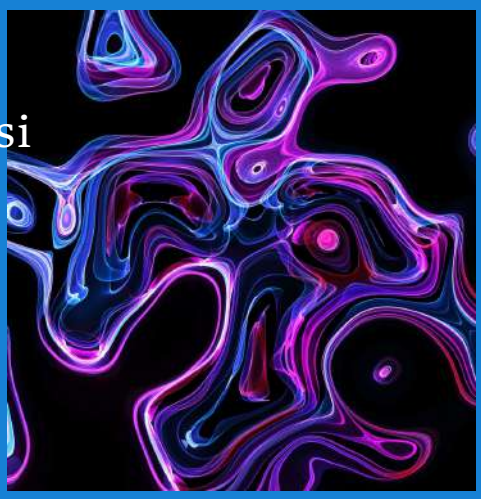
STEI-ITB

II 1200
Pengantar
Sistem dan Teknologi Informasi



Minggu 6
Komponen Sistem Informasi-2

Windy Gambetta

School of Electrical Engineering and Informatics, ITB

Semester 2 2024-2025

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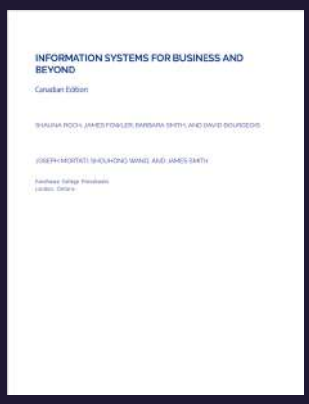
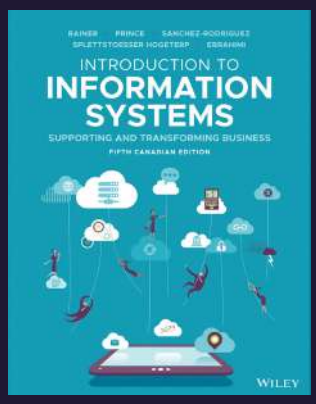
REFERENSI





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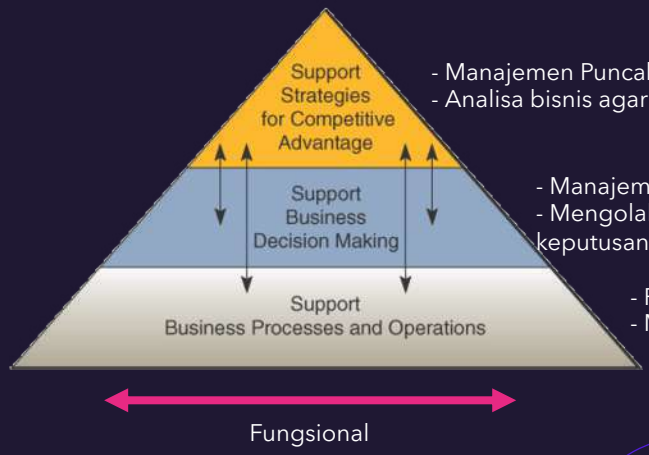
PERAN DASAR SISTEM INFORMASI



- Manajemen Puncak
- Analisa bisnis agar bisa berkompetisi

- Manajemen menengah
- Mengolah pelaporan, analisis untuk pembuatan keputusan

- Para Pelaksana
- Mengolah transaksi operasi

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KOMPONEN SISTEM INFORMASI

- Teknologi (Technoware)
  - Teknologi Informasi: HW, SW, Jaringan Data (Infoware)
  - Teknologi Pendukung
- Organisasi (Organoware)
  - Struktur
  - Kebijakan
  - Prosedur Bisnis (Operasi Standard)
- Sumber Daya Manusia (Brainware)
  - Pengguna (customer, pelayan, kasir,...)
  - Pengelola (sysadmin,help desk,...)
  - Pengembang
- Sumber Daya Data

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SOFTWARE/ PERANGKAT LUNAK

Software is a set of instructions or programs that tell a computer what to do.

