex workflow steps, users, and routes in different colors

When a system has numerous processes that interact and synchronise with each other, then coloured Petri nets are ideal. This modelling technique is used to design, specify, simulate and verify systems.

Petri nets are unique in that they can represent both a state – such as passive, unsent, or waiting – and an action – such as send, receive, or transmit – in the same diagram. Coloured nets use colours to differentiate their symbols, and use a formal, mathematical representation with well-defined syntax and semantics.

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Source: (Sep, 2018). 'Business process modeling techniques with examples'. Retrieved from Creately.

12. Simulation

Simulation model comes in handy when you want to study a complex real-world system. You want to learn more about the system to make an informed decision but the complexity of the system prevents you from doing that directly.

Therefore you proceed indirectly by creating and studying another entity (the simulation model), which is sufficiently similar to the real-world system. Simulation can have many forms (for example, discrete-event simulation, continuous simulation, system dynamics, Monte-Carlo simulation, qualitative simulation, etc.).

TCO / ROI Agenda

- Understand TCO
- Learn to perform TCO calculations
- Understand ROI
- Learn to perform ROI calculations

TCO = “Total Cost of Ownership”

- TCO a type of calculation or business concept designed to help managers assess the economic value of an investment through its cost.
- In the IT world, your investment is usually a system (hardware/software) or a service.
- TCO calculations consist of both direct and indirect costs
 - **Direct Costs:** Are directly accountable to the investment.
Eg. Hardware, Software, Operation, and Admin. Costs
 - **Indirect Costs:** Are not directly accountable to the investment.
Eg. End user operations (support), Downtime, Loss of Productivity

TCO In Action

- TCO has demonstrated:
- Approximately 30% of the total cost of owning an Workstation is the cost of the computer and software
- The remaining 70% is support, downtime, and training.
 - This is the 30/70 principle.
 - This a \$2000 computer really costs \$6,666.67
 - (30% is \$2000 of \$6666.67)
- TCO can be applied to almost any investment
- Oftentimes we compare investments in term of which one has the lower TCO. This is known as a TCO analysis.

Example TCO Analysis – Open Source Software

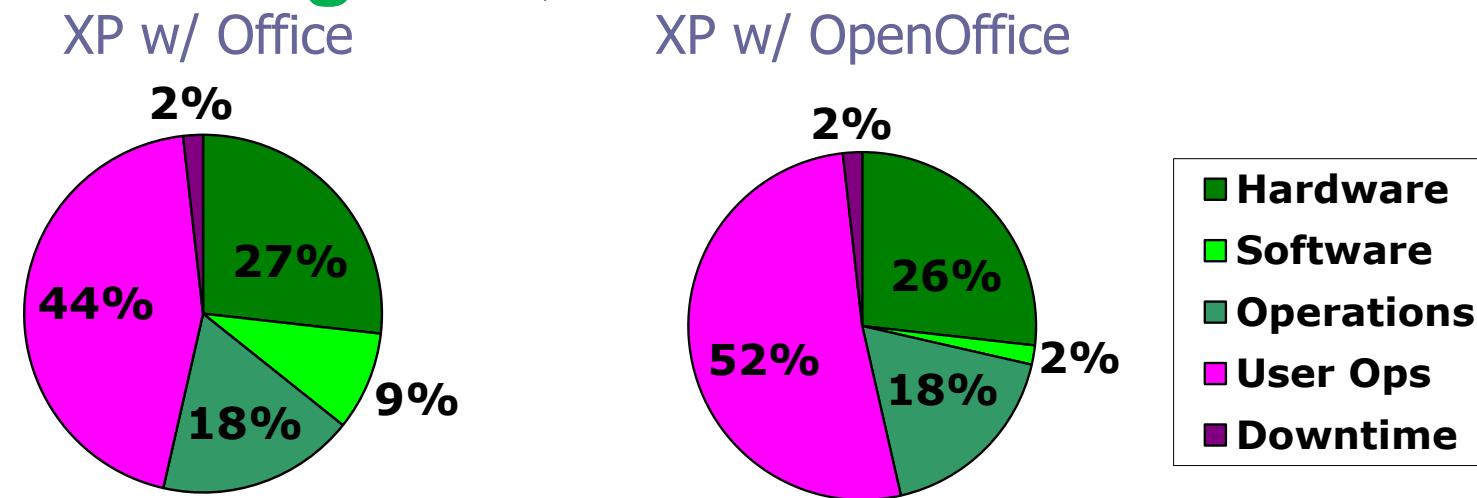
- Recent web articles have emphasized TCO as a key element in the Open-Source vs. proprietary software debate.
- OSS delivers lower Direct costs over proprietary software (due to reduced licensing costs).
 - Seems obvious enough!
- Several TCO studies claim OSS has higher indirect costs when compared to market-leading proprietary software.
 - How are they able to make this claim?

TCO Study By E-Week 4/26/2004

- Office 2003 vs. OpenOffice.Org
 - FN Manufacturing in Columbia, SC. 300 PC users.
 - Evaluating whether to switch from Office 97/2000 to OpenOffice 1.1.1 or Office 2003.
- Conclusion: OpenOffice a good fit for small shops:
 - OpenOffice = \$0 in direct costs
 - Office 2003 = $300 \times \$200 = \$60,000$ in direct costs
 - Both products have associated indirect costs, and similar switching costs.
 - **But will OpenOffice have more than \$60,000 worth of indirect costs during its lifetime (3 years)?**

Example TCO Analysis Study OSS and Indirect Costs

- Sample TCO analysis of the Same Windows XP computer with Microsoft Office and OpenOffice
- Direct costs are **green**, Indirect costs are **fuchsia**



Key Determining Factor:

software cost savings > gain in user operating costs + cost of switching

Important Software Evaluation Considerations

- Evaluate TCO numbers for yourself.
 - Estimate your own direct costs, based on hard numbers.
 - Indirect costs can be very difficult to calculate.
- Don't Ignore the traditional software selection process:
 - Identify, Review, Compare, Analyze
- Don't forget the cost of switching:
 - Training Costs
 - Deployment Costs
 - Training and consistent deployment help reduce indirect costs.
 - Switching costs can be an **enormous** indirect cost.

ROI = “Return on Investment”

- ROI is a type of calculation designed to help managers assess the economic value of an investment through its potential
- $\text{ROI} = (\text{gain}-\text{cost})/\text{cost}$
- Example gain=\$7,500 cost=\$5,000 $\text{ROI}=50\%$
- Positive ROI is good, negative is bad.
- ROI is used in IT to help compare similar IT investments.

ROI Example: Selling Products on the Web

- You work for a parts distributor. Currently you do not sell products on line.
- A) A Recent TCO study has revealed it will cost \$12,000/year to begin selling products on the web.
- If you would like a 25% ROI, what is the expected gain?
- B) If another option is to partner with Amazon.com to sell your parts on line at a cost of \$5,000/year What is the expected gain for the same 25% ROI? Is it better?
- C) If the marketing department claims that by spending \$5,000 next year on local advertising they can generate an additional \$9000 in sales boost sales
- Which option has the best ROI?

ROI Example: Selling Products on the Web

- A) $.25 = (\text{gain} - 12000)/12000 \rightarrow 3000 = \text{gain} - 12000 \rightarrow \text{gain} = 15,000$
- B) $.25 = (\text{gain} - 5000)/5000 \rightarrow 1250 = \text{gain} - 5000 \rightarrow \text{gain} = 6,250$
- C) $\text{ROI} = (9000-5000)/5000 \rightarrow \text{ROI} = 4000/5000 = .8$
- Option C has the highest ROI.
- Option A and B have the same ROI but option B has a lower TCO so...
- Option B is better than option A

Datacenter Virtualization

Virtualization (to-be)

- Hardware Costs?
- Software Costs?
- Training Costs?
- SA Labor Costs?
- Effect on Users or Downtime?
- Others?

No Virtualization (as-is)

- Hardware Costs?
- Software Costs?
- Training Costs?
- SA Labor Costs?
- Effect on Users or Downtime?
- Others?

Some people feel this is a no-brainer from a TCO/ROI. Is it?
Just Google Datacenter virtualization TCO and read away...

Datacenter TCO and ROI Resources

■ Whitepaper

□ http://www.vmware.com/files/pdf/tco_roi_methdology.pdf

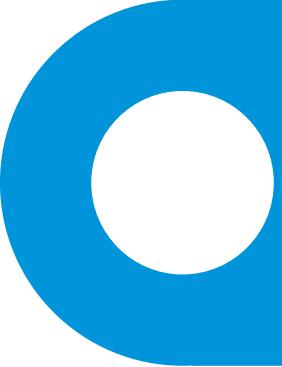
■ Calculators:

■ VMWare:

□ <http://www.vmware.com/files/elqNow/elqRedir.htm?ref=http://www.vmware.com/go/calculator>

■ Microsoft:

□ <https://roianalyst.alinean.com/msft/AutoLogin.do?d=307025591178580657>



Заклучок

ETL

(Extract-Transform-Load)

Integrated Systems



Main Goals

- Challenges: Large volumes of data from multiple data sources. Two *heterogeneity* problems:
 - Different parameters
 - Different meaning of information
- Existing frameworks for integrating data across disparate platforms
- Extracts and transforms data from multiple systems and loads it into data repository (ETL)
- Metadata and Data Content Management (Terminology, mappings, etc)

Questions to be addressed before ETL process

- Data Transformation?
 - provide data in term of common and/or native format ?
- Data Push or pull ?
- Simple file upload or Web Service?
- Data repository with analyzing tool ?
- Checking rules ?
- Interactive data browser ?
- Open Source?

DEFINITION

- **Component of BI**

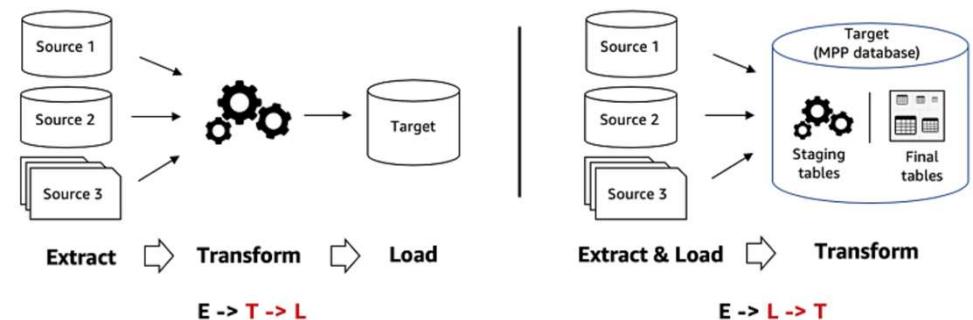
ETL is the set of process that includes extraction, transformation and loading data

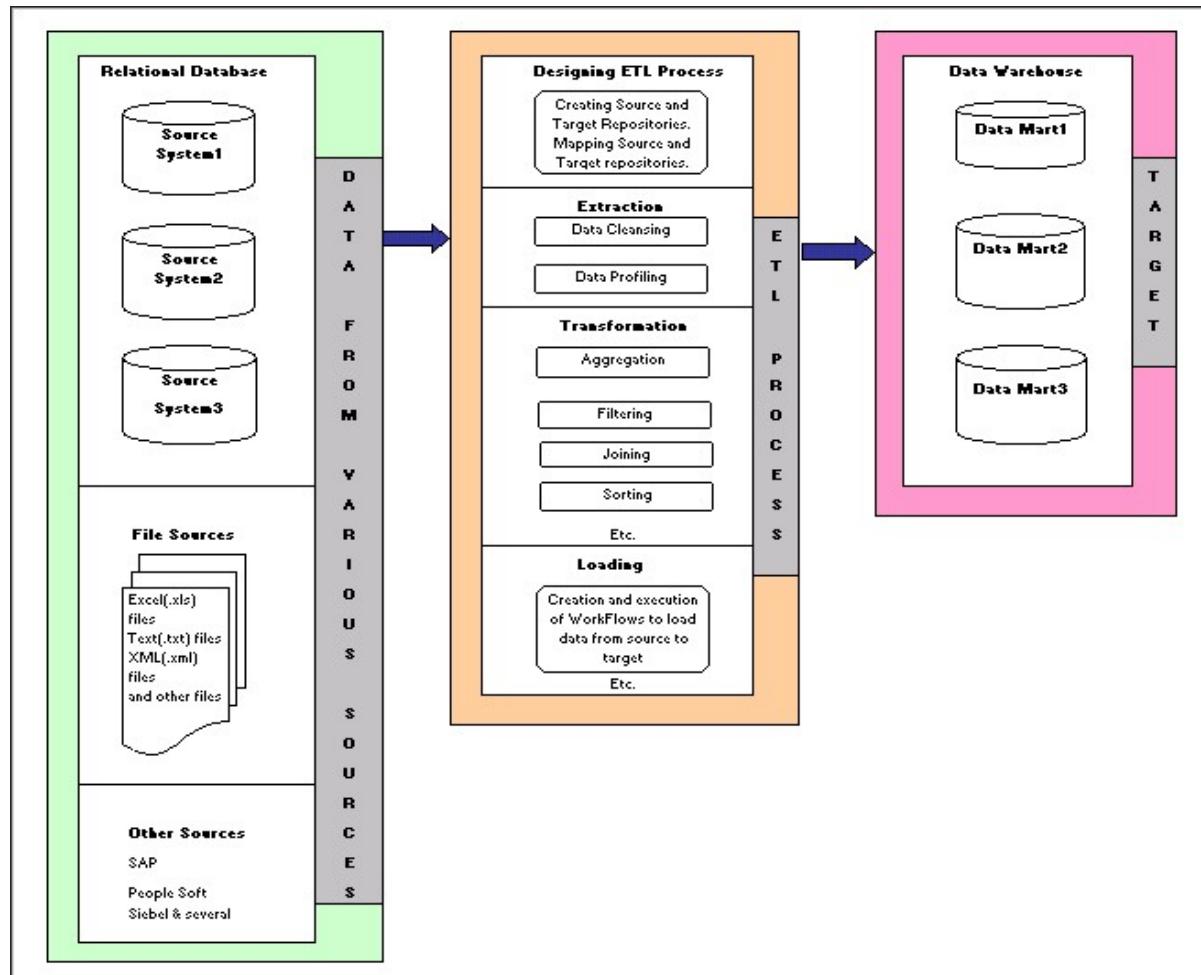
Data warehouses are supplied by ETL processing

