

CURRENT TOPICS IN COMPUTER SCIENCE



Business Intelligence Systems and Analytics INTRODUCTION

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OUTLINE

- Data warehouse overview
- Decision support system overview
- Discussion
- Summary
- References

ALICE'S STORY

- Here is Alice
- She is interested in F&B
- One day, she opened her first store in Saigon
- It's a traditional restaurant with Vietnamese cuisine

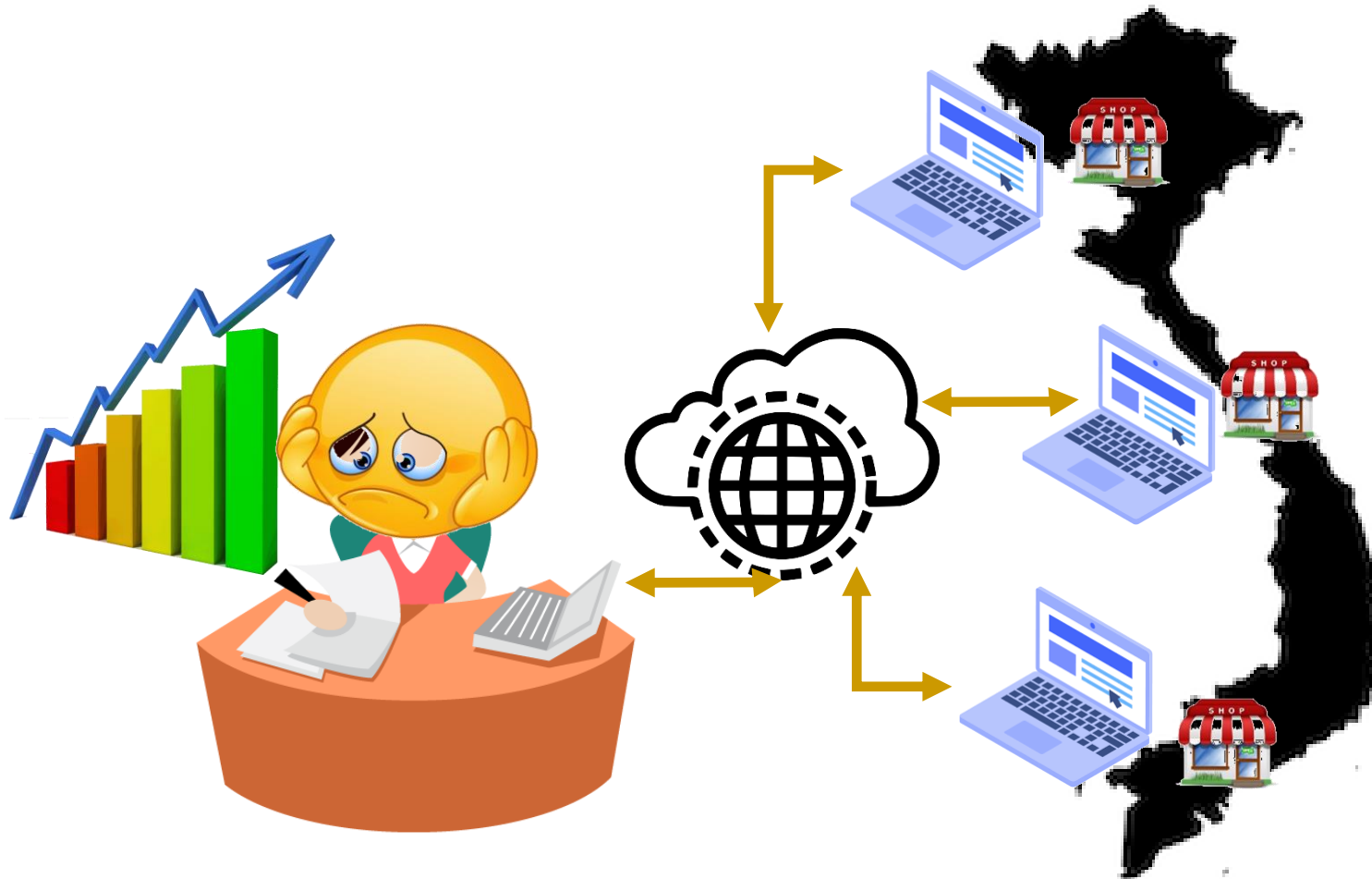


INTRODUCTION (1/5)



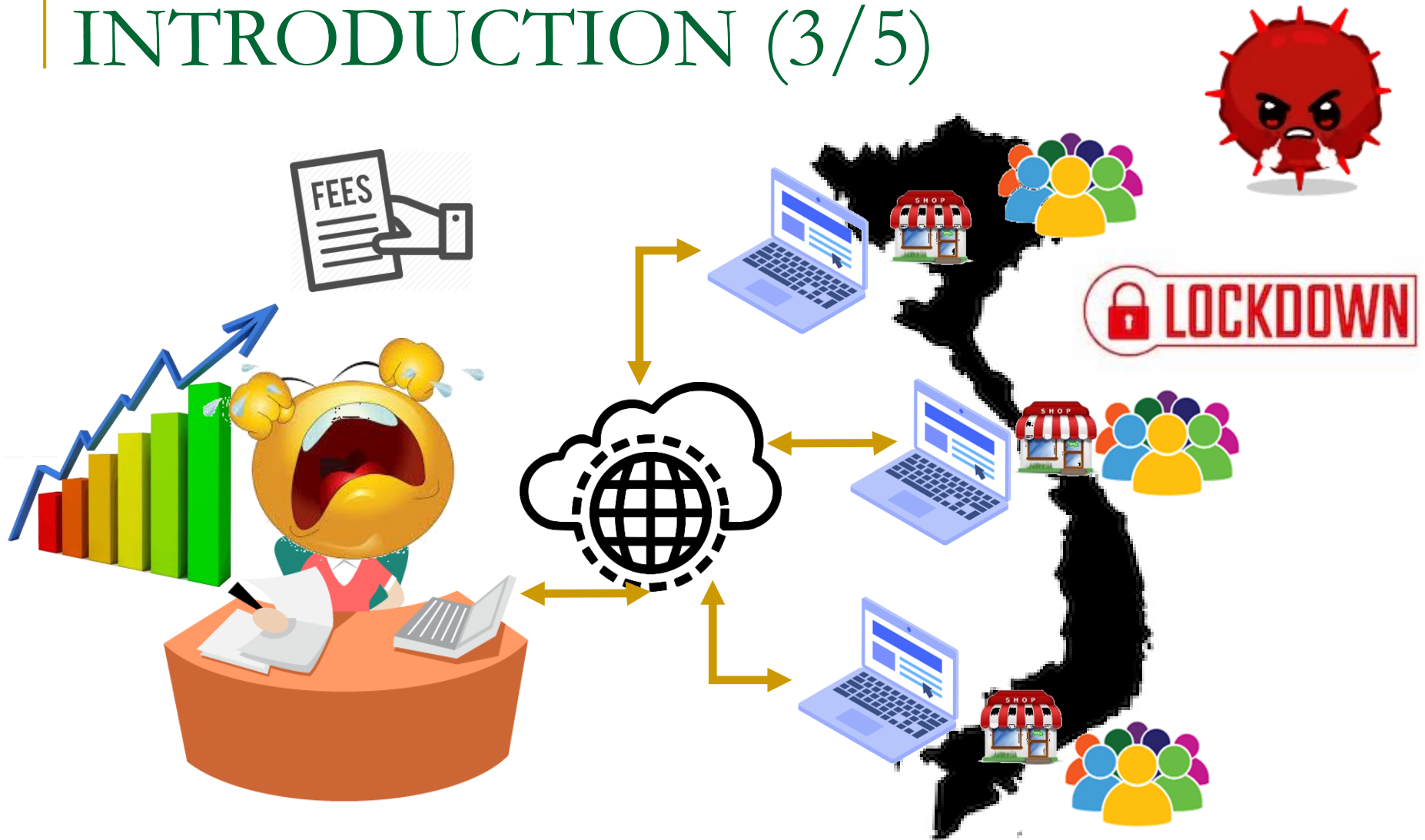
<http://www.dinh.vip/small-store-icon-psd-free-psd>; <https://iconbug.com/data/06/512/f91d30a37d1b631de0005b1402442924.png>; <https://static.pakwheels.com/2015/06/graph.gif>; https://cdn.pixabay.com/photo/2021/05/25/02/03/restaurant-6281067_1280.png;

INTRODUCTION (2/5)



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INTRODUCTION (3/5)



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DISCUSSION



WOULD YOU SUGGEST ANY
SOLUTIONS TO HELP HER?