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MAIN TYPES OF SOFTWARE

1. System Software
2. Application Software
3. Database Management Systems (DBMS)
4. Middleware
5. Utility Software

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SYSTEM SOFTWARE

- A set of programs that manage a computer's hardware and applications. It also provides a platform for running application software.
- Consist of:
  - Operating system: A set of programs that coordinate the activities between hardware and software components
  - Utility software: Focuses on how a computer's operating system, software, and hardware functions
  - Antivirus software: Prevents, detects, and removes malicious software

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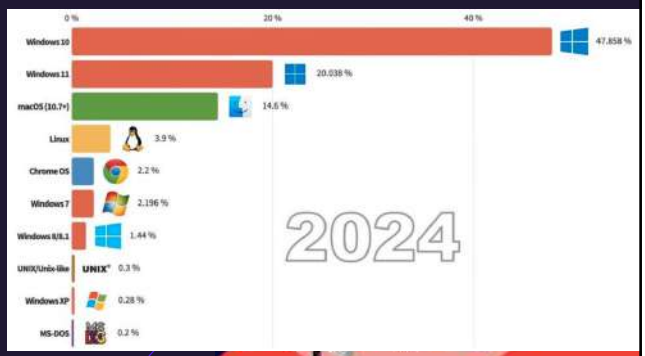
SYSTEM SOFTWARE: OPERATING SYSTEM (OS)

- A set of programs that coordinate the activities between hardware and software components
- Key Functions:
  - Process Management
  - Memory Management
  - File System Management
  - Device Control



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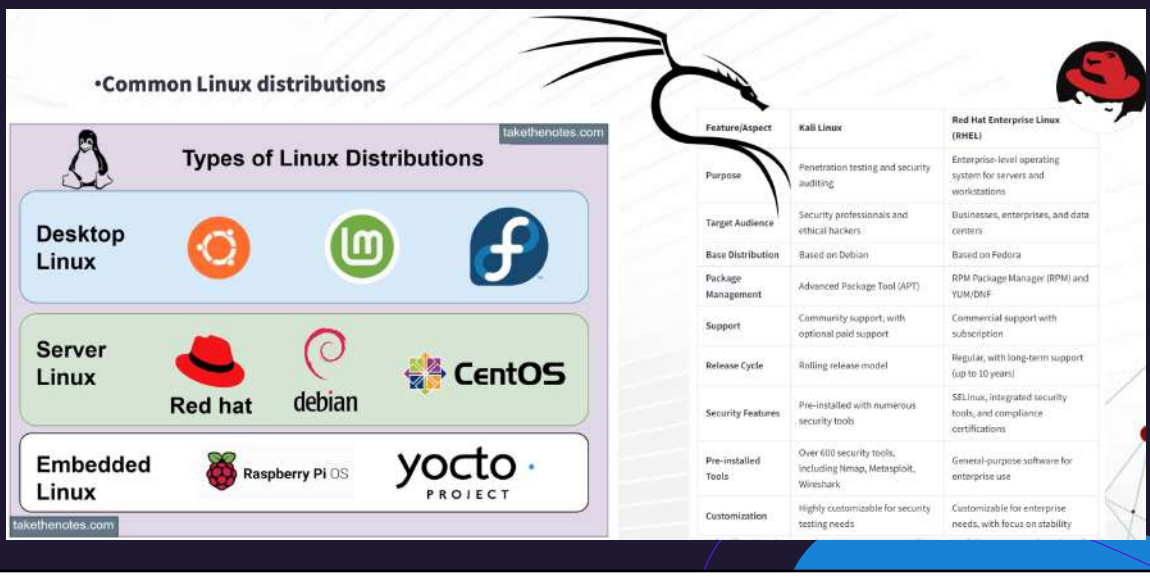
OPERATING SYSTEM/ SISTEM OPERASI