Data are moved from sources to target databases

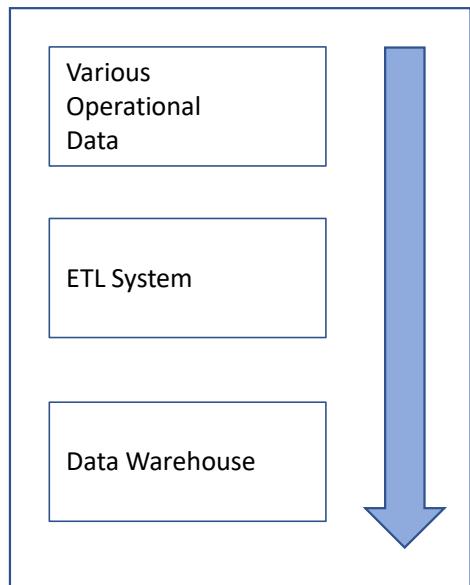
It is A very costly and time-consuming part of data warehousing

ELT : Extract – Load – Transform





Extract



- Data is extracted from data sources
 - DBMS
 - Operating Systems
 - Hardware
 - Communication protocols
 - Documents
 - Third party files/sources
- Different systems may exist
 - DBMS
 - Operating Systems
 - Hardware
 - Communication protocols
 - Documents
 - Third party files/sources
- Needs logical data map document that includes rules, sources and target tables definitions

TRANSFORMATION

Transformation is the **main step** where the ETL adds value

Actually changes data and provides guidance for its intended purposes

Includes : aggregation/disaggregation, sorting, cleaning dirty data,

Checking for data integrity and applying business rules

Could be done by SQL codes or ETL tools

Dirty Data:

What is the dirty data ?

1) Lack of Standardization

- Multiple encoding, locales, languages..
- Different abbreviations (bul. Partizanski Odredi, ul. Bul. P. Odredi, Partizanska...)
- Semantic equivalence (Trajkovski Trajko, T. Trajko)
- Multiple standards : 1.6 miles is the same as 1 kilometer

Because OLTP s are different cities or different countries, different abbreviations or standards may be used)

Dirty Data (Cont'd)

2) Missing, incorrect and duplicate data

- Missing age field for an employee
- Incorrectly entered values
- Duplication of datasets across OLTP units
- Semantic duplication

what is the correlation the age of the staff between their performance ? We need to know age .

3) Inconsistencies

- Incorrect use of codes
(M/F is used somewhere, 0/1 is used in others for gender)

there could be inconsistent data..

- Referential inconsistency (for example there is 24 as department id, although there isn't a department which id is 24)

Transformation – Data Cleaning

- Dirty data is cleaned in transformation processs.
- While cleaning data,
standardizing is important. So, Companies decide on the standards.
- Data cleaning is not a simple issue
It is not automatically and required considerable knowledge
Complexity increases with increasing data sources

For example ; there is one km in a record; and there is 1 mile in a record.
Or there may be abbreviation of a street
You should know geography, metrics, so on to compare and clean data.

Data Cleaning Steps

1. Data Analysis : Analyse data set to obtain meta-data and detect dirty data
2. Definition of transformation rules
3. Rule Verification : Verification of the transformation rules on test data sets
4. Transformation : Execution of transformation rules on dataset
5. Back flow: Re-populating data sources with cleaned data

Transformation – Confirming DB Structure

Tables should :

- have proper primary and foreign keys
- obey referential integrity
- simple business rules
- Provide logical data checks

Data transformation

- **Extraction and parsing**

- In the modern ELT process, data ingestion begins with extracting information from a data source, followed by copying the data to its destination. Initial transformations are focused on shaping the format and structure of data to ensure its compatibility with both the destination system and the data already there. Parsing fields out of comma-delimited log data for loading to a relational database is an example of this type of data transformation.

- **Translation and mapping**

- Some of the most basic data transformations involve the mapping and translation of data. For example, a column containing integers representing error codes can be mapped to the relevant error descriptions, making that column easier to understand and more useful for display in a customer-facing application.
- Translation converts data from formats used in one system to formats appropriate for a different system. Even after parsing, web data might arrive in the form of hierarchical JSON or XML files, but need to be translated into row and column data for inclusion in a relational database.

- **Filtering, aggregation, and summarization**

- Data transformation is often concerned with whittling data down and making it more manageable. Data may be consolidated by filtering out unnecessary fields, columns, and records. Omitted data might include numerical indexes in data intended for graphs and dashboards or records from business regions that aren't of interest in a particular study.
- Data might also be aggregated or summarized. by, for instance, transforming a time series of customer transactions to hourly or daily sales counts.
- BI tools can do this filtering and aggregation, but it can be more efficient to do the transformations before a reporting tool accesses the data.

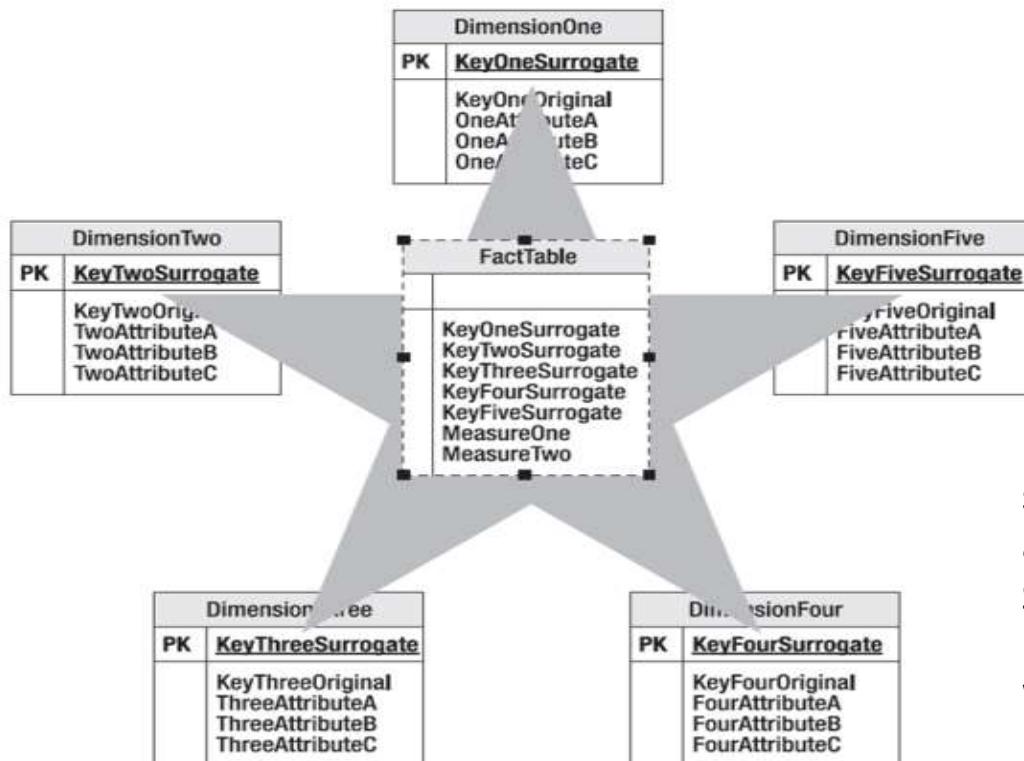
Data transformation (cont.)

- **Enrichment and imputation**
 - Data from different sources can be merged to create denormalized, enriched information. A customer's transactions can be rolled up into a grand total and added into a customer information table for quicker reference or for use by customer analytics systems. Long or freeform fields may be split into multiple columns, and missing values can be imputed or corrupted data replaced as a result of these kinds of transformations.
- **Indexing and ordering**
 - Data can be transformed so that it's ordered logically or to suit a data storage scheme. In relational database management systems, for example, creating indexes can improve performance or improve the management of relationships between different tables.
- **Anonymization and encryption**
 - Data containing personally identifiable information, or other information that could compromise privacy or security, should be anonymized before propagation. Encryption of private data is a requirement in many industries, and systems can perform encryption at multiple levels, from individual database cells to entire records or fields.
- **Modeling, typecasting, formatting, and renaming**
 - Finally, a whole set of transformations can reshape data without changing content. This includes casting and converting data types for compatibility, adjusting dates and times with offsets and format localization, and renaming schemas, tables, and columns for clarity.

LOADING

- Loading is the third part of the ETL process
- Loading is performing transformed data to the target Data Warehouse
- Data is physically moved to Data Warehouse
- Data Warehouse is a star-schema (or snowflake...)
- To provide data integrity : first dimension tables and then fact tables are loaded
- Generally only change data is loaded

Loading to DW



Dimension tables have a surrogate key, Normal key and attributes,
Surrogate key should be a unique integer, a single field
While normal key may have multiple field.

Slowly Changing Dimensions

The "Slowly Changing Dimension" problem is a common one particular to data warehousing.

Briefly, this applies to cases where the attribute for a record changes over time.

We give an example:

Customer Id	Name	City
1001	Jovana Trajkovska	Skopje

Later she moved to Pehchevo.

How should company modify its customer table to reflect this change? This is the "Slowly Changing Dimension" problem.

There are three ways to solve this type of problem, and they are categorized as follows:

Type 1: The new record replaces the original record. No trace of the old record exists.

Type 2: A new record is added into the customer dimension table. Therefore, the customer is treated essentially as two people.

Type 3: The original record is modified, but the old value is also kept.

Type 1 Dimension

The new information simply overwrites the original information. In other words, no history is kept.

New record will be:

Customer Id	Name	City
1001	Jovana Trajkovska	Pehchevo

This is the easiest way to handle the Slowly Changing Dimension problem. But the historical data is lost. Company doesn't know the previous city of the Customer.

This type can be used when history of data is not important.

Type 2 Dimension

A new record is added to the table to represent the new information. Therefore, both the original and the new record will be present. The new record gets its own primary key.

Result will be :

Customer Id	Name	City
1001	Jovana Trajkovska	Skopje
1002	Jovana Trajkovska	Pehchevo

In this approach, history of data is kept. But, the size of the table will increase. And ETL process will be complicated.

When tracking the changes is important, this type of dimension could be used.

Type 3 Dimension

In Type 3 Slowly Changing Dimension,

There will be two columns to indicate the particular attribute of interest, one indicating the original value, and one indicating the current value.

There will also be a column that indicates when the current value becomes active (date value)

After Customer moves to Istanbul, the table will be shown as below:

customer_id	name	original_city	current_city	effective_date
1001	Jovana Trajkovska	Skopje	Pehchevo	24.03.2021

Keeps some historical data, (only 1 historical data, here)

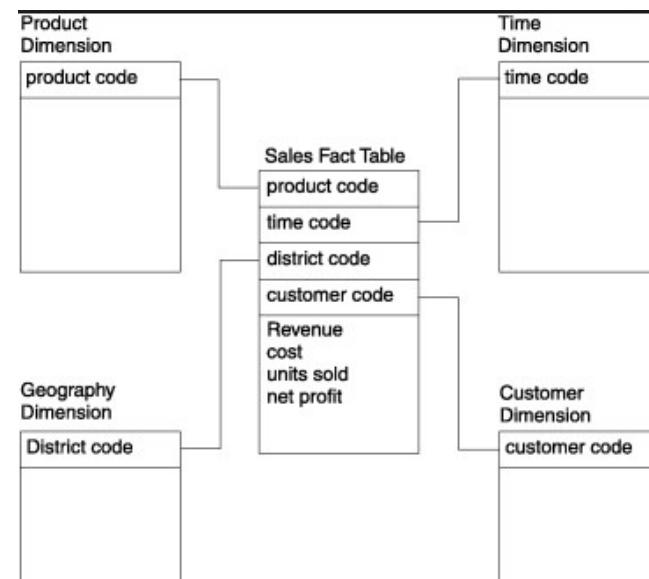
size is not increasing more.

This type is rarely used.