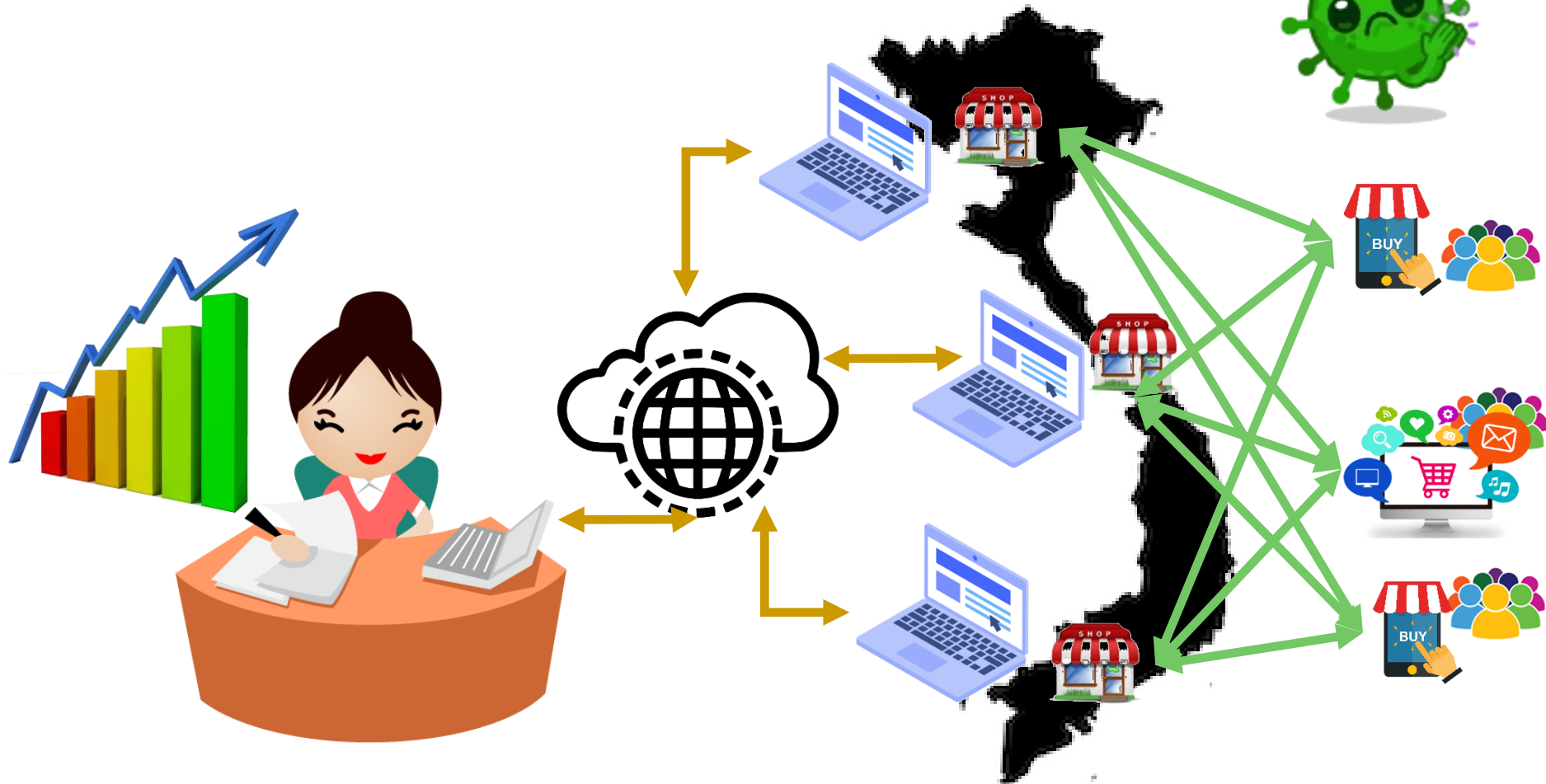


INTRODUCTION (4/5)



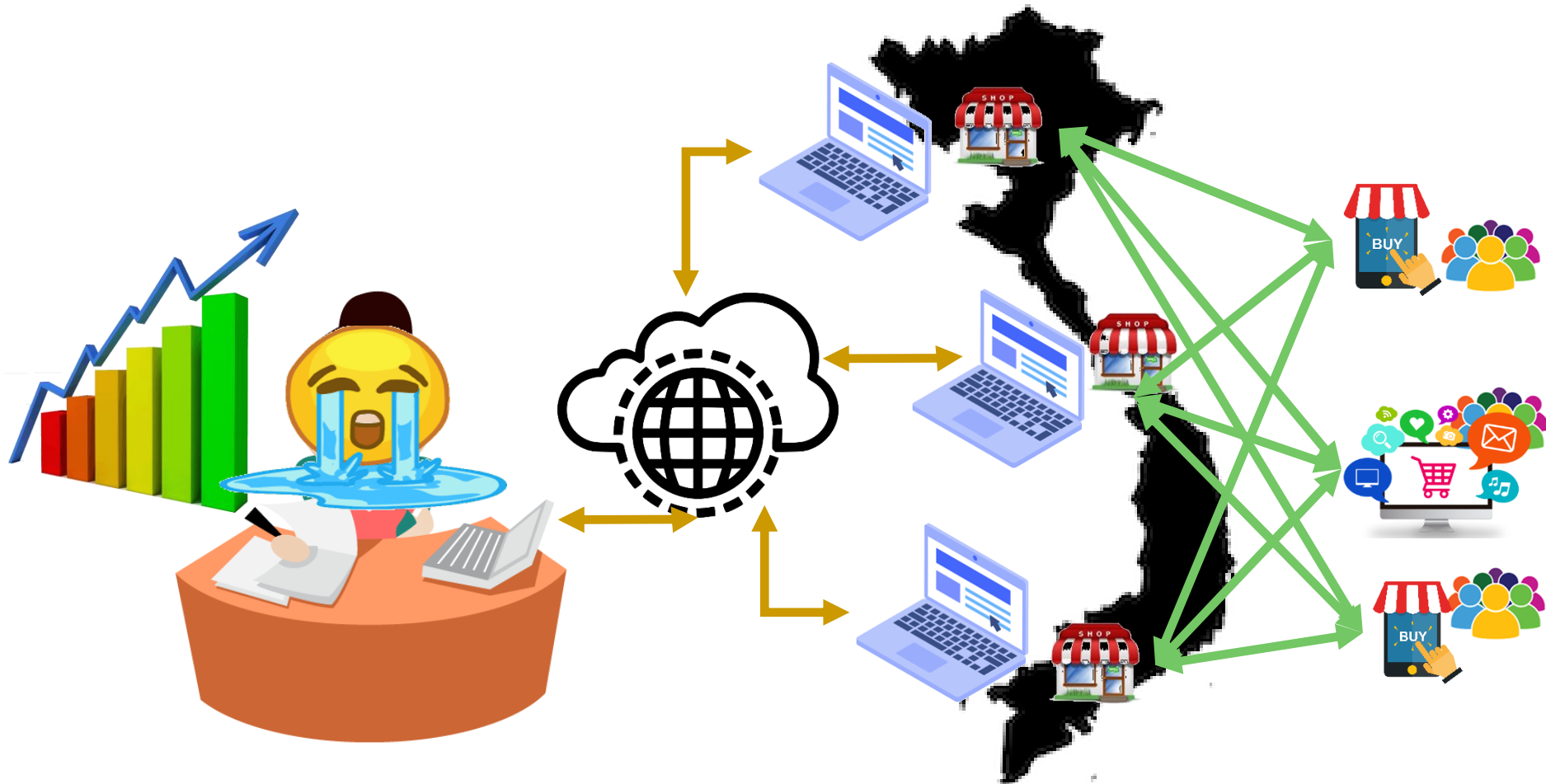
<https://violettek.com/wp-content/uploads/2018/09/violettek-e-store.png>; <https://www.paymill.com/en/blog/how-to-maintain-business-flow-through-m-commerce/>

INTRODUCTION (5/5)



<http://www.dinh.vip/small-store-icon-psd-free-psd>; <https://iconbug.com/data/06/512f91d30a37d1b631de0005b1402442924.png>; <https://static.pakwheels.com/2015/06/graph.gif>; <https://image.shutterstock.com/image-vector/high-detailed-vector-map-vietnam-260nw-150472901.jpg>; <https://encrypted-tbn0.gstatic.com/images?q=tbn%3AANd9GcGeeOZor21HxRcdDaFqBdsNqBkoZoYjo1b1h8Lv0FAMwXwLjqr&usqp=CAU>; https://st2.depositphotos.com/10019117/684v/450/depositphotos_76840679-stock-illustration-depressed-emoticon.jpg; <https://www.onlinewebfonts.com/icon/504308>; https://encrypted-tbn0.gstatic.com/images?q=tbn%3AANd9GcRxN_w4kEKxFirNI_P7sJrrlaKDbPgnxeleV3aZO7uCuRPpibJ8&usqp=CAU; <https://telegramchannels.me/stickers/s-thevirus>

AND ANOTHER PROBLEM COMES...