Feature/Aspect	Kali Linux	Red Hat Enterprise Linux (RHEL)
Purpose	Penetration testing and security auditing	Enterprise-level operating system for servers and workstations
Target Audience	Security professionals and ethical hackers	Businesses, enterprises, and data centers
Base Distribution	Based on Debian	Based on Fedora
Package Management	Advanced Package Tool (APT)	RPM Package Manager (RPM) and YUM/DNF
Support	Community support, with optional paid support	Commercial support with subscription
Release Cycle	Rolling release model	Regular, with long-term support (up to 10 years)
Security Features	Pre-installed with numerous security tools	SELinux, integrated security tools, and compliance certifications
Pre-installed Tools	Over 600 security tools, including Nmap, Metasploit, Wireshark	General-purpose software for enterprise use
Customization	Highly customizable for security testing needs	Customizable for enterprise needs, with focus on stability

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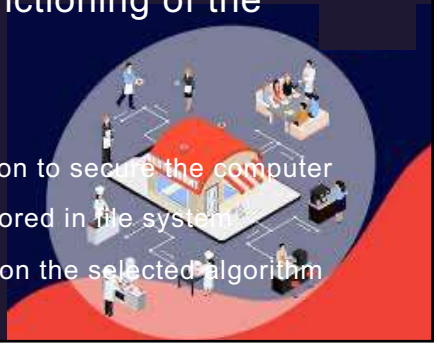
SYSTEM SOFTWARE: UTILITY SW

- Utility software performs specific tasks to manage system resources.
- This software is focused on how OS works on that basis it performs tasks to enable the smooth functioning of the computer.
- Example:
  - Antivirus: Detect virus, notify users, and takes action to secure the computer
  - File Management System: Used to manage files stored in file system
  - Compression Tools: To reduce size of a file based on the selected algorithm
  - Backup Tools



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DATABASE MANAGEMENT SYSTEM (DBMS)

- Software that helps in creating, managing, and manipulating databases.

[Application] ↔ [DBMS] ↔ [Database]

- Functions:
  - Store and retrieve data
  - Query processing
  - Backup and recovery

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MIDDLEWARE

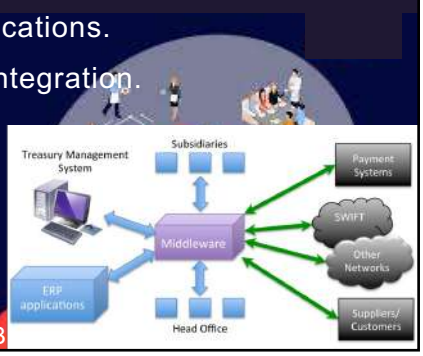
- Software software that acts as a bridge, enabling communication and data management between different applications, tools, and databases, essentially acting as "software glue" that connects diverse systems.
- Purpose:

[App A] ↔ [Middleware] ↔ [App B]

  - Enables communication between different applications.
  - Facilitates distributed systems and enterprise integration.

Examples:

  - web servers, application servers,
  - message-oriented middleware (MOM),
  - database middleware, and enterprise service buses (ESB



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APPLICATION SOFTWARE

- Programs designed for end-users to perform specific tasks.
- Types:
  - Productivity: MS Office, Google Docs
  - Enterprise: SAP ERP, Salesforce CRM
  - BI Tools: Tableau, Power BI

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APPLICATION SOFTWARE: CUSTOM vs Off-the-Shelf

- Custom Software:
  - Tailored to specific business needs
  - Higher cost and development time
- Off-the-Shelf Software:
  - Ready-made for general users
  - Lower cost, immediate use
- Choose based on requirements, budget, and time.