Loading Fact Tables

Fact table consists of

- Dimensions' keys
- Measures



Metadata Repository

Metadata defines warehouse objects

It stores:

Description of the structure of the data warehouse

Operational meta-data

The algorithms used for summarization

The mapping from operational environment to the data warehouse

Data related to system performance

Business data, business rules

Most Popular ETL Tools are:

- Informatica
- Power CenterIBM
- SAP - BusinessObjects Data Integrator
- IBM - Cognos Data Manager
- Microsoft - SQL Server Integration Services
- Oracle - Data Integrator
- SAS - Data Integration Studio
- Oracle - Warehouse Builder
- Open Source Examples:** Pentaho, Talend,..

Advantages of ETL Tools

The single greatest advantage of an ETL tool is that it provides a visual flow of the system's logic.

It also provides attractive, self documentation.

These tools provide monitoring the ETL system.

Manual coded is also useable in ETL tools.

Finding data dependencies will be easier if needed after or before any change.

These tools have cleaning functionality.

Performance may be better in some situations.

Using an ETL tool will be easier for inexperienced developer.

Disadvantages of ETL Tools

Software licensing cost is the most important disadvantage (more than 1000\$ per user per month...)

There is uncertainty in many ETL teams. They may use only few features of the Tools.
Finding experienced ETL team is difficult.

Sometimes, flexibility is limited. They have some limits and experience is needed.

Developers may resist to use a new tool

So, Should we use an ETL tool ? ..

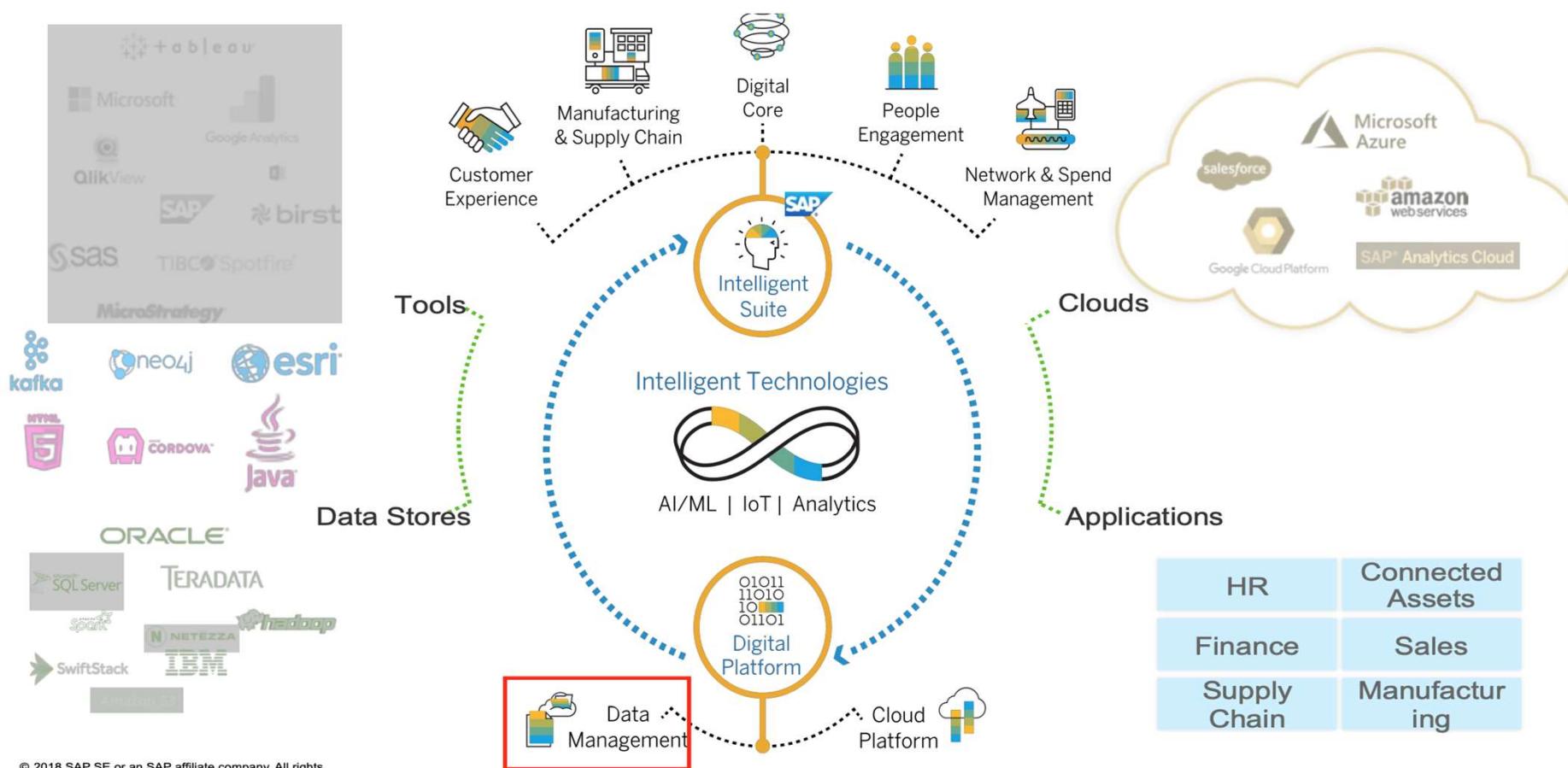
Because, each company has different data size, business rules, etc. , tool necessity should be evaluated according to their criterias.

So decision is **different** for each company.

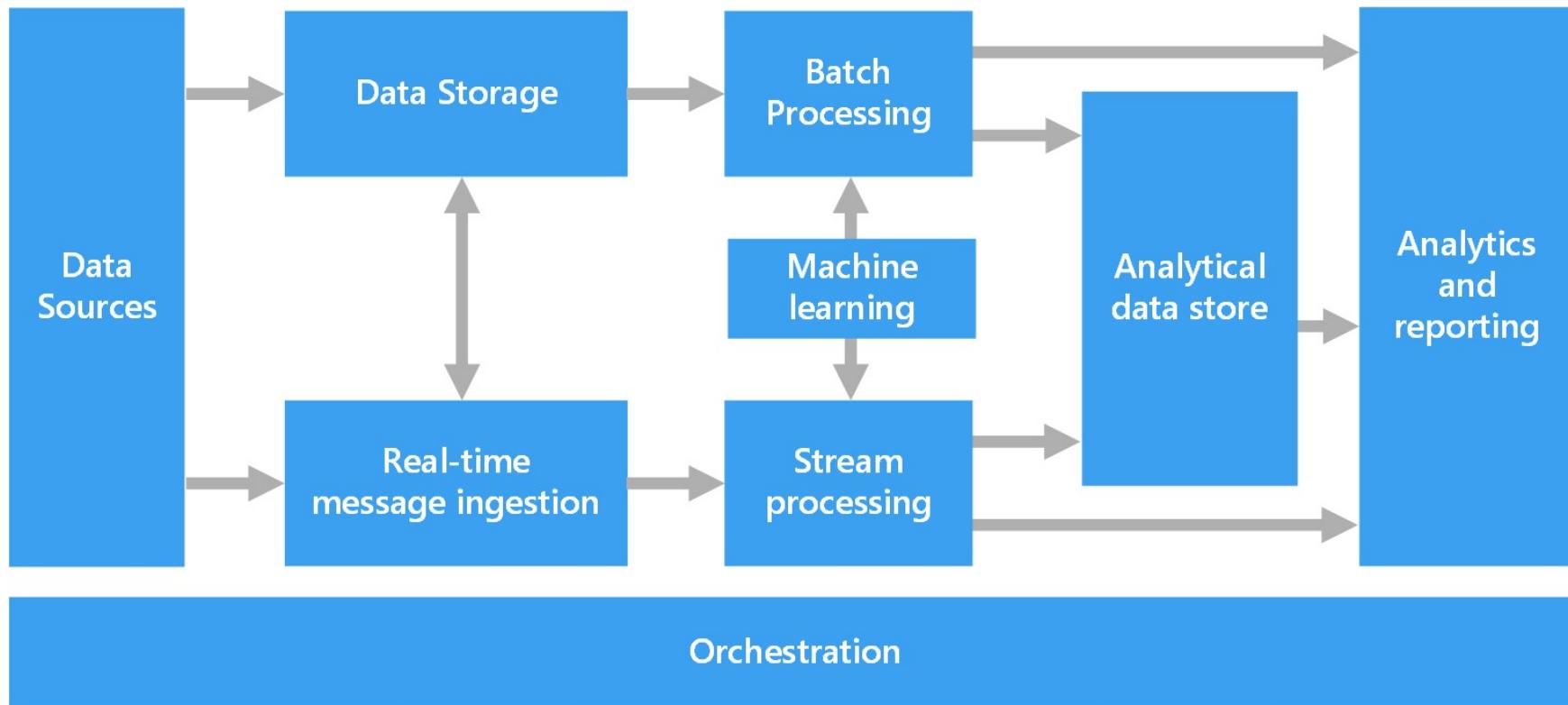
Key Points:

- ETL is often a complex combination of process and technology
- ETL is not a one-time event
- It should be performed periodically (monthly, daily, hourly)
- Should be automated, well **documented** and easily changeable
- Steps are; data cleaning, integrating and loading
- First dimensions, then fact table are loaded
- There are some useful ETL tools but they are not always necessary

THE BIG PICTURE



Logical components in Big Data era (Azure)



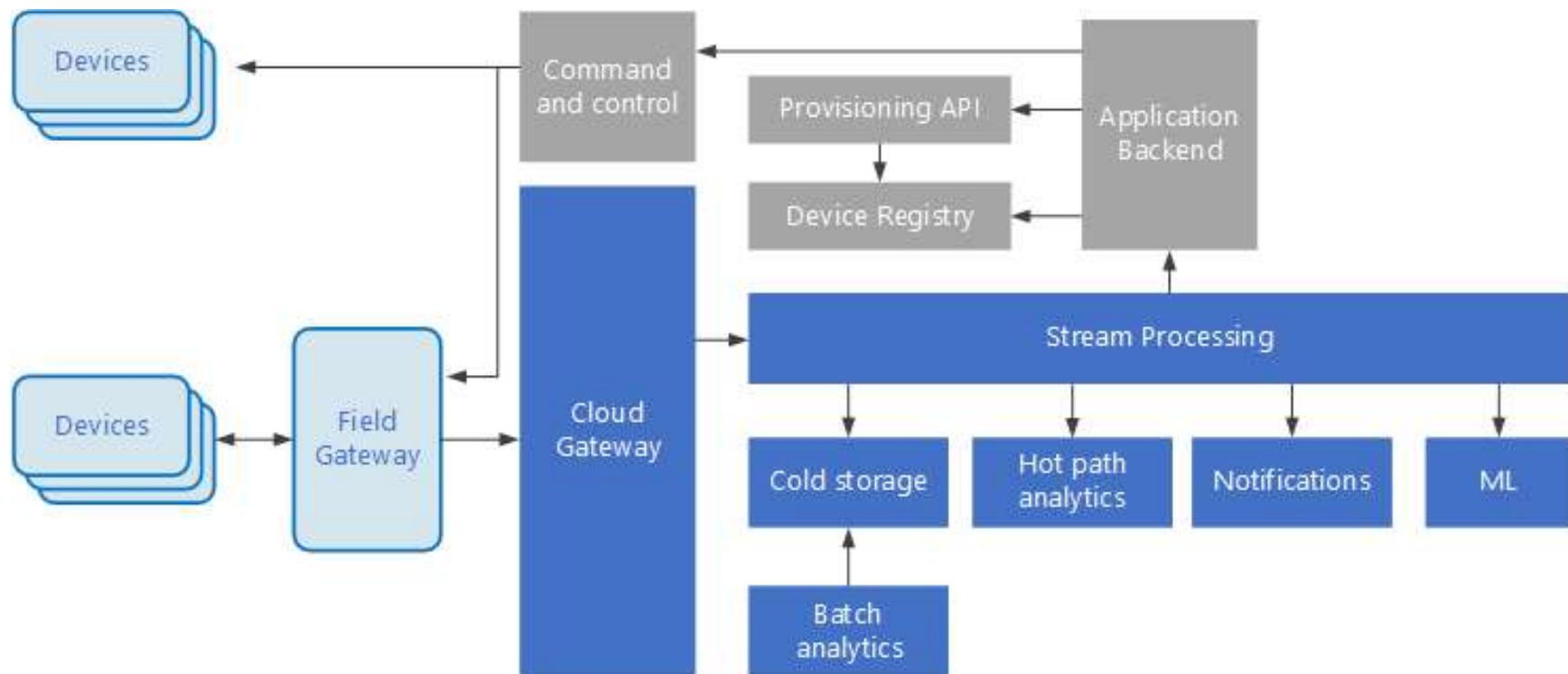
Workload types

- Big data solutions typically involve one or more of the following types of workload:
- Batch processing of big data sources at rest.
- Real-time processing of big data in motion.
- Interactive exploration of big data.
- Predictive analytics and machine learning.