<http://www.dinh.vip/small-store-icon-psd-free-psd/>; <https://iconbug.com/data/06/512f91d30a37d1b631de0005b1402442924.png>; <https://static.pakwheels.com/2015/06/graph.gif>; <https://image.shutterstock.com/image-vector/high-detailed-vector-map-vietnam-260nw-150472901.jpg>; <https://encrypted-tbn0.gstatic.com/images?q=tbn%3AANd9GcQoeQZor21HdRCoDaF6B9N6RKnZo7jo1b1h8VofAmwXvLpr&usqp=CAU>; https://s2.depositphotos.com/1001911/7884/v450/depositphotos_78840879-stock-illustration-depressed-emoticon.jpg; <https://www.onlinewebfonts.com/icon/504308>; https://encrypted-tbn0.gstatic.com/images?q=tbn%3AANd9GcRvXN_y4kEKFirNj_P7sJrtaKDbPqnxleV3aZ07UCuRPPlbJ8&usqp=CAU; <https://telegramchannels.me/stickers/s-thevirus>; <https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcQXP2CsEm1eg1ewxCqselmYSDlpnNU7RBAnttiDMzfiMBvZ0DiKgb7Z68plYEKOBuw&usqp=CAU>

DISCUSSION



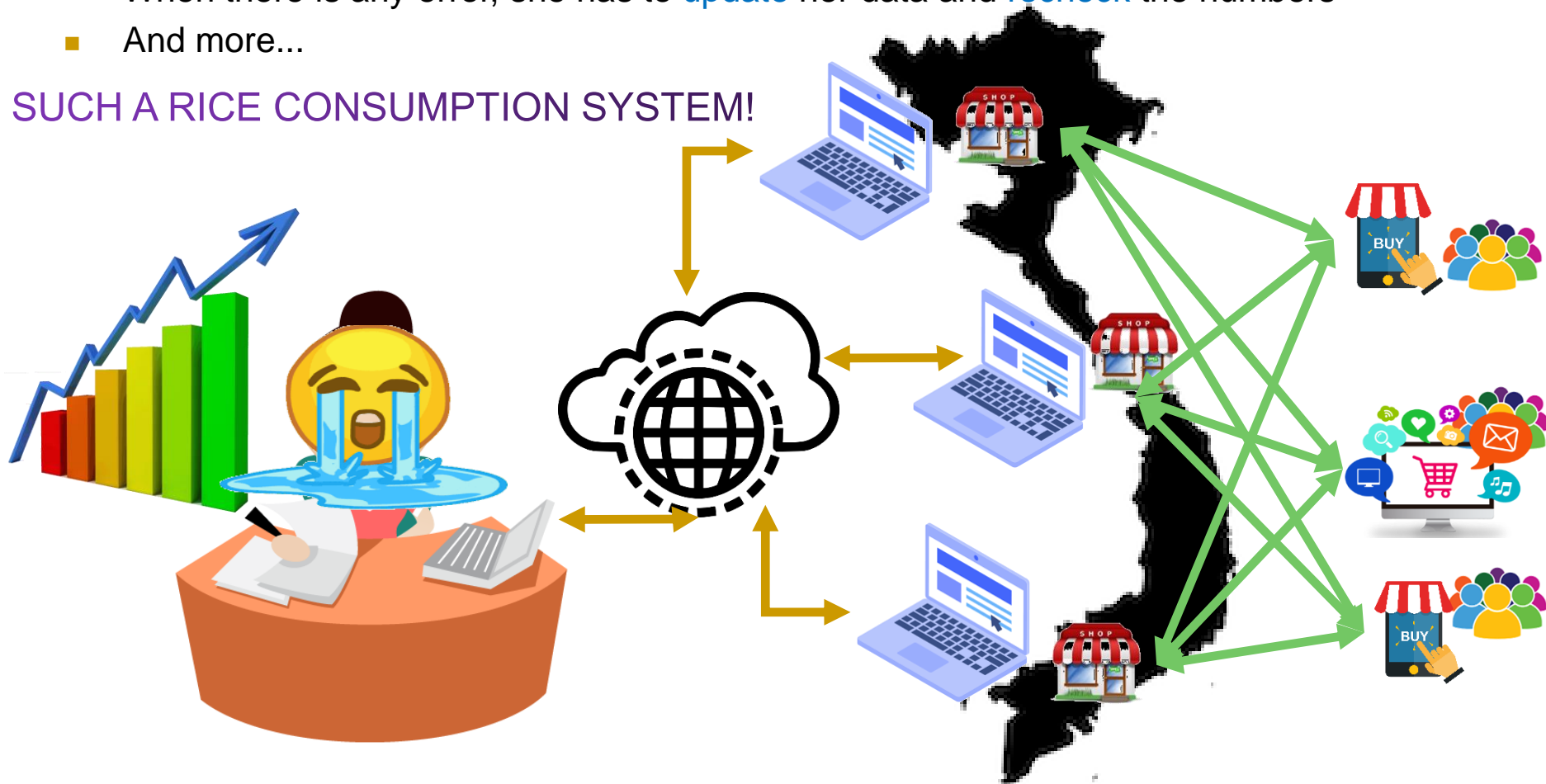
SHE NEEDS YOUR SUPPORT
AGAIN!
AND
WANNA PLAY THE ROLE OF
ALICE?



Class activities

- It takes her **long time** to summarize sales measurements
- She has to **redo all** for the new cycle (i.e., week, month, and year)
- When there is any error, she has to **update** her data and **recheck** the numbers
- And more...

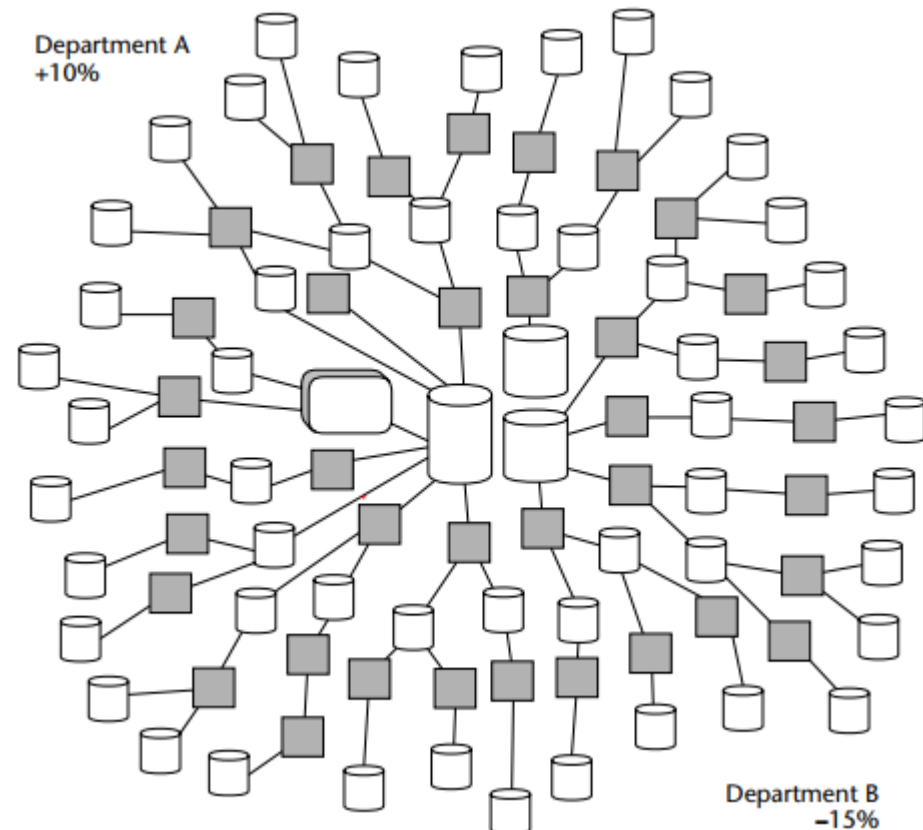
SUCH A RICE CONSUMPTION SYSTEM!