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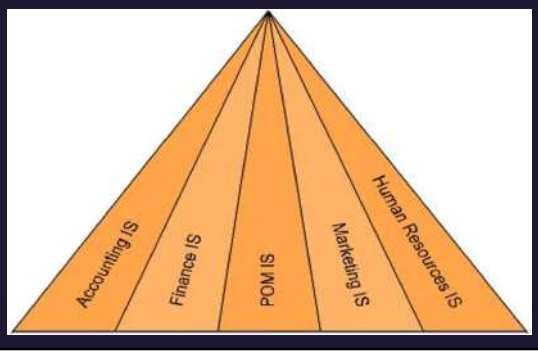
APPLICATION SOFTWARE: ERP

- Enterprise Resource Planning (ERP)
  - A software system that integrates and automates core business processes like finance, HR, manufacturing, supply chain, sales, and procurement, providing a *unified view of activity* and *a single source of truth* for an organization.



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APPLICATION SOFTWARE: ERP

- Enterprise Resource Planning (ERP)

Integrates core business processes: It connect different departments and functions, allowing data to flow seamlessly.

Automates tasks: ERP software automates repetitive tasks, freeing up employees to focus on more strategic work.

Provides real-time insights: ERP systems provide real-time data and reporting capabilities, allowing businesses to make informed decisions.

Improves efficiency: By streamlining processes and automating tasks, ERP systems can improve overall operational efficiency.

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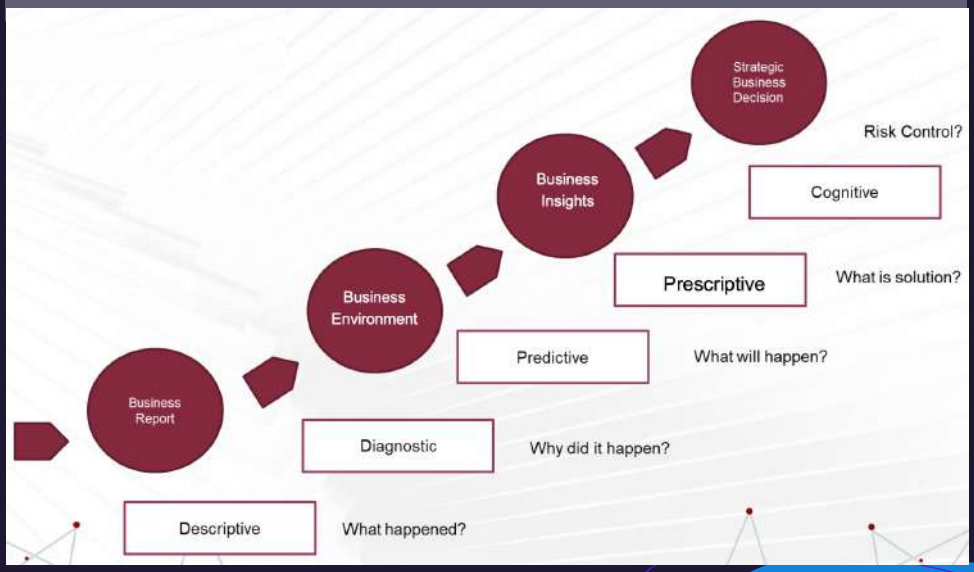
APPLICATION SOFTWARE: ANALYTICS



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CLOUD SOFTWARE and SaaS

- Software as a Service (SaaS):
  - Cloud-hosted software accessible via the internet
  - Subscription-based model
  - Examples: Google Workspace, Zoom, Dropbox
- Benefits:
  - No local installation
  - Scalable and cost-effective
  - Easy updates and maintenance

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DEVELOPMENT SOFTWARE

- Tools to write, test, and maintain software applications
- Software Development Tools: Programming Environment

VS

No Code/ Low-Code Platforms: Visual Development Environment

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SOFTWARE DEVELOPMENT TOOLS

- Tools used by developers to write, test, and maintain software applications
- Examples:
  - IDEs (Integrated Development Environments)
    - Visual Studio, IntelliJ IDEA, Eclipse, PyCharm
  - Code Editors: VS Code, Sublime Text
  - Version Control Systems: Git, GitHub, GitLab
  - Compilers & Debuggers
- Diagram:

  [Source Code] → [Compiler/Interpreter] → [Executable Program]

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NO CODE/ LOW-CODE PLATFORM

- To create software applications using graphical interfaces and prebuilt logic, rather than traditional code.
- Role in IS:
  - Rapid development of internal tools, dashboards, forms, and automation.
  - Encourages participation from non-technical users (business users, analysts).
- Examples:
  - No-Code: Bubble, Glide, AppGyver, RapidMiner
  - Low-Code: Microsoft Power Apps
- Diagram:
  [User] → [Visual Builder] → [Business App]

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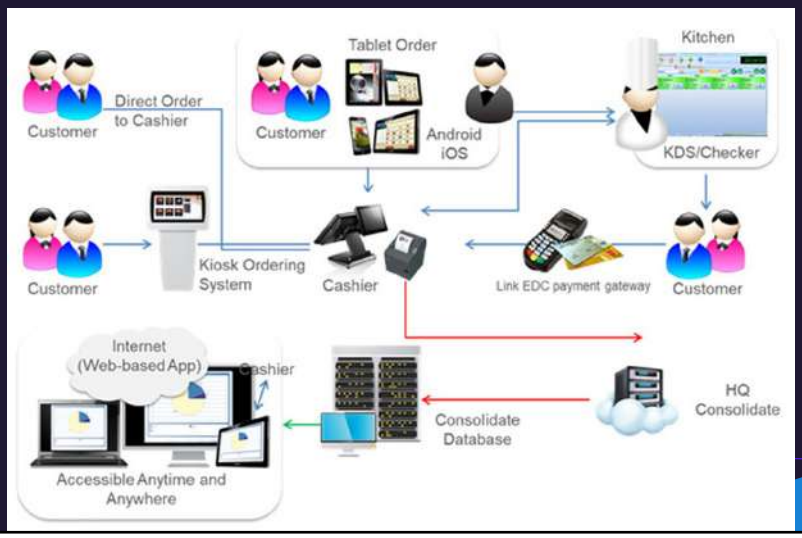
Case: Restaurant



Software?

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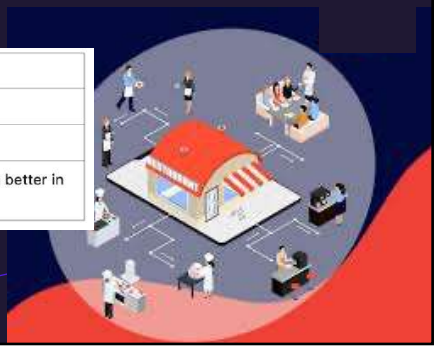
DATA

- Raw facts and figures without context
- Examples: “John”, “35”, “200000”, “Sales Dept”
- Data, Information

Component	Description	Example
Data	Raw facts	"35", "John"
Information	Processed data	"John is 35 years old"
Knowledge	Contextualized info	"Employees over 30 perform better in sales"



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DATA

- Raw facts and figures without context
- Examples: “John”, “35”, “200000”, “Sales Dept”
- Data → Information → Knowledge

Component	Description	Example
Data	Raw facts	"35", "John"
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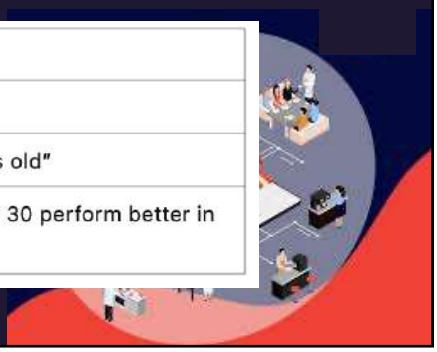

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DATA CLASSIFICATION

1. By Data Structure (Format):

How data is organized, which affects how it is stored, retrieved, and processed

Label	Description	Examples
Structured Data	Clearly defined format, fits into tables (rows/columns)	SQL databases, Excel spreadsheets
Semi-Structured Data	Not fully tabular, but has some organizational schema	XML, JSON, logs, CSVs
Unstructured Data	No predefined structure or format	Images, videos, audio, free-text emails

2. By Data Type (Content):

This refers to the nature of the data values themselves – how the system interprets them.