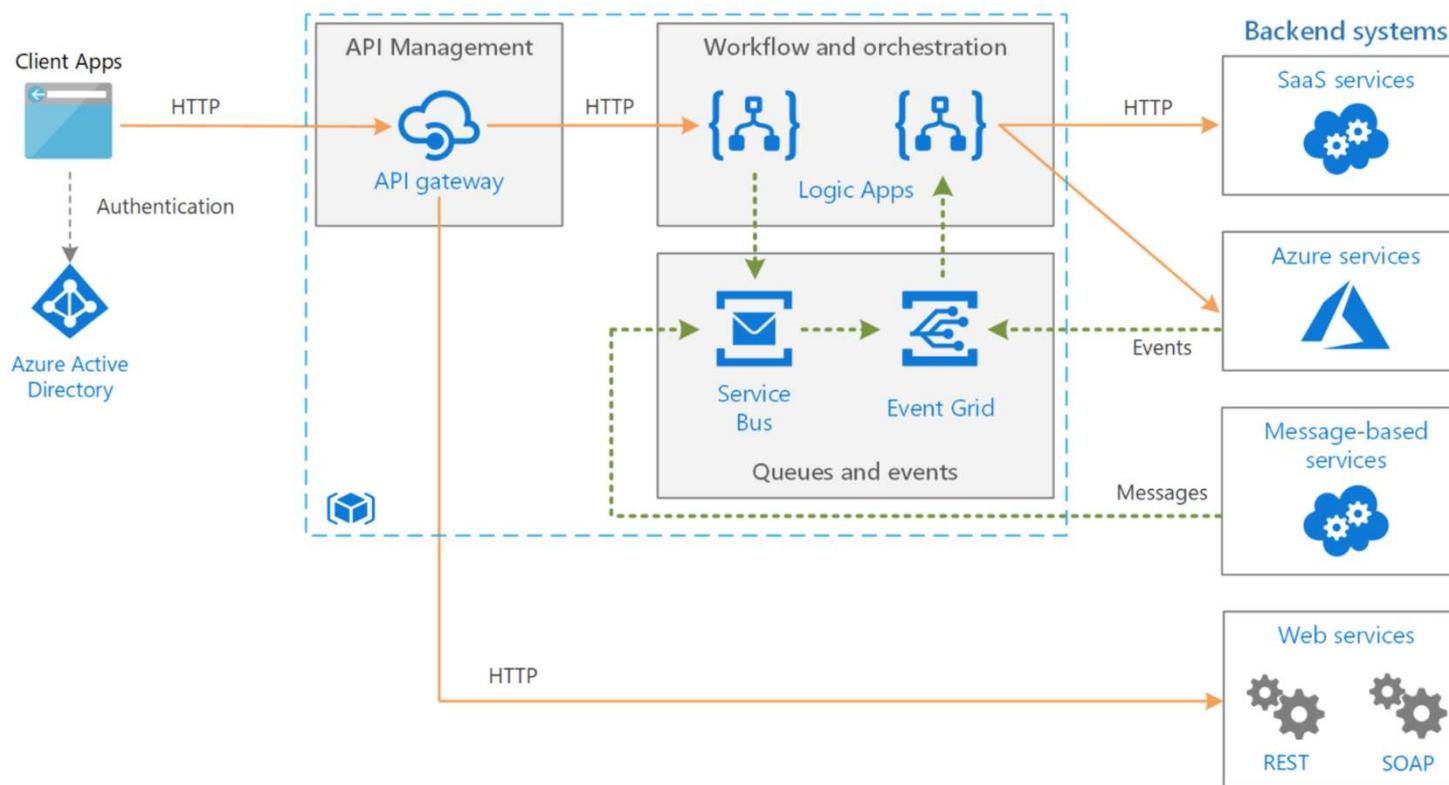
Components

- **Data sources:** All big data solutions start with one or more data sources. Examples include:
 - Application data stores, such as relational databases.
 - Static files produced by applications, such as web server log files.
 - Real-time data sources, such as IoT devices.
- **Data storage:** Data for batch processing operations is typically stored in a distributed file store that can hold high volumes of large files in various formats.
- **Batch processing:** Because the data sets are so large, often a big data solution must process data files using long-running batch jobs to filter, aggregate, and otherwise prepare the data for analysis. Usually these jobs involve reading source files, processing them, and writing the output to new files.
- **Real-time message ingestion:** If the solution includes real-time sources, the architecture must include a way to capture and store real-time messages for stream processing. This might be a simple data store, where incoming messages are dropped into a folder for processing. However, many solutions need a message ingestion store to act as a buffer for messages, and to support scale-out processing, reliable delivery, and other message queuing semantics.
- **Stream processing:** After capturing real-time messages, the solution must process them by filtering, aggregating, and otherwise preparing the data for analysis. The processed stream data is then written to an output sink.
- **Analytical data store:** Many big data solutions prepare data for analysis and then serve the processed data in a structured format that can be queried using analytical tools.
- **Analysis and reporting:** The goal of most big data solutions is to provide insights into the data through analysis and reporting. To empower users to analyze the data, the architecture may include a data modeling layer, such as a multidimensional OLAP cube or tabular data model in Azure Analysis Services. It might also support self-service BI, using the modeling and visualization technologies in Microsoft Power BI or Microsoft Excel.
- **Orchestration:** Most big data solutions consist of repeated data processing operations, encapsulated in workflows, that transform source data, move data between multiple sources and sinks, load the processed data into an analytical data store, or push the results straight to a report or dashboard.