<http://www.dinh.vip/small-store-icon-psd-free-psd/>; <https://iconbug.com/data/06/512f91d30a37rtb631de0005b1402442924.png>; <https://static.pakwheels.com/2015/06/graph.gif>; <https://image.shutterstock.com/image-vector/high-detailed-vector-map-vietnam-260ny-150472901.jpg>; <https://encrypted-tbn0.gstatic.com/images?q=tbn%3AANd9GcQoeQZor21HvRc0DaF6B9N6RknZo7jo1b1h8v0FAmwXvLpr&usqp=CAU>; https://s2.depositphotos.com/10019117/6884/v450/depositphotos_76840879-stock-illustration-depressed-emoticon.jpg; <https://www.onlinewebfonts.com/icon/504308>; https://encrypted-tbn0.gstatic.com/images?q=tbn%3AANd9GcRvXN_y4dEKxfrNJ_P7sJmIakDbPgrxeleV3aZ07UCuRPPIbJ8&usqp=CAU; <https://telegramchannels.me/stickers/s-thevirus>; <https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcQXP2CsFem1eg1ewxCqelmYSDlpnNU7RBAnttDMzdfMBvZ0DkGb7Zj68nlYEK0Buw&usqp=CAU>

WHAT'S MORE...

- Lack of credibility
 - ❑ Sales says revenue is +10%
 - ❑ Finance says revenue is -15%
 - ❑ SCM says revenue is +5%
- Reasons
 - ❑ No time basis of data
 - ❑ The algorithmic differential of data
 - ❑ The levels of extraction
 - ❑ The problem of external data
 - ❑ No common source of data from the beginning
 - ❑ Errors of all kinds
 - ❑ Etc.



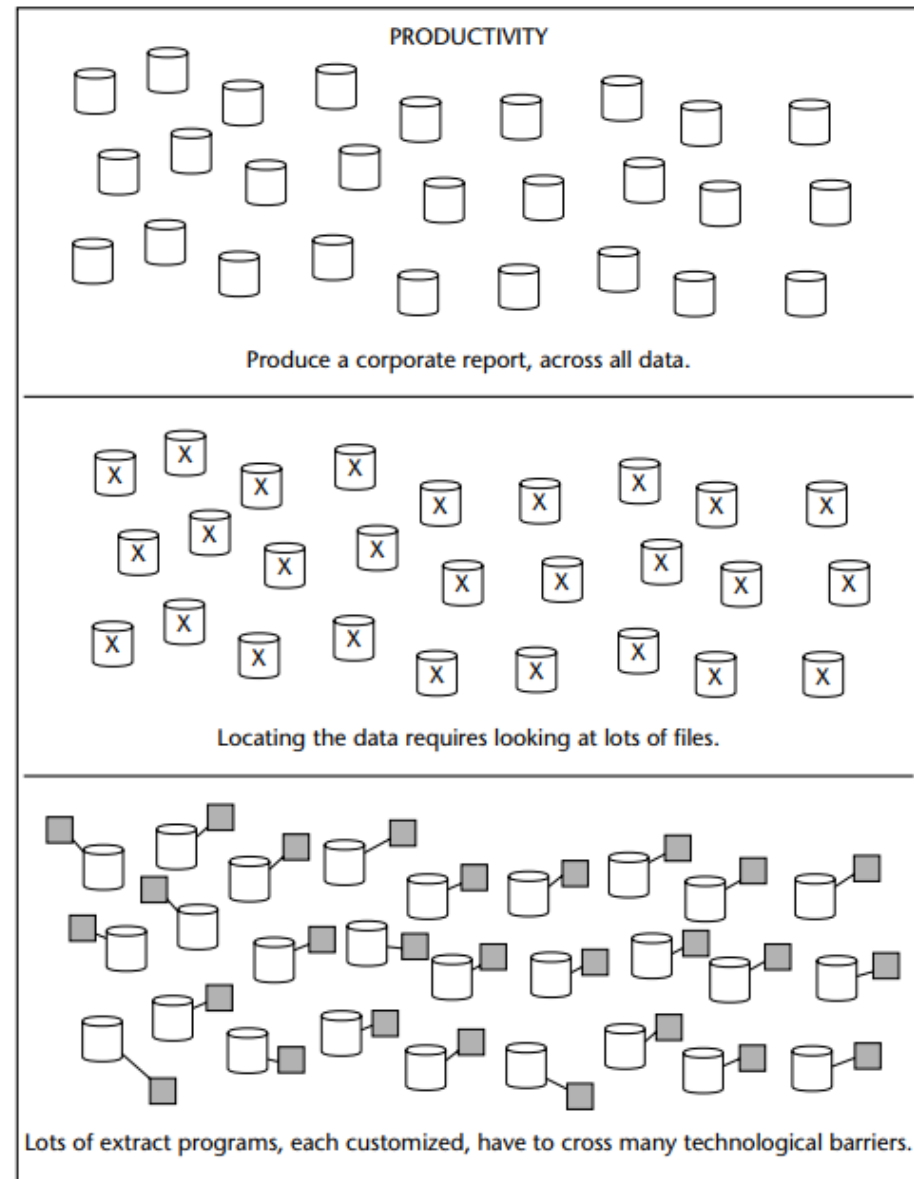
WHAT'S MORE...

■ Problems of productivity

- ❑ Locate and analyze the data for the report.
- ❑ Compile the data for the report.
- ❑ Get programmer/analyst resources to accomplish these two tasks.

■ Reasons

- ❑ Big data (3Vs)
- ❑ Technology variance
- ❑ Reusability
- ❑ Unknown future demands
- ❑ Etc.



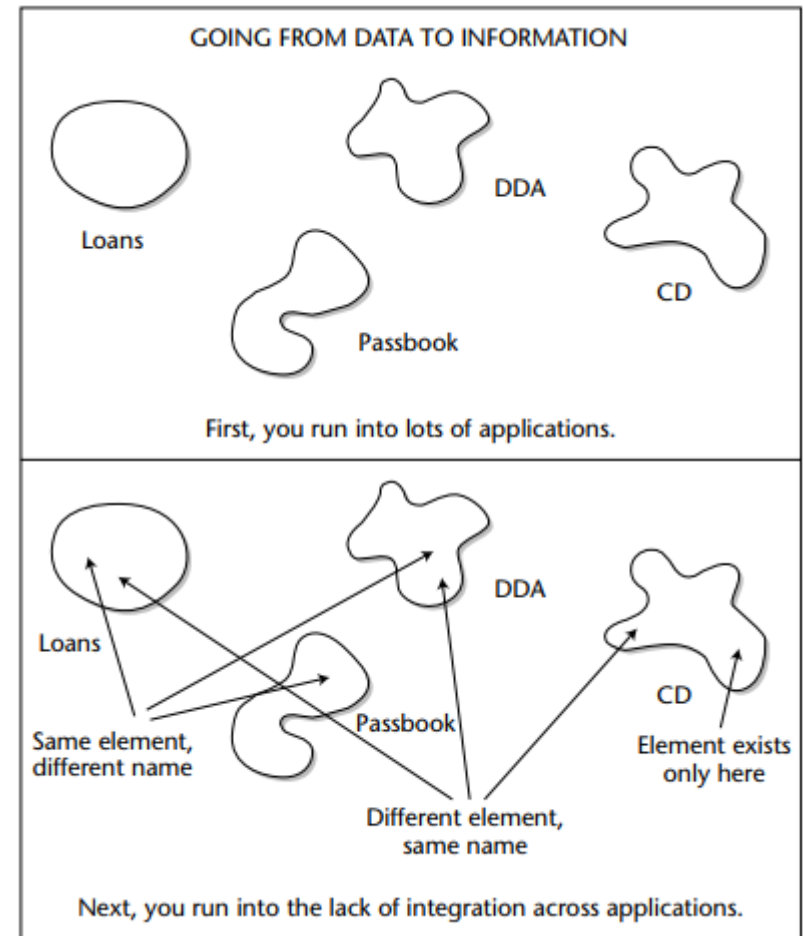
WHAT'S MORE...