Label	Description	Examples
Numeric Data	Numbers that can be used in calculations	Age, salary, temperature
Categorical Data	Values representing categories or labels	Gender, product type, location
Textual Data	Free-form human language text	Comments, emails, tweets
Image Data	Visual data (pixels, formats like PNG, JPG)	Product photos, profile pictures
Audio/Video Data	Multimedia content	Voice commands, security footage

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DATA PROCESSING

- CRUD: Create, Read, Update, Delete
- Data pipelines (Extract → Transform → Load)
- Automation and scheduled reports

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DATA STORAGE

- Stored in **databases** (managed by DBMS)
- Cloud storage vs on-premises
- Table/Field/Record concept (ER Diagram basics)

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DATA BASE

- A **database** is an organized collection of data that is stored and accessed electronically.
- It allows for **efficient storage, retrieval, and management of data**.
- Typically used to support Transaction Processing Systems (TPS), MIS, DSS, and ERP.

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HOW TO STORE DATA IN DATABASE

• **Tables** are used to store data in **rows (records)** and **columns (fields)**.

MENU Table

MenuID (PK)	ItemName	Category	Price
1	Nasi Goreng	Main Dish	25,000
2	Ayam Bakar	Main Dish	30,000
3	Teh Manis	Beverage	8,000

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DATABASE EXAMPLE

MENU Table
Stores all available dishes.

MenuID (PK)	ItemName	Category	Price
1	Nasi Goreng	Main Dish	25,000
2	Ayam Bakar	Main Dish	30,000
3	Teh Manis	Beverage	8,000

2. ORDER Table:
Stores general order information (one row per customer order).

OrderID (PK)	TableNo	OrderTime
1001	5	2025-03-10 11:34 AM
1002	3	2025-03-10 11:35 AM

OrderDetailID (PK)	OrderID (FK)	MenuID (FK)	Quantity
1	1001	1	2
2	1001	3	1
3	1002	2	1

3. ORDER_DETAIL Table:
Bridge table to store multiple dishes per order.

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DATABASE CONCEPT

- Relationship: Relation between trecord in two ables
  - One-to-One:
  - One-to-Many:
    - One record in the ORDER table can be linked to many records in the ORDER_DETAIL table.
  - Many-to-Many:
    - Many orders can include many dishes, resolved using a bridge table (ORDER_DETAIL).
- Normalization: Data is not duplicated, easier to maintain.
- Referential Integrity: Ensures valid references between related records.

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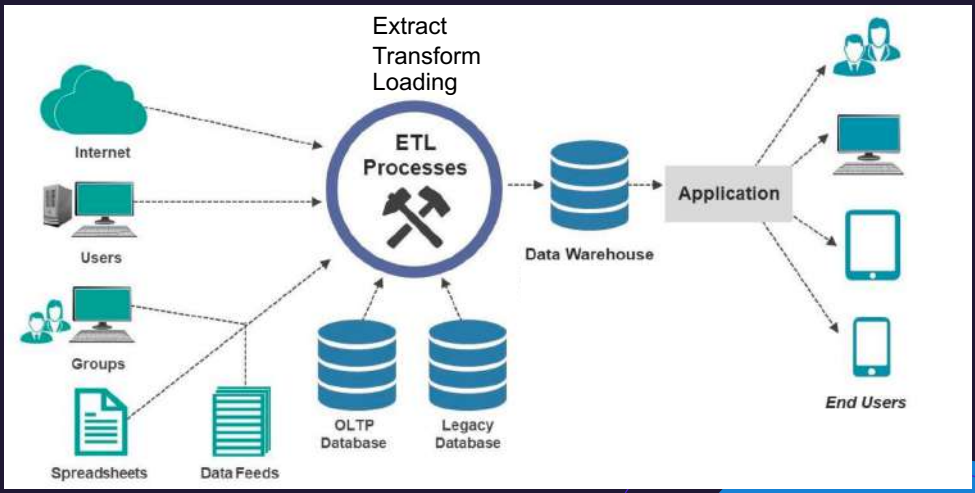
DATAWAREHOUSE