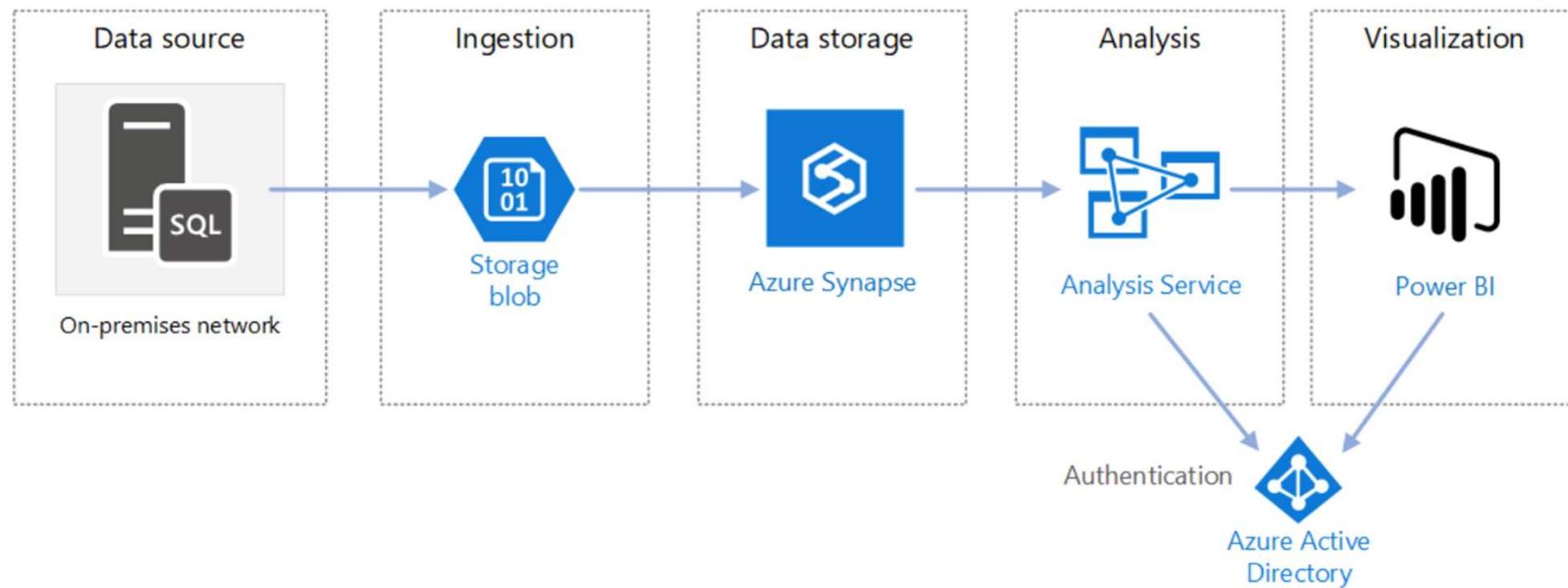
Architecture for IoT



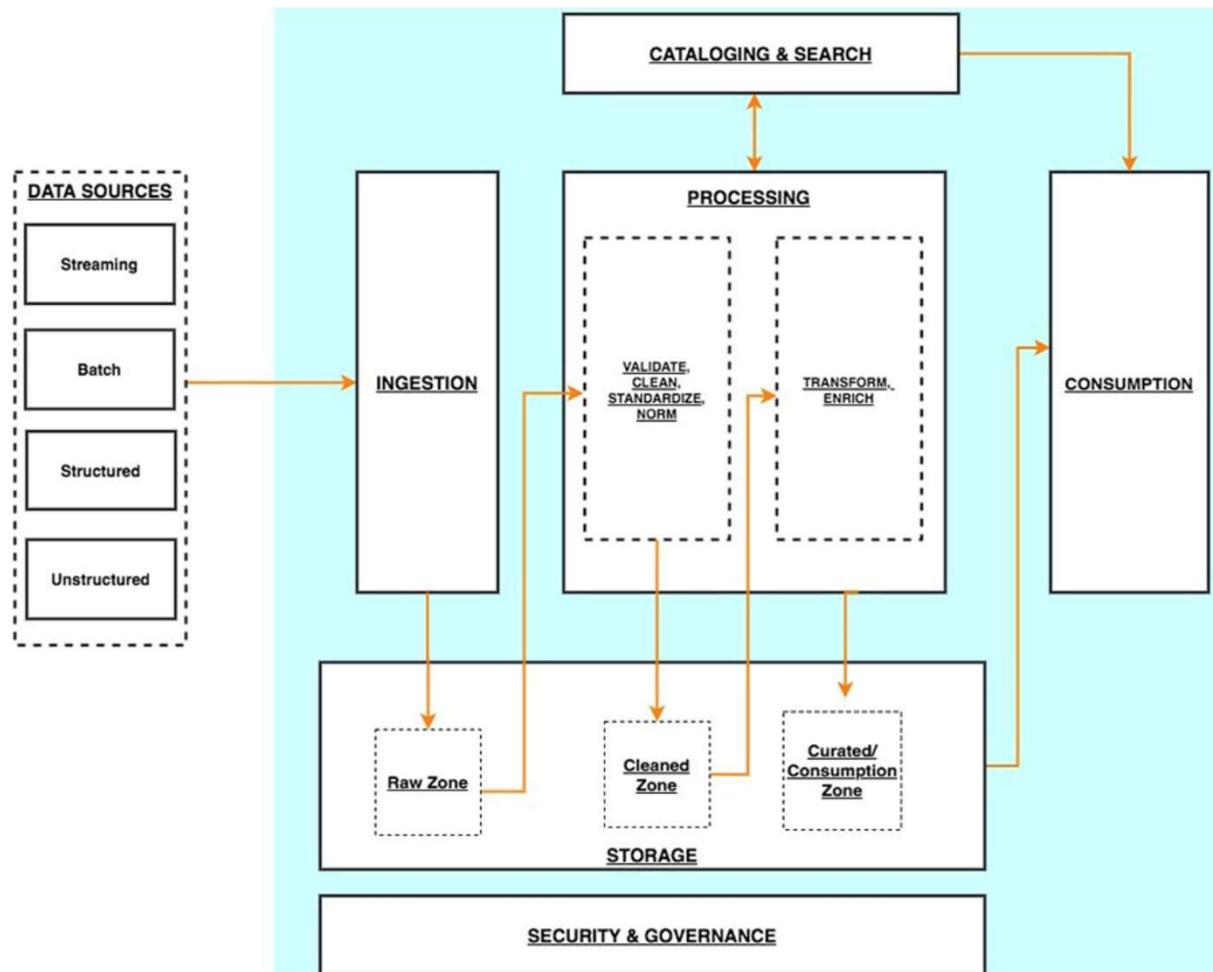
Azure Enterprise Integration



Azure Enterprise BI



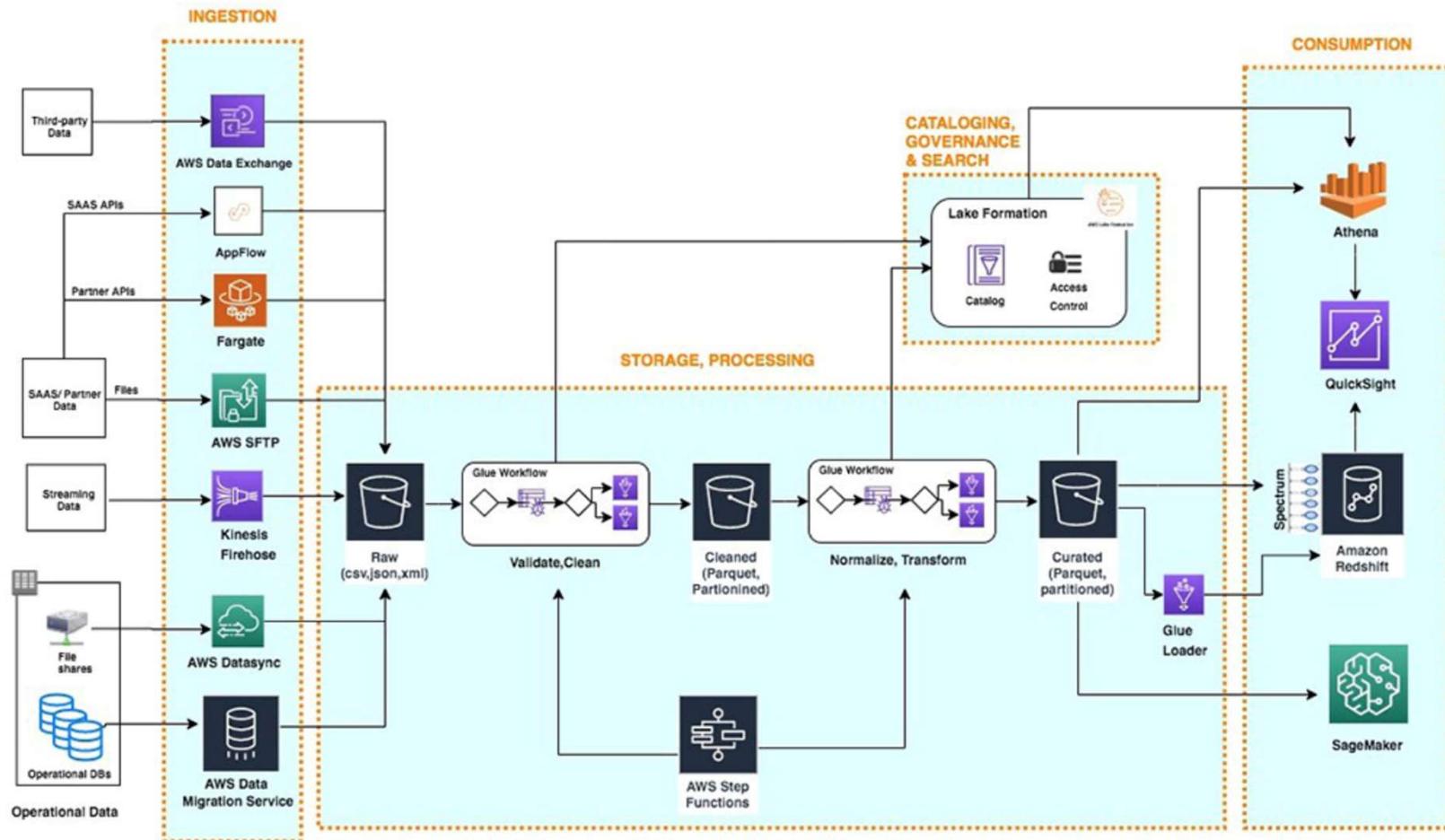
Big Data ETL with phases (AWS)



Zones

- Raw zone – The storage area where components from the ingestion layer land data. This is a transient area where data is ingested from sources as-is. Typically, data engineering personas interact with the data stored in this zone.
- Cleaned zone – After the preliminary quality checks, the data from the raw zone is moved to the cleaned zone for permanent storage. Here, data is stored in its original format. Having all data from all sources permanently stored in the cleaned zone provides the ability to “replay” downstream data processing in case of errors or data loss in downstream storage zones. Typically, data engineering and data science personas interact with the data stored in this zone.
- Curated zone – This zone hosts data that is in the most consumption-ready state and conforms to organizational standards and data models. Datasets in the curated zone are typically partitioned, cataloged, and stored in formats that support performant and cost-effective access by the consumption layer. The processing layer creates datasets in the curated zone after cleaning, normalizing, standardizing, and enriching data from the raw zone. All personas across organizations use the data stored in this zone to drive business decisions.

Serverless data lake centric



The technology landscape



Jun 27, 2019

© Matt Turck (@mattturck), Lisa Xu (@lisaxu92), & FirstMark (@firstmarkcap)

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FIRSTMARK
EARLY STAGE VENTURE CAPITAL

Most important factor for successful ETL and Integration?



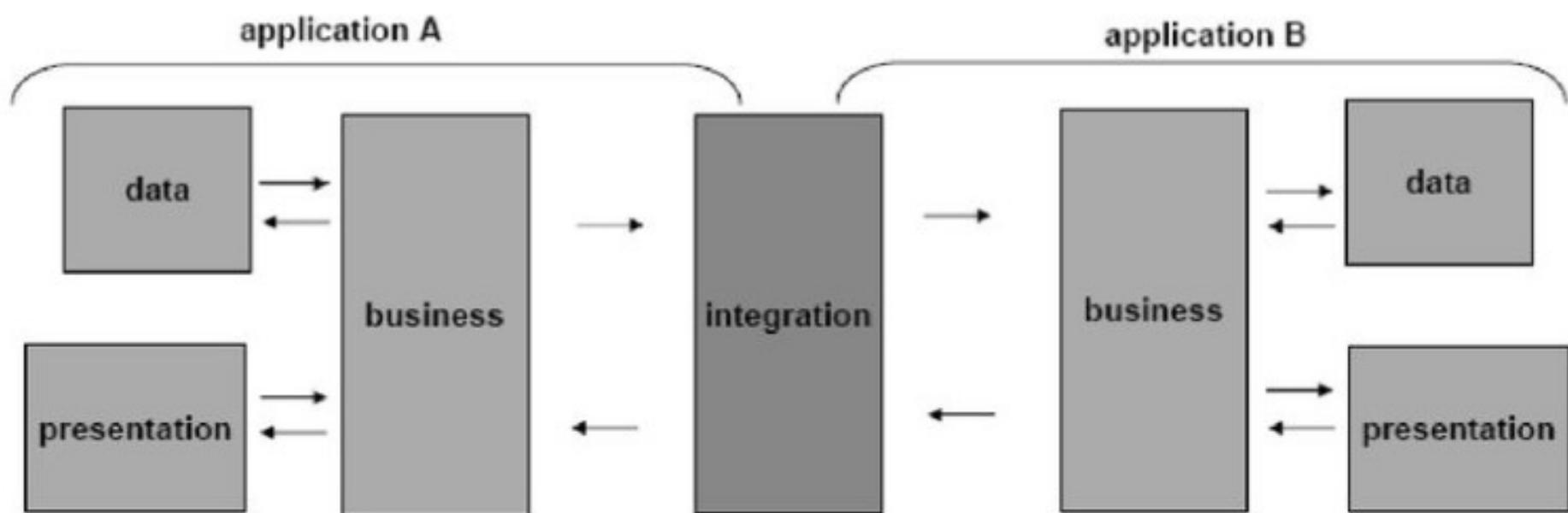
System integration technologies

Integrated Systems



Integration basics

- Integration refers to connection of two or more systems that could be implemented in different technologies, reside on different platforms and locations so that they are able to communicate with one another and transport data between each-other.
- Manual data transfer between systems is prone to human error requires human workforce.
- Just integration for the purpose of communication between systems and for the purpose of data transfer is not enough. Systems that are interconnected, need the ability to interpret data content and process data as required



What to do when we plan integration

- When planning system integrations, it pays to consider the following needs:
 - Sufficiently precise specification of what is required of the system integrations
 - Interface descriptions of the systems to be integrated
 - Possibility of a test interface
 - Organising permissions to the system to be integrated

Most common data transfer methods

- Web service: Programming Interface. A server provides software running on other computers with a service via HTTP(S) or another web-based protocol.
- FTP (File Transfer Protocol): An FTP enables the transfer of files between two computers, regardless of operating system.
- SOAP (Simple Object Access Protocol): A language and protocol that allows a service user to send a message to the service provider and the service provider can send a response.
- REST (Representational State Transfer): An HTTP-based architectural style for creating application programming interfaces.
- GRAPHQL: An HTTP-based architectural style for creating application programming interfaces.

	First released	Formatting type	Key strength
SOAP	Late 1990s	XML	Widely used and established
REST	2000	JSON, XML, and others	Flexible data formatting
JSON-RPC	mid-2000s	JSON	Simplicity of implementation
gRPC	2015	Protocol buffers by default; can be used with JSON & others also	Ability to define any type of function
GraphQL	2015	JSON	Flexible data structuring
Thrift	2007	JSON or Binary	Adaptable to many use cases

Formatting types

- JSON (JavaScript Object Notation): An open-standard file format for transmitting data.
- XML (Extensible Markup Language): XML is used both as a format for data transfer between systems and as a format for saving documents.
- Binary

System integration approaches

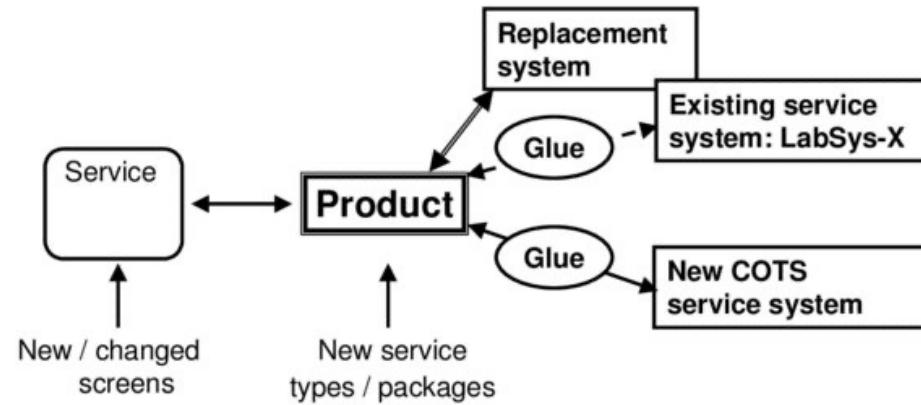
- XML
- SOA/Web Services
- COTS
- Cloud based

XML in integration

- XML provides a common data-exchange format, encapsulating both data and metadata. This format allows various applications and databases to exchange information without having to understand anything about one other.
- An XML integration is basically a connector that acts as a "translator" between customers and suppliers allowing different formats or programming languages (usually XML) to be compatible.
- XML can be used, when desired, to establish and maintain dynamic relationships between the Web server and any other external data sources. XML messaging provides an effective method of enterprise integration for exchanging data in XML formats.

COTS Integration

- Commercial-off-the-shelf (COTS) software is a term for software products that are ready-made and available for purchase in the commercial market.
- When buying COTS-based software, the customer has to choose between what is available. The supplier may add some minor parts, but not everything the customer wants. This means that the customer cannot write down his requirements and expect that they can all be met.

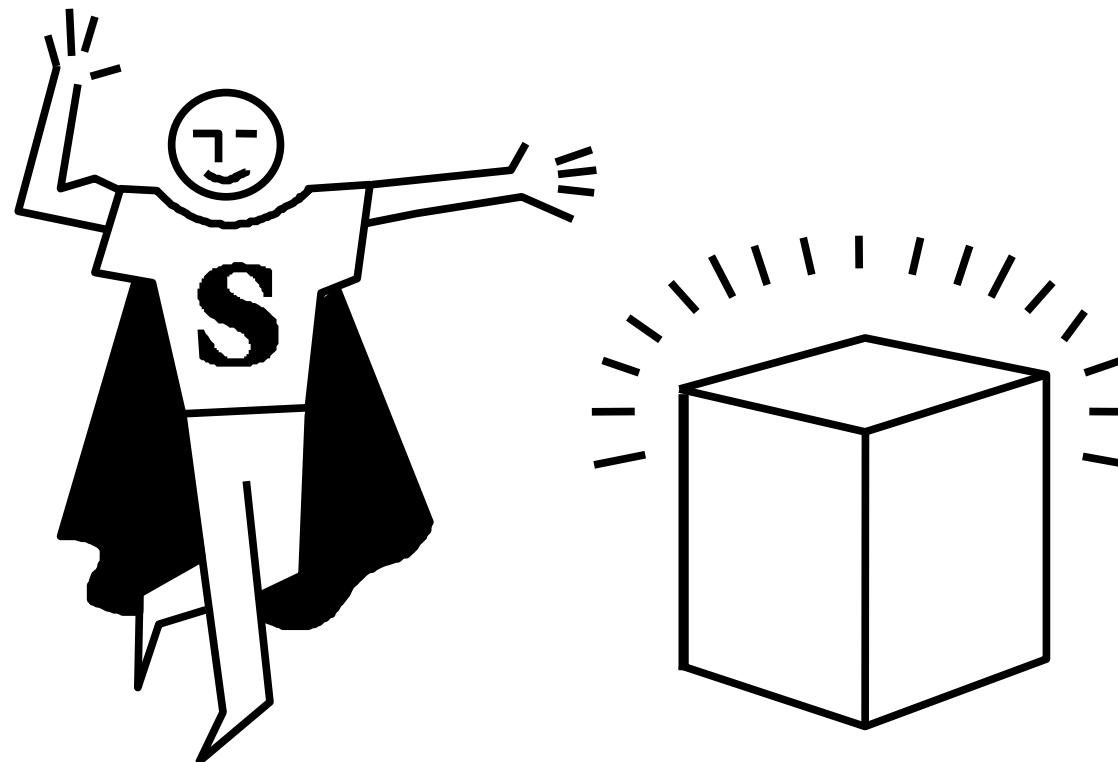


Benefits of COTS-Based System

- To Improve software development process
- To reduce coding, debugging, unit testing, code inspection
- To reduce software life-cycle
- To reduce development cost

Weakness of COTS-Based System

A new COTS-based System!