■ Problems of obtaining information

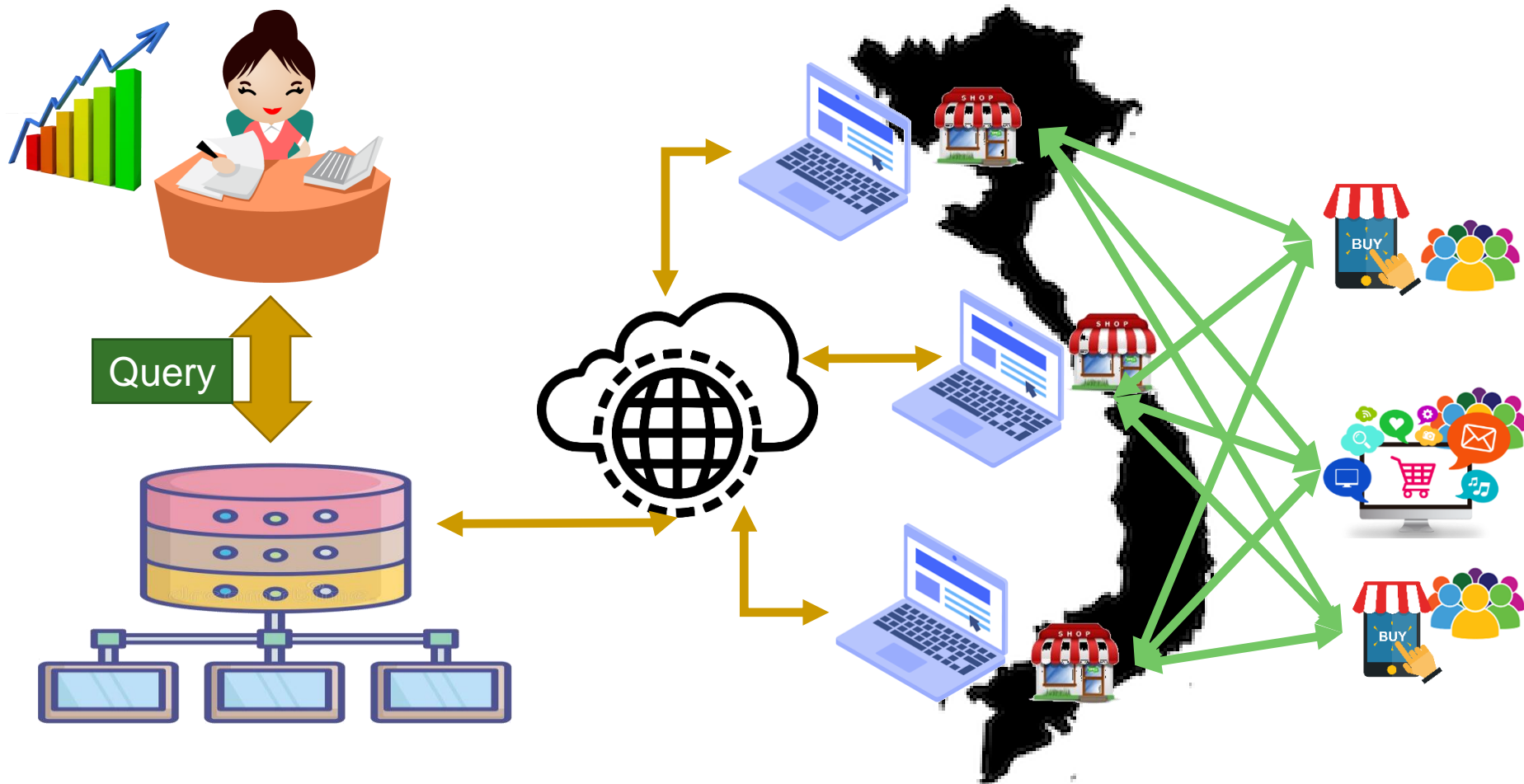
- ❑ Data is unavailable
- ❑ Data is not integrated

■ Reasons

- ❑ No data history
- ❑ Unforeseen data needs
- ❑ Unintegrated legacy applications
- ❑ Etc.

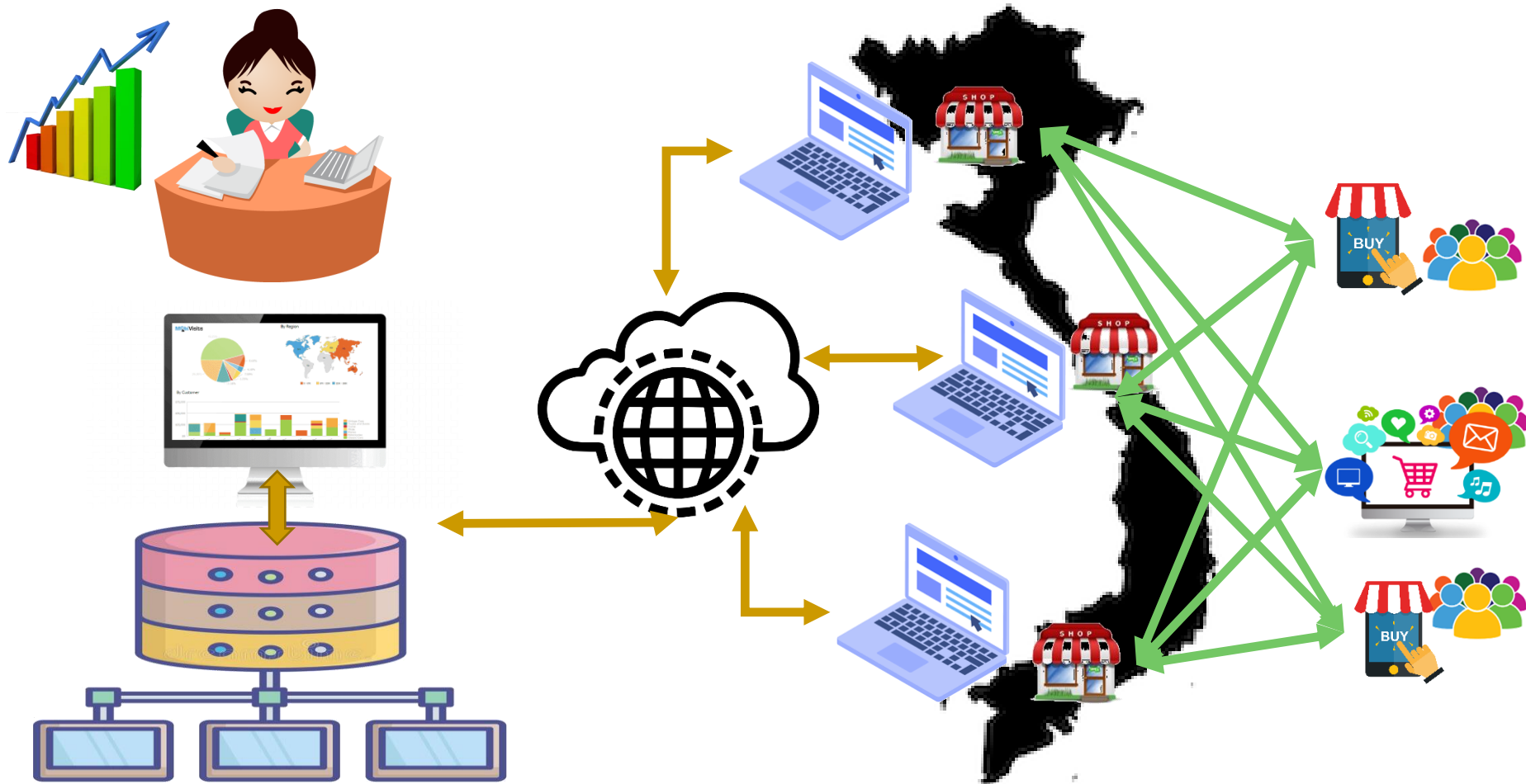


YOU MAY COME UP WITH...



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OR BETTER FOR ALICE...



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DATA WAREHOUSE (DWH) OVERVIEW

A DWH USECASE

■ Alice's restaurant expansion with

- ❑ More menu items
- ❑ More sale types
 - Dine-in
 - Delivery
 - Take-away
- ❑ More supporting systems



<http://www.dinh.vip/small-store-icon-psd-free-psd>; <https://iconbug.com/data/06/512/f91d30a37d1b631de0005b1402442924.png>; <https://static.pakwheels.com/2015/06/graph.gif>; <https://image.shutterstock.com/image-vector/high-detailed-vector-map-vietnam-260nw-150472901.jpg>; <https://encrypted-tbn0.gstatic.com/images?q=tbn%3AANd9GcQeeOZor21HxIRcdDaFqBdsNgBknZoYjo1b1h8Lv0FAmwXwLjqr&usqp=CAU>; https://st2.depositphotos.com/1001911/7684/v/450/depositphotos_76840879-stock-illustration-depressed-emoticon.jpg; <https://www.onlinewebfonts.com/icon/504308>; https://encrypted-tbn0.gstatic.com/images?q=tbn%3AANd9GcRxN_w4kEKxFIrNI_P7sJrrlaKDbPgnxeleV3aZO7uCuRPPIbJ8&usqp=CAU; <https://telegramchannels.me/stickers/s-thevirus>

WHAT IS DWH?