- Integrating data from multiple sources into one warehouse



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DATAWAREHOUSE

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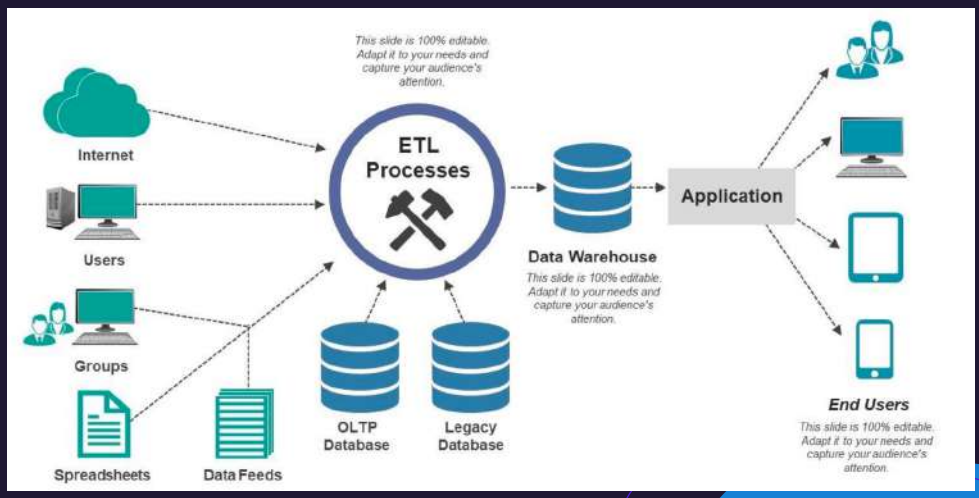

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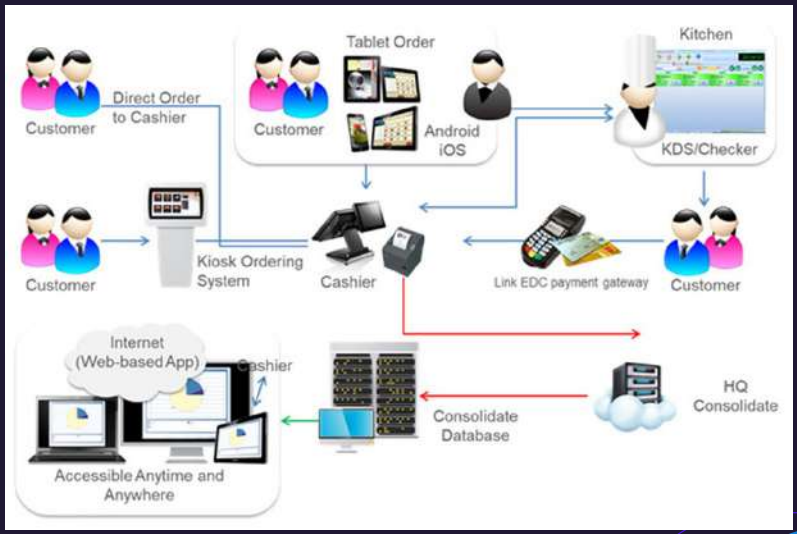
Case: Restaurant



Data?
Tabel?

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