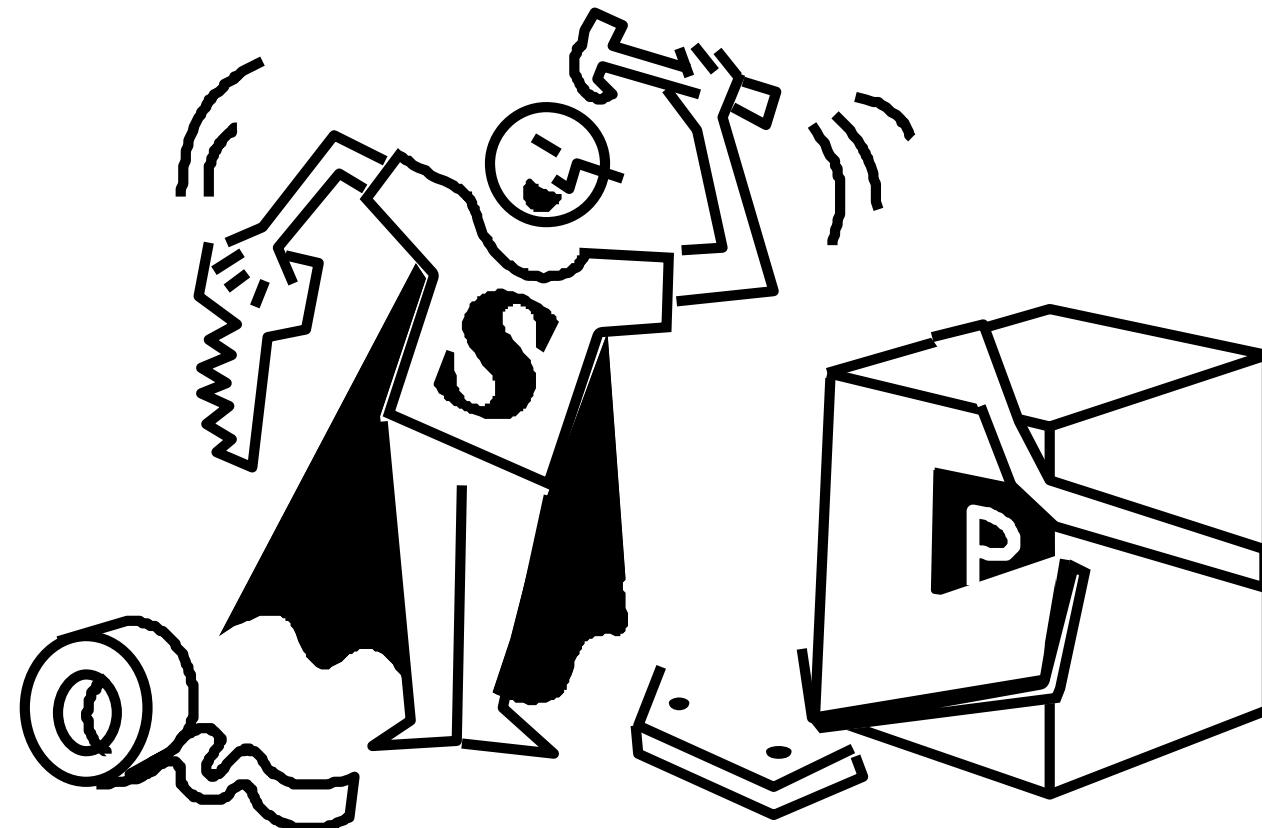


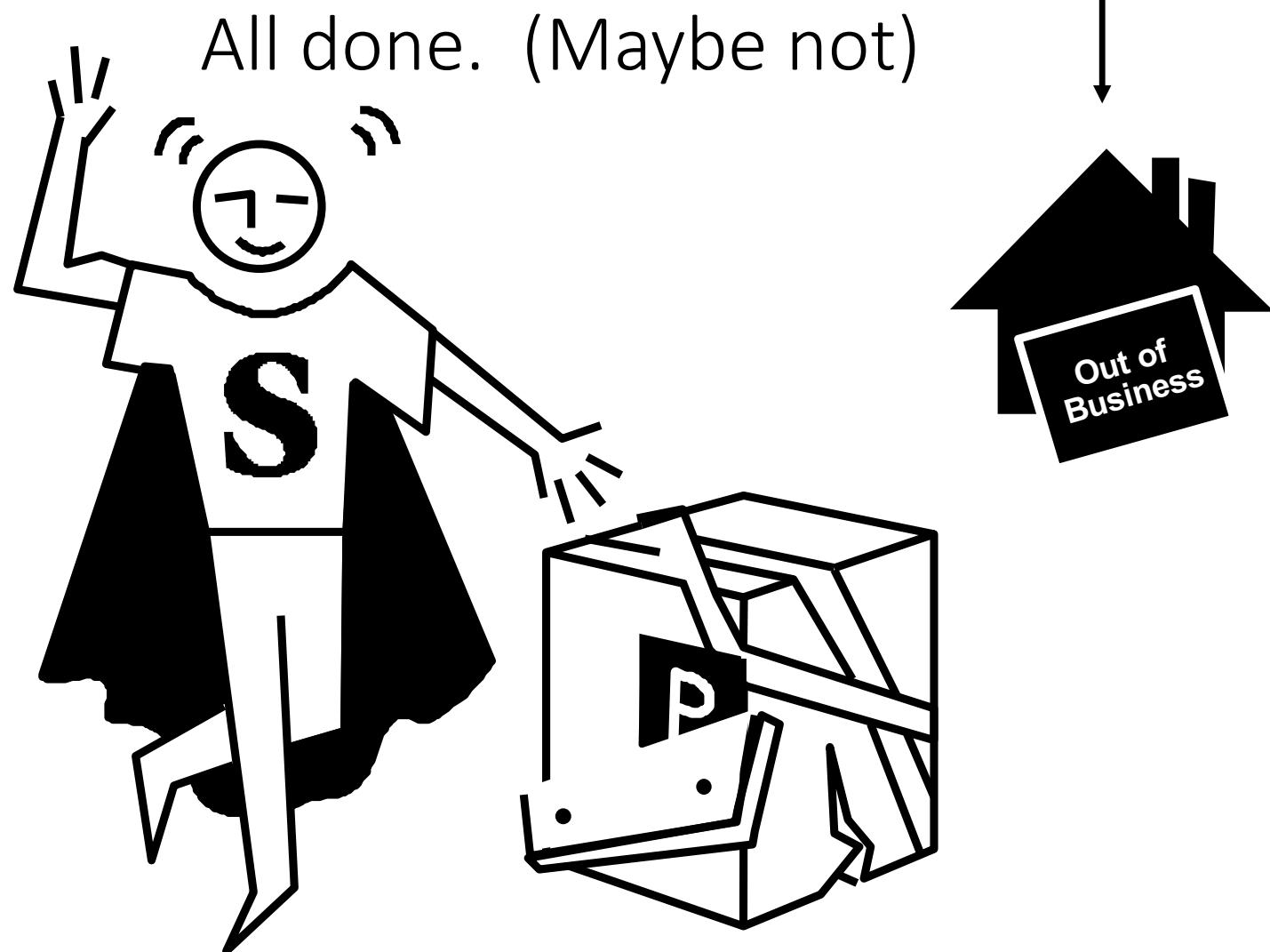
But Wait! An Upgrade!



Copyright 1997 Software Engineering Institute

No problem! I'll make it fit!





Copyright 1997 Software Engineering Institute

SOA in Integration

- SOA, or service-oriented architecture, defines a way to make software components reusable and interoperable via service interfaces.
- Services use common interface standards and an architectural pattern so they can be rapidly incorporated into new applications.
- This removes tasks from the application developer who previously redeveloped or duplicated existing functionality or had to know how to connect or provide interoperability with existing functions.
- Each service in an SOA embodies the code and *data* required to execute a complete, discrete business function (e.g. checking a customer's credit, calculating a monthly loan payment, or processing a mortgage application).
- The service interfaces provide loose coupling, meaning they can be called with little or no knowledge of how the *service* is implemented underneath, reducing the dependencies between applications.

Advantages of SOA

- Greater business agility; faster time to market: Reusability is key.
 - The efficiency of assembling applications from reusable services - i.e. building blocks, rather than rewriting and reintegrating with every new development project, enables developers to build applications much more quickly in response to new business opportunities.
 - The service oriented architectural approach supports scenarios for application integration, data integration, and service orchestration style automation of business processes or workflows. This speeds software design and software development by enabling developers to spend dramatically less time integrating and much more time *focusing on delivering and improving* their applications.

Advantages of SOA

- Ability to leverage legacy functionality in new markets:
 - A well-crafted SOA enables developers to easily take functionality ‘locked’ in one computing platform or environment and extend it to new environments and markets.
 - For example, many companies have used SOA to expose functionality from mainframe-based financial systems to new web applications, enabling their customers to serve themselves to processes and information previously accessible only through direct interaction with the company’s employees or business partners.

Advantages of SOA

- Improved collaboration between business and IT:
- In an SOA, services can be defined in business terms (e.g., ‘generate insurance quote’ or ‘calculate capital equipment ROI’). This enables business analysts to work more effectively with developers on important insights—such as the scope of a business process defined using services or the business implications of changing a process—that can lead to a better result.

SOA VS Microservices

- SOA is an integration architectural style and an enterprise-wide concept. It enables existing applications to be exposed over loosely-coupled interfaces, each corresponding to a business function, that enables applications in one part of an extended enterprise to reuse functionality in other applications.
- Microservices architecture is an application architectural style and an application-scoped concept. It enables the internals of a single application to be broken up into small pieces that can be independently changed, scaled, and administered. It does not define how applications talk to one another—for that we are back to the enterprise scope of the service interfaces provided by SOA.
- Microservices can be used for integration. They are independently deployable, scalable and the downtime of the system is reduced. Smaller codebase is also simpler to maintain. SOA is more coarse, microservices are more fine-grained.

SOA Roles and interactions

- SOA is based upon the interactions between three roles:
 - Provider – the owner of the service
 - Registry or Broker – manages repositories of information on providers and their assets
 - Requestor – discovers and invokes software assets provided by one or more providers
- Three fundamental interactions:
 - Publishing – providers publish information or metadata about services to registry
 - Finding (service location) – requestors query a public or private registry for service description
 - Binding – requestors use service description to create message to be sent to service providers

Components VS Web Services

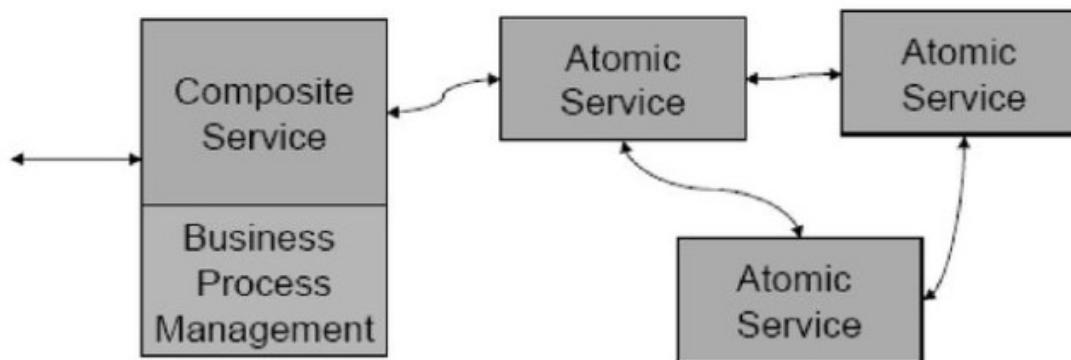
- ***Component-Based Model***
 - Mainly designed for processes within the enterprise
 - Different protocols and technologies (e.g. EJBs, DCOM, CORBA)
 - Typically, programming language dependent
 - Usually bound to a particular transport
- ***Web Service Model***
 - Mainly designed for processes across enterprises
 - Uses common protocol and technologies (e.g. XML, SOAP, WSDL, ...)
 - Programming language independent
 - Easily bound to different transport

Tight VS Loose Coupling

- Tight coupling
 - Efficient interaction
 - Compressed communication
 - Requires deep knowledge and is inflexible
- Loose coupling
 - Less efficient interaction
 - Not very detailed
 - No deep knowledge required