- A data warehouse is a **central repository** of information that can be **analyzed** to make more informed decisions.

DWH BENEFITS

- Strong data consistency
- Better business decisions
- Easier access to enterprise data
- Single data documentation
- Independence of operational systems

DWH CHARACTERISTICS

- Subject-oriented
- Integrated
- Non-volatile
- Time-variant

DWH ARCHITECTURE (1/2)

- Bottom tier
- Middle tier
- Top tier

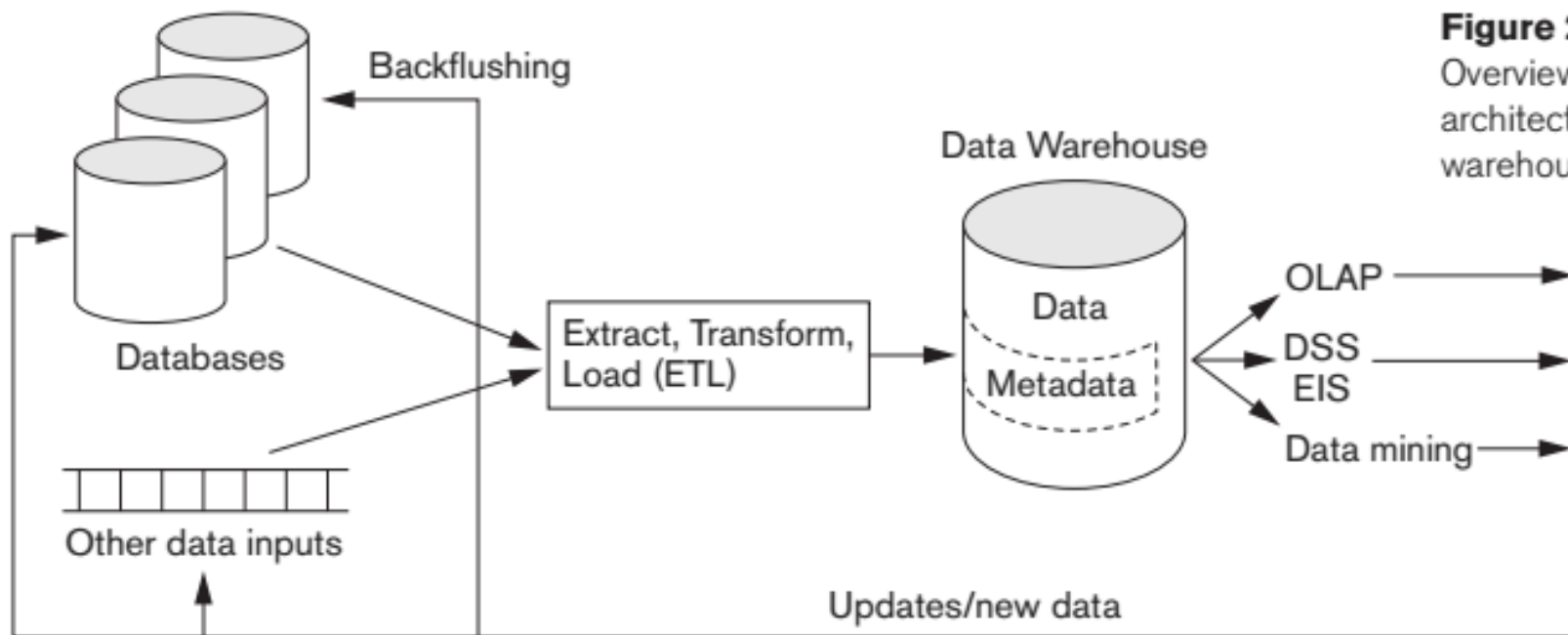
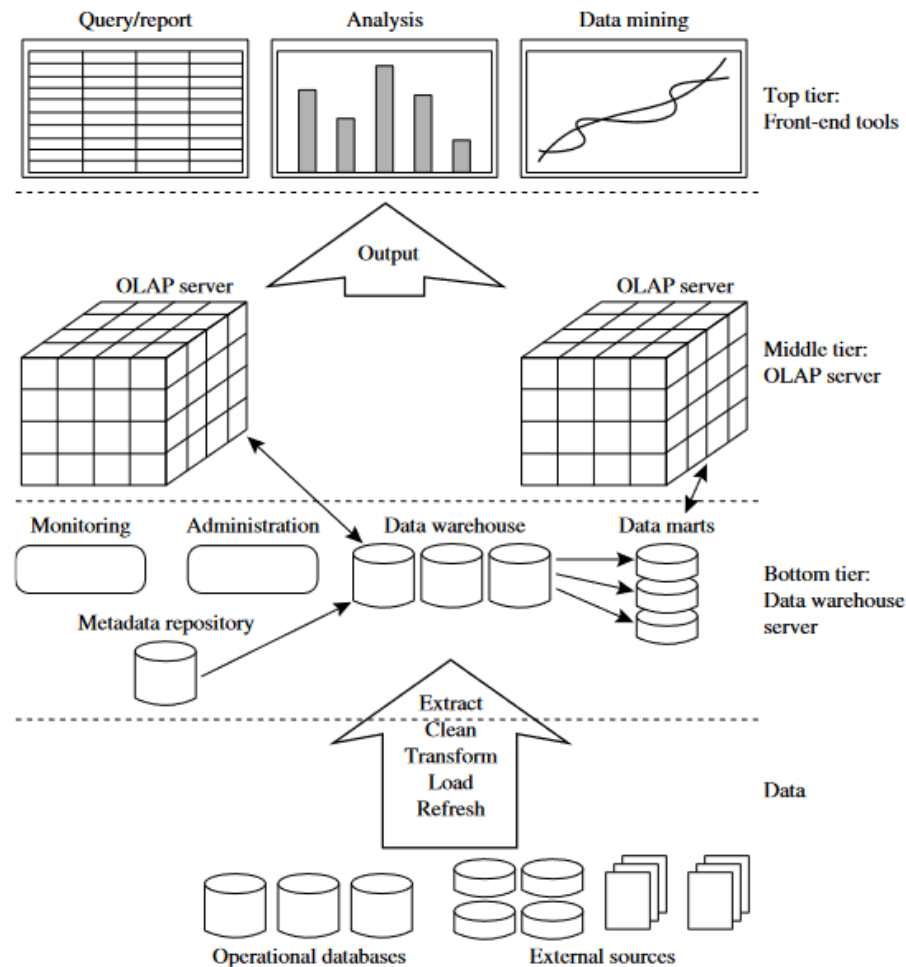


Figure 29.1
Overview of the general
architecture of a data
warehouse.

DWH ARCHITECTURE (2/2)



[5]

Figure 4.1 A three-tier data warehousing architecture.

ARCHITECTED ENVIRONMENT

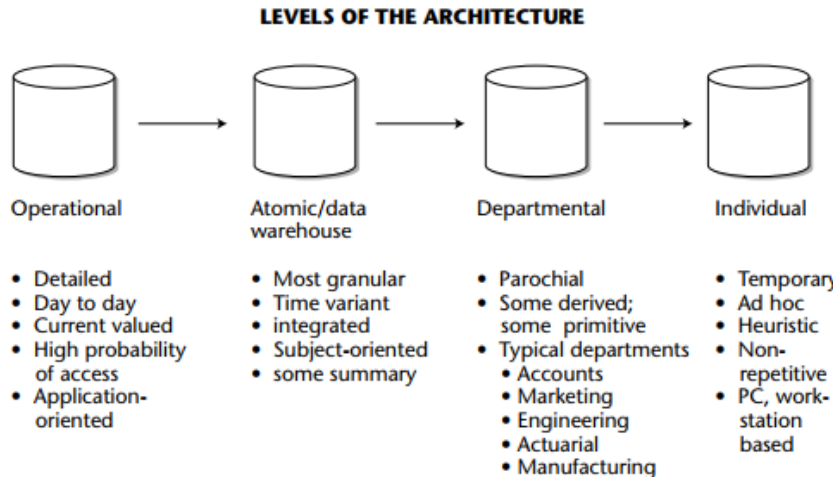


Figure 1-10 Although it is not apparent at first glance, there is very little redundancy data across the architected environment.

A CHANGE IN APPROACHES	
PRIMITIVE DATA/OPERATIONAL DATA	DERIVED DATA/DSS DATA
<ul style="list-style-type: none"> • Application-oriented • Detailed • Accurate, as of the moment of access • Serves the clerical community • Can be updated • Run repetitively • Requirements for processing understood <i>a priori</i> • Compatible with the SDLC • Performance-sensitive • Accessed a unit at a time • Transaction-driven • Control of update a major concern in terms of ownership • High availability • Managed in its entirety • Nonredundancy • Static structure; variable contents • Small amount of data used in a process • Supports day-to-day operations • High probability of access 	<ul style="list-style-type: none"> • Subject-oriented • Summarized, otherwise refined • Represents values over time, snapshots • Serves the managerial community • Is not updated • Run heuristically • Requirements for processing not understood <i>a priori</i> • Completely different life cycle • Performance relaxed • Accessed a set at a time • Analysis-driven • Control of update no issue • Relaxed availability • Managed by subsets • Redundancy is a fact of life • Flexible structure • Large amount of data used in a process • Supports managerial needs • Low, modest probability of access

Figure 1-9 Differences between primitive and derived data.

AN EXAMPLE

A SIMPLE EXAMPLE-A CUSTOMER

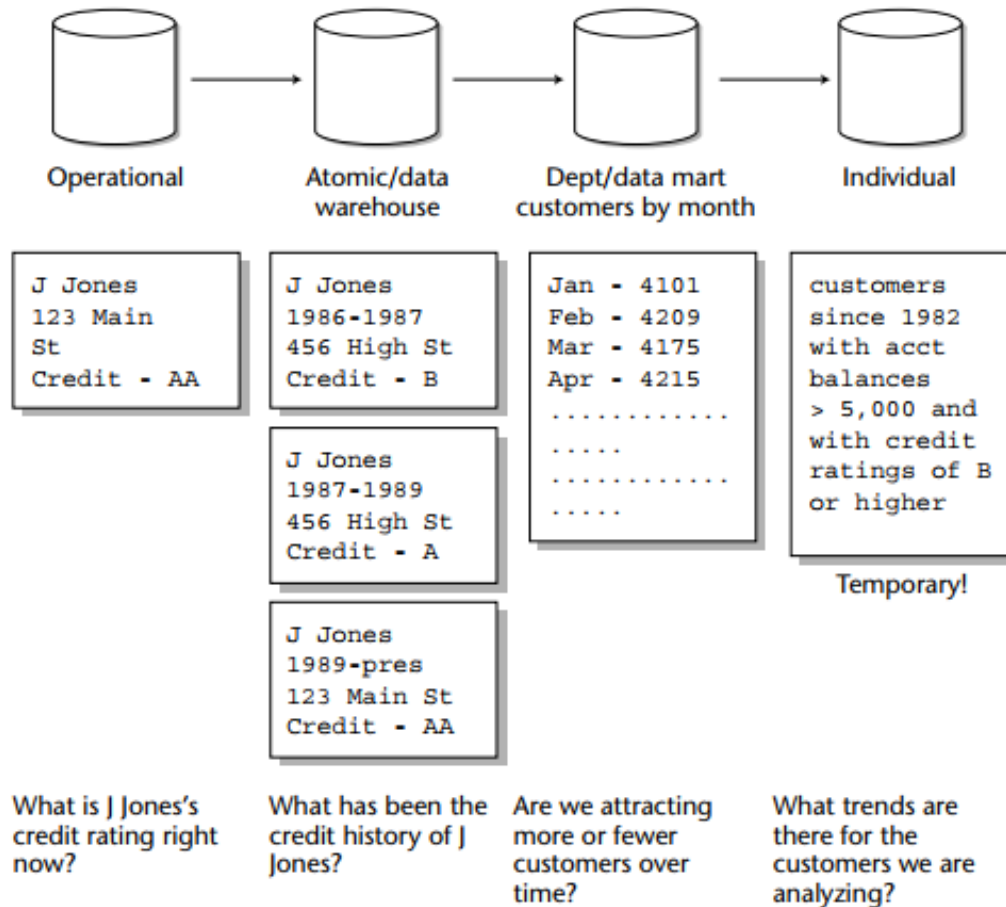


Figure 1-11 The kinds of queries for which the different levels of data can be used.

DISCUSSION



WHEN SHOULD WE GET A
DATA WAREHOUSE?

DATA WAREHOUSE FOR USE

- Data analytics
- Data mining
- Machine learning
- BI
- Ad-hoc queries
- Etc.

DATA WAREHOUSE PRODUCTS

- Google Bigquery
- Snowflake
- Amazon Redshift
- Teradata
- Oracle 12c
- Cloudera
- Panoply
- Xplenty
- Informatica
- IBM Infosphere
- Etc.

DECISION SUPPORT SYSTEM (DSS) OVERVIEW

DISCUSSION



WHAT DO YOU KNOW ABOUT
DSS?
ANY EXAMPLE?

USE-CASES

The screenshot displays the Google Maps interface for a route calculation in Ho Chi Minh City. The left sidebar contains a search bar with the starting point '268 Lý Thường Kiệt, Phường 6, Tân Bình,' and the destination 'CM cơ sở 2, VRJ4+65C, Đồng Hoà, Dĩ An,'. Below the search bar are options to 'Add destination', 'Leave now', and 'Send directions to your phone'. The main map area shows a blue route line connecting the two points, passing through the city center. Two route options are listed in the sidebar:

- via Hoàng Sa**: 50 min, 27.8 km. Fastest route now due to traffic conditions. This route has tolls.
- via XL Hà Nội**: 51 min, 26.5 km.

The map also shows various landmarks, including the 'Đại học Bách Khoa TP.HCM cơ sở 2', 'Chợ Thủ Đức', and 'Chợ Hạnh Thông Tây'. The Google Maps logo is visible in the bottom right corner of the map area.

<https://www.google.com/maps>

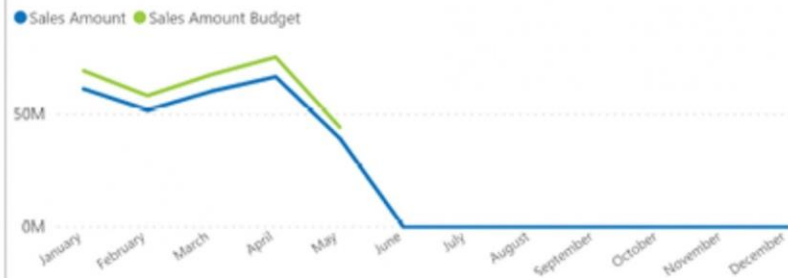
USE-CASES

The screenshot displays the Slack desktop application interface. On the left is a purple sidebar with navigation options: AI, AL, and AM (with a red notification badge), followed by a plus sign. Below these are sections for 'All unread' (Threads, Mentions & reactions, Drafts, Show more), 'Channels' (announcements, design-crit, media-and-pr with a red badge, and social-media which is selected), and 'Direct messages' (slackbot, Zoe Maxwell (you), Lee Hao, Sara Parras). The main workspace shows the '#social-media' channel with 21 members and 1 pinned message. The channel description is 'Track and coordinate social media'. The message history includes a post from 'Acme Team' about a meeting starting in 15 minutes, a post from 'Harry Boone' about a team sync, and a post from 'Lee Hao' about meeting notes. A file named '1/9 Meeting Notes' is attached to the last post. At the bottom, there is a text input field for sending messages to the channel. On the right side, a 'Details' panel for the channel is open, showing options to Add, Find, Call, or More, and an 'About' section with the topic 'Track and coordinate social media', description 'Home of the social media team', and creation date 'October 18th, 2019'. Below the details are sections for 'Members' (21) and 'Organizations' (2).

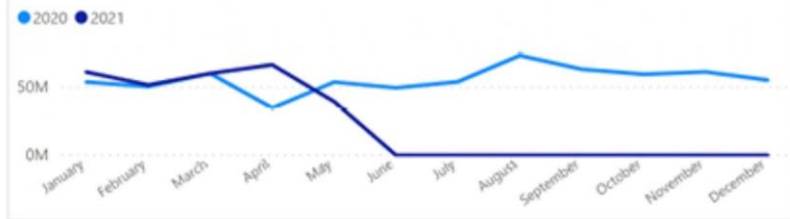
<https://a.slack-edge.com/c5da2d2/marketing/img/downloads/refreshed/slack-client-windows-desktop.png>