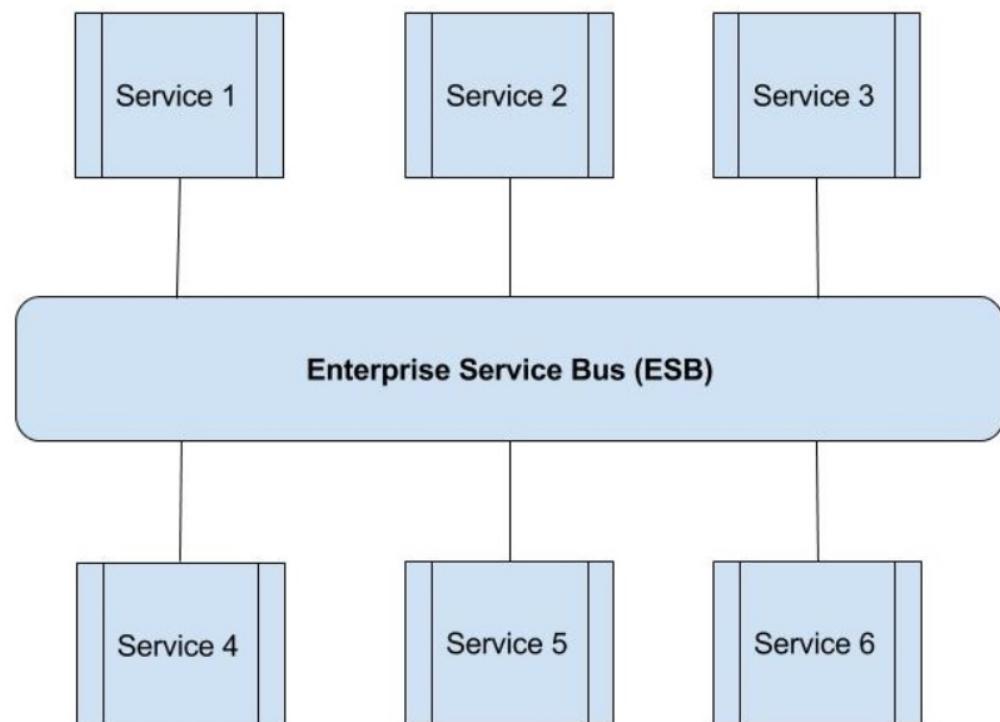
Composition of services

- Interlinked services to provide larger service set

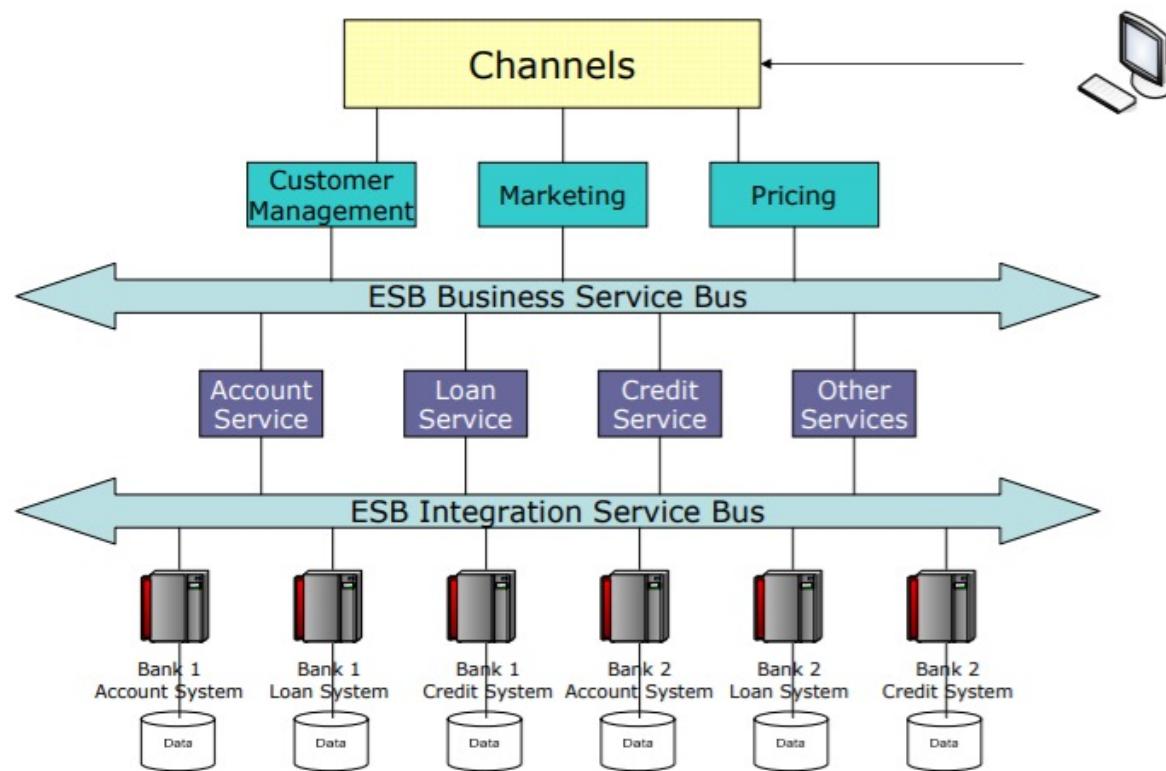


Enterprise Service Bus (ESB)

- The Enterprise Service Bus (ESB) is a software architecture which connects all the services together over a bus like infrastructure. It acts as communication center in the SOA by allowing linking multiple systems, applications and data and connects multiple systems with no disruption.



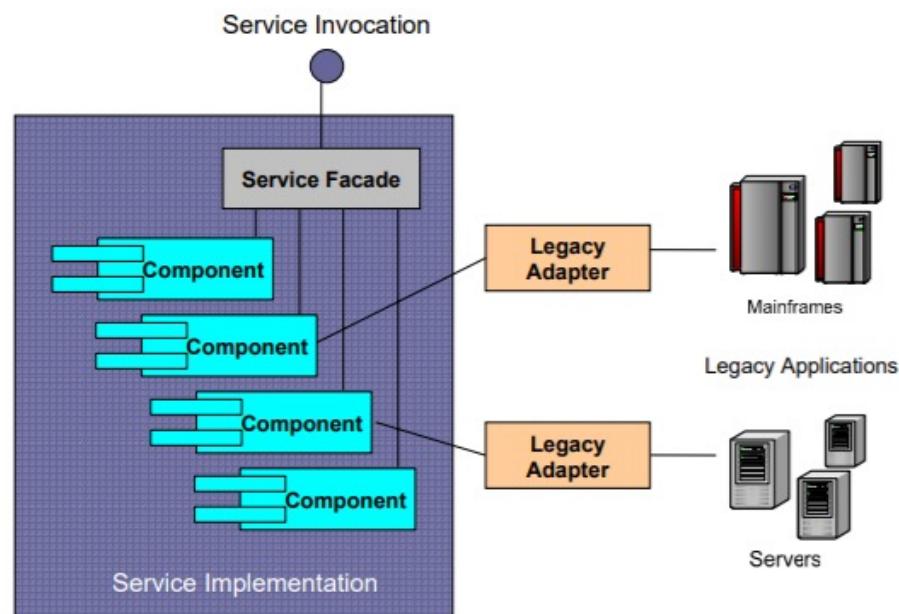
Service Oriented Integration



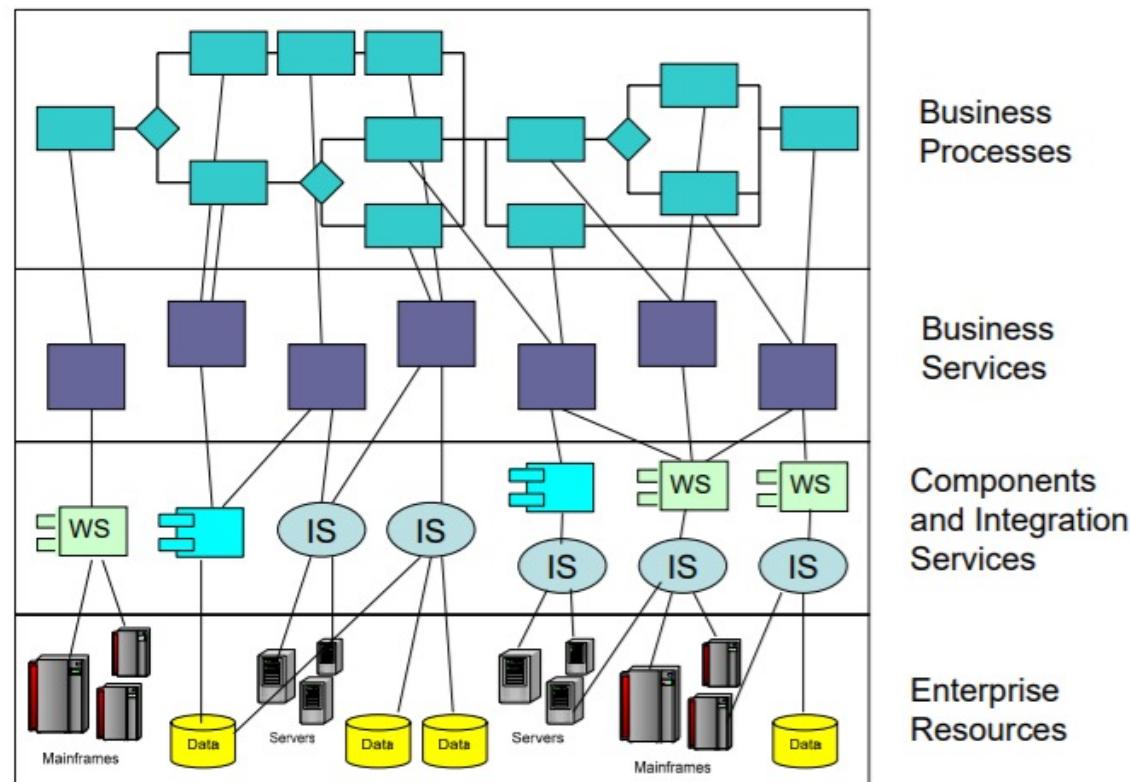
Benefits of SOA Integration Approach

- Integrate once, connect many
- Build up higher level services
- Flexibility
- Adaptability to change
- Can be incrementally done

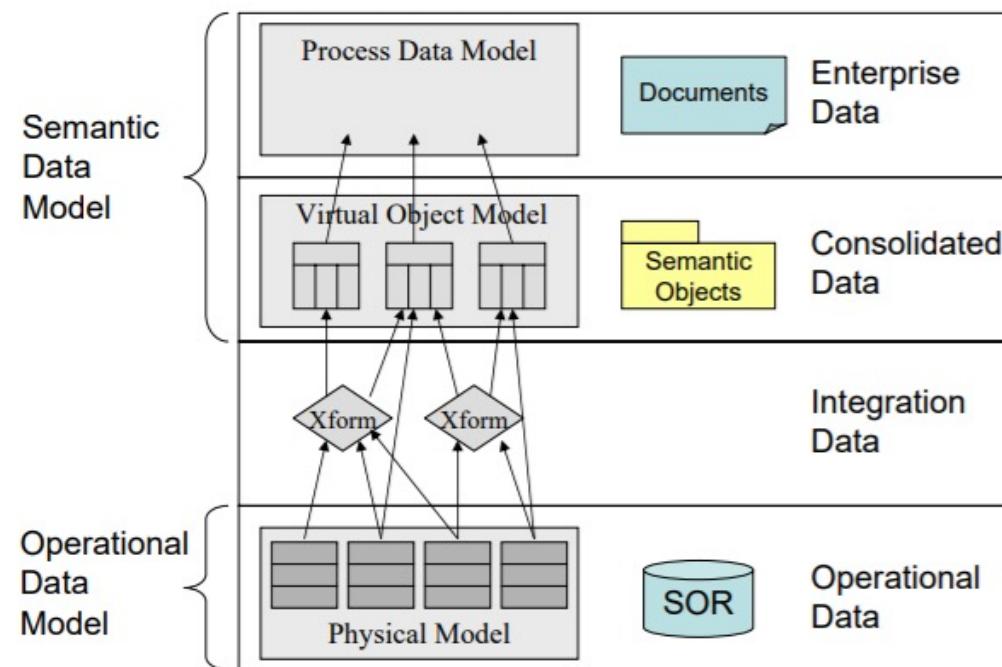
Integration Pattern



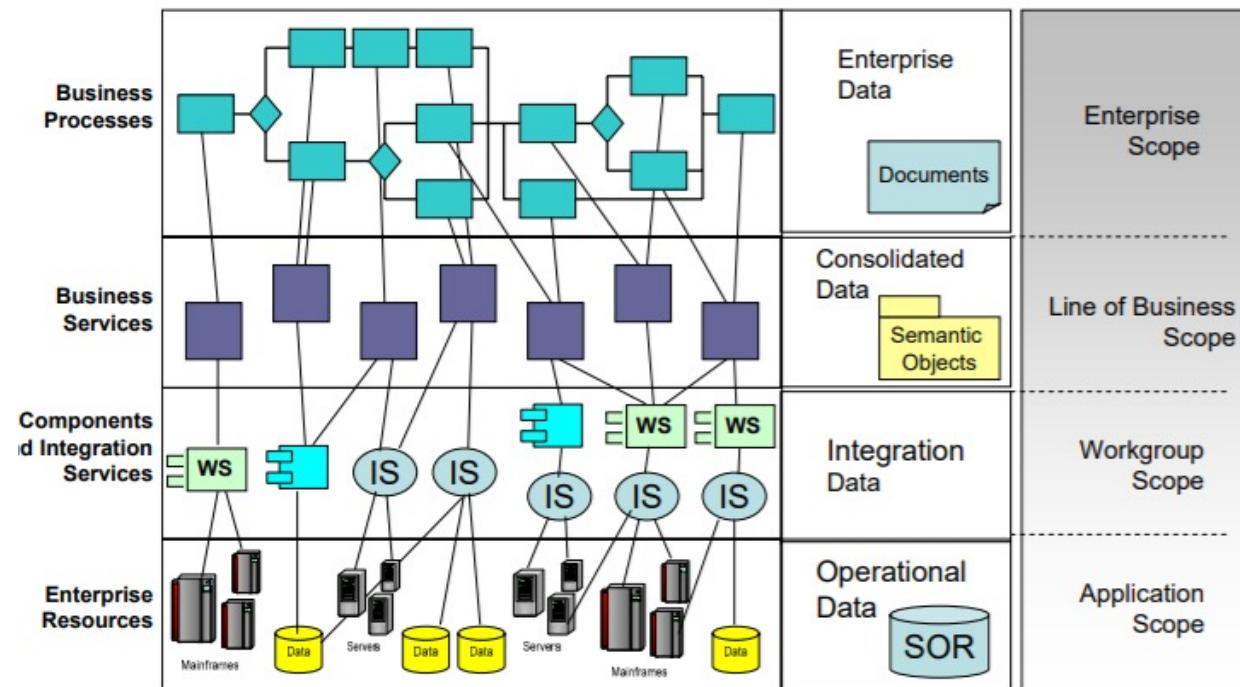
Layered Enterprise Architecture (SOI)



Information layers



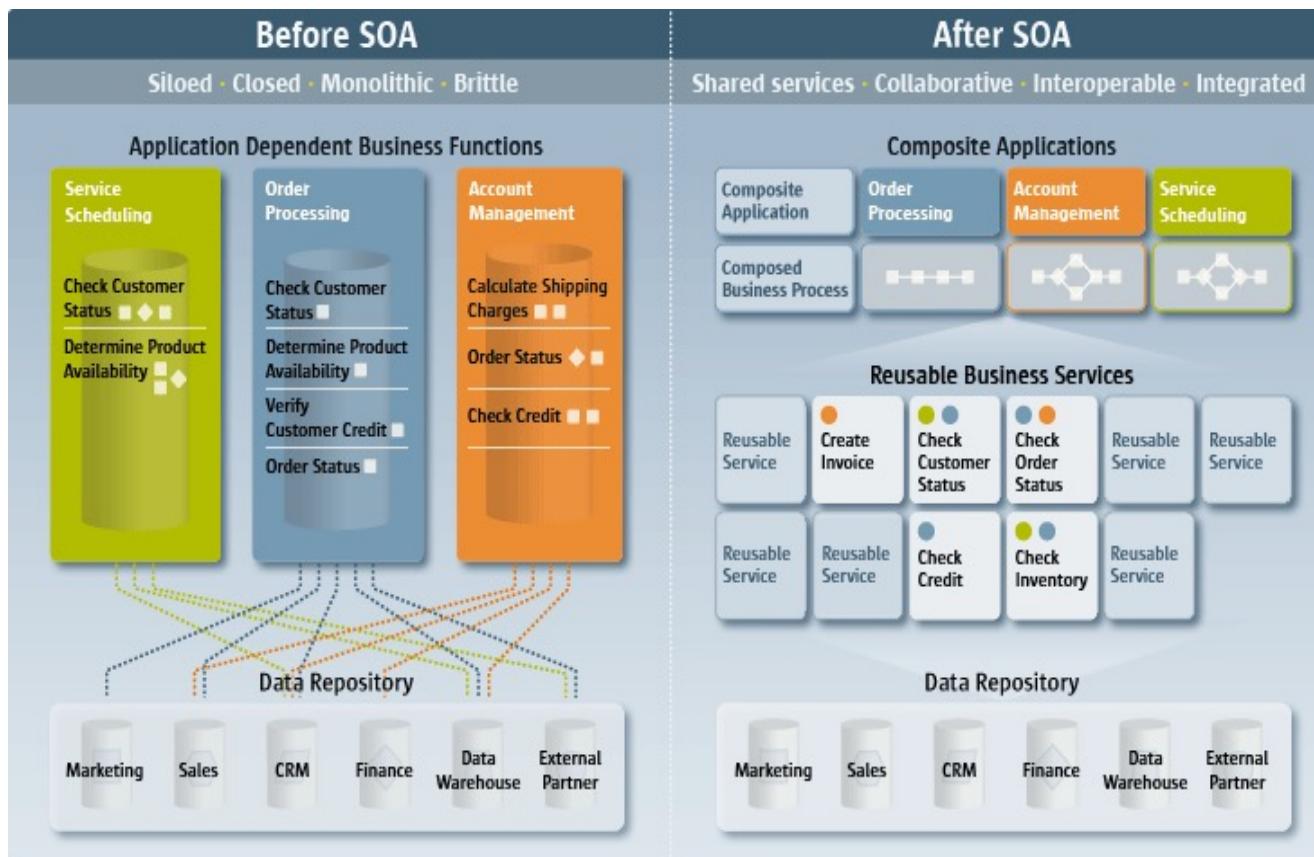
Scopes and combination of all



SOI Integration Requirements

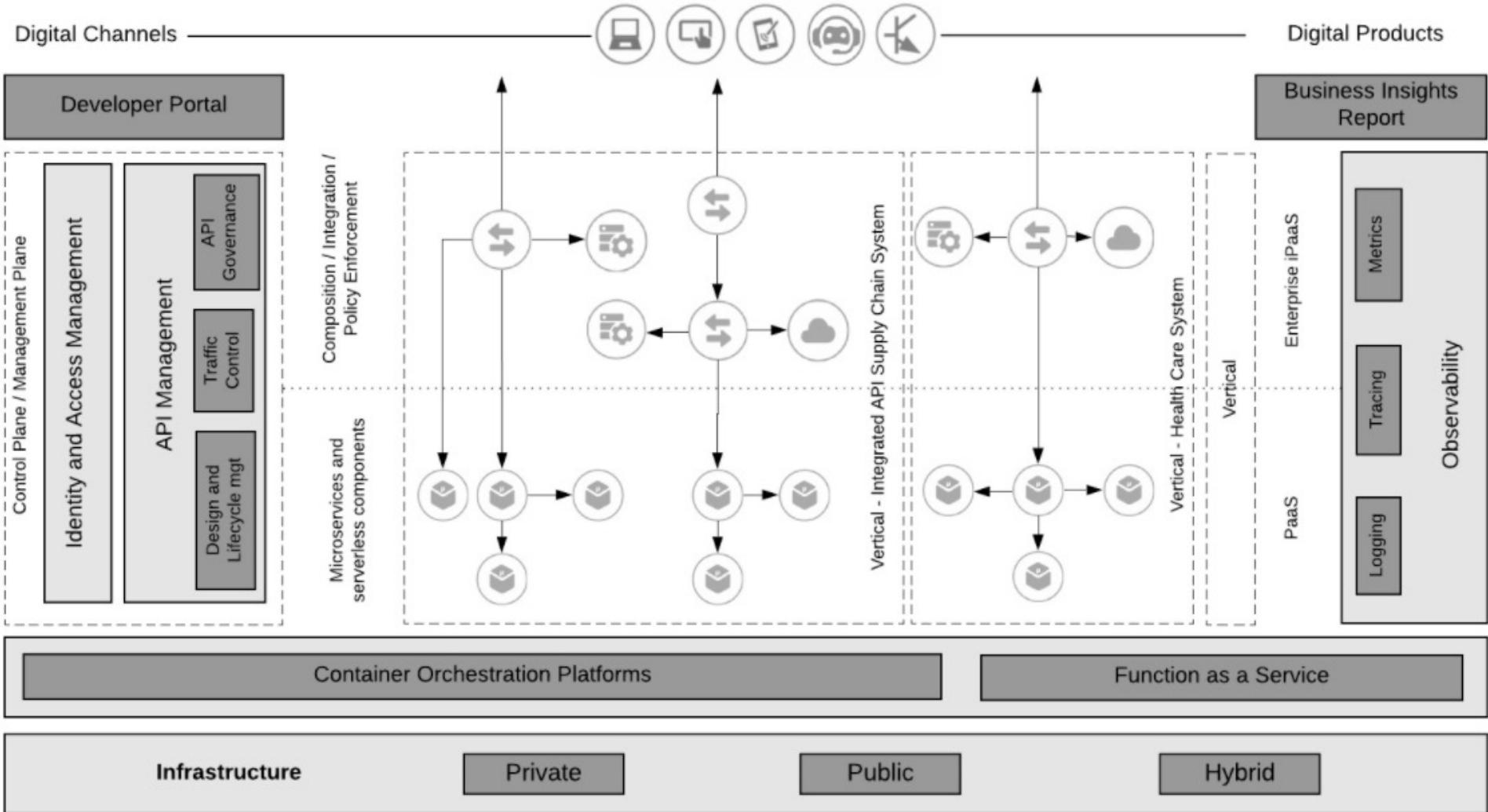
- Architecture
 - Describe the essential context to enable cooperating services
 - Be as detailed as possible
- Business Model
 - Describe processes, services, interfaces, data and semantics
- Tools
 - Support service construction
 - Incorporate architectural concepts
 - Implement Service composition
 - Provide platform independence of business logic

Before and after SOA

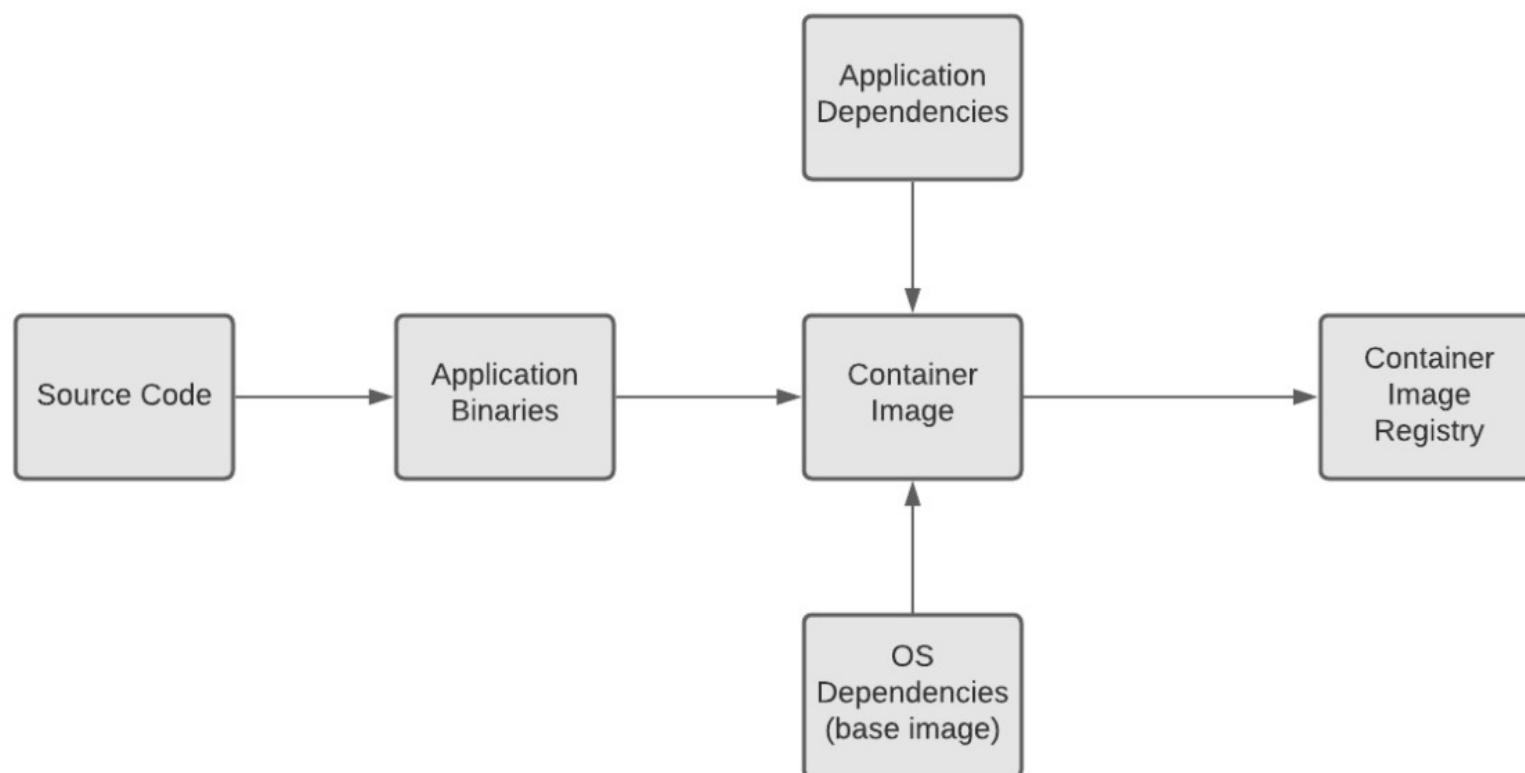


Cloud native approach

- An approach to building and operating software that takes advantage of the cloud-computing model. Combination of microservices, continuous delivery, containers and DevOps.
- Cloud native is a term used to explain technologies that help to create, deploy, and operate applications in a scalable environment such as in public, private, and hybrid clouds. It also refers to explaining the characteristics of these applications specifically made to address scalability.
- Built for scale
- Built for continuous change
- Built to tolerate failure
- More secure, cheaper and better data handling
- Granular



Containers



Advantages and dissadvantages

- Although microservices enable an iterative approach to application improvement, they also create the necessity of managing more elements. Rather than one large application, it becomes necessary to manage far more small, discrete services.
- Cloud native apps demand additional toolsets to manage the DevOps pipeline, replace traditional monitoring structures, and control microservices architecture.
- Cloud native applications allow for rapid development and deployment, but they also demand a business culture that can cope with the pace of that innovation.

Questions?