USE-CASES

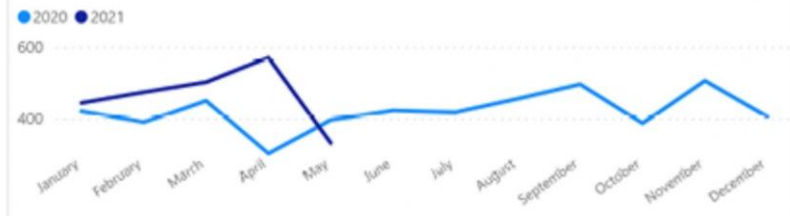
Sales Trend - Actual vs Budget



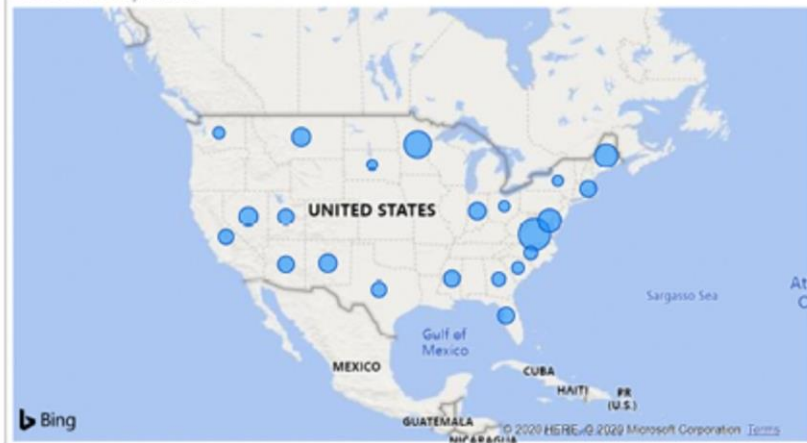
Sales Amount - Trend



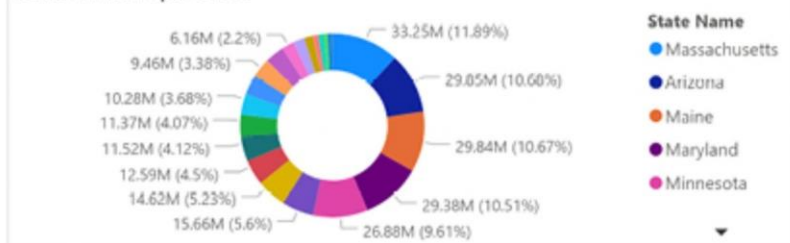
Sold Units - Trend



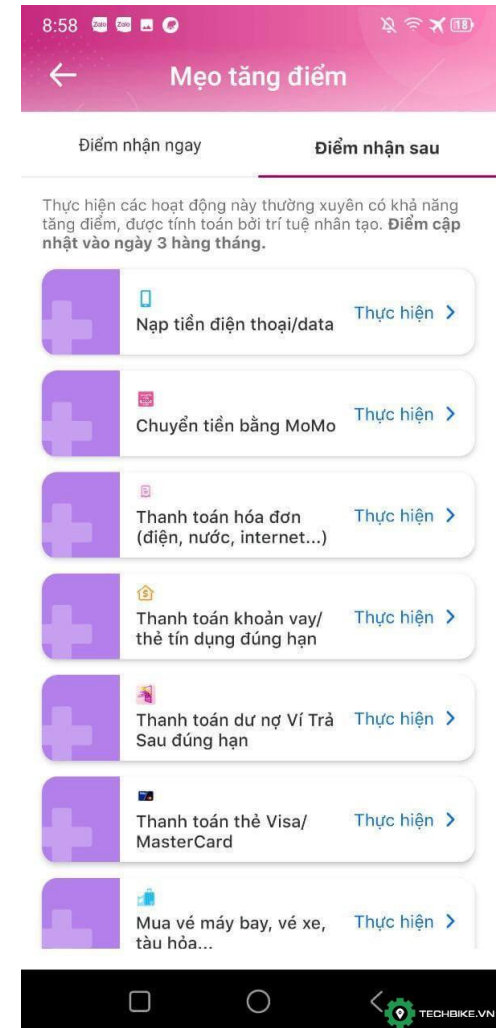
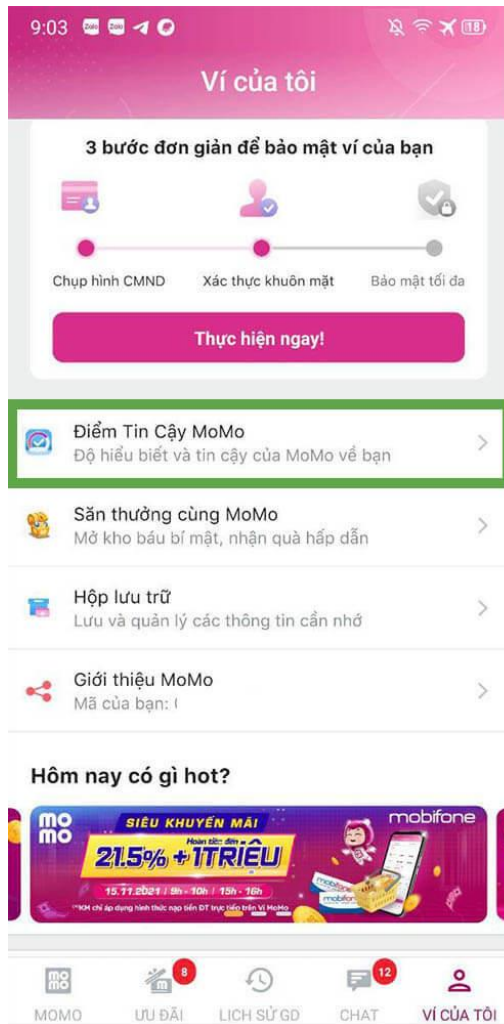
Sold Units by State



Sales Amount per State



USE-CASES



<https://techbike.vn/attachments/cach-xem-diem-tin-cay-momo-jpg.14337/>

USE-CASES

DDx
 Click button for hint

[Help](#) [Feedback](#) [Exit](#)

[New Case](#) [Retrv Case](#) [Save Case](#) [D/F Info](#)

Case Findings

[Remove](#) [Focus](#) [DDx](#) [Findings Present?](#)

Enter findings separated by ";".
 tick exposure; ankle purpura

[Submit](#) [Reset](#)

Are these findings present?

<input type="radio"/> Y	<input type="radio"/> N	<input type="radio"/> Uk	polyserositis	<input checked="" type="checkbox"/>
<input type="radio"/> Y	<input type="radio"/> N	<input type="radio"/> Uk	morning stiffness	<input checked="" type="checkbox"/>
<input type="radio"/> Y	<input type="radio"/> N	<input type="radio"/> Uk	sacroback tenderness	<input checked="" type="checkbox"/>

Current Findings List:
☐ Headache, dull
☐ Thrombocytopenia
☐ Insomnia
☐ Joint stiffness
☐ Malaise
☐ Chronic (> few days)
☐ Male
☐ Adult, young (18 to 40 yrs)

[Remove](#) [Focus](#) [DDx](#) [Findings Present?](#)

Two more findings present in this patient are entered.

After the user clicks on the "Submit" button, the new findings will be added to the Current Findings List, and the "Current DXplain Disease List" will be updated to reflect the newly added findings. This can be seen on the next screen of this demo.

Current DXplain Disease List

COMMON Diseases:
[Evidence for Dx](#) [Dx Description](#) [References](#)
 + Purpura, thrombocytopenic, idiopathic
 Lupus erythematosus, systemic
 Arthritis, rheumatoid
 Purpura, thrombocytopenic, secondary
 -- Aids, CDC group IV
 -- Polymyalgia rheumatica
 -- Lead poisoning
 -- Aids, CDC group I
 -- Chronic fatigue syndrome
 -- Meningitis, pneumococcal

RARE Diseases:
[Evidence for Dx](#) [Dx Description](#) [References](#)
 Spondylitis, ankylosing
 -- Anemia, aplastic
 -- Rocky mountain spotted fever
 -- Leptospirosis
 -- Mycosis fungoides
 -- Tuberculosis, miliary
 -- Leukemia, promyelocytic
 -- Encephalitis, rubella
 -- Disseminated intravascular coagulation
 -- Ornithosis

+ sufficient information to suggest this DX
 -- insufficient information to support this disease

[New Case](#) [Retrv Case](#) [Save Case](#) [D/F Info](#)

 DXplain and DXplain Vocabulary Copyright 1987-1999
 Massachusetts General Hospital / Harvard Medical School

USE-CASES

The screenshot displays an Excel spreadsheet with the following structure:

	A	B	C	D
1				
2		Daily Compound Loan Interest Calculator		
3				
4		Total Loan Amount (TLA)	\$5,000,000	
5		Annual Interest Rate (AIR)	8.00%	
6		Period of Loan (Year)	7	
7		Date of Loan Issue	05-06-11	
8		Date of First Pay Back	06-06-11	
9		Frequency	Monthly	
10		Number of Days Per Year	365	
11		Payments Per Year	12	
12		Rounding	On	
13				
14		Monthly Payment	\$77,995	
15		Daily Compound Loan Interest	\$2,600	
16				
17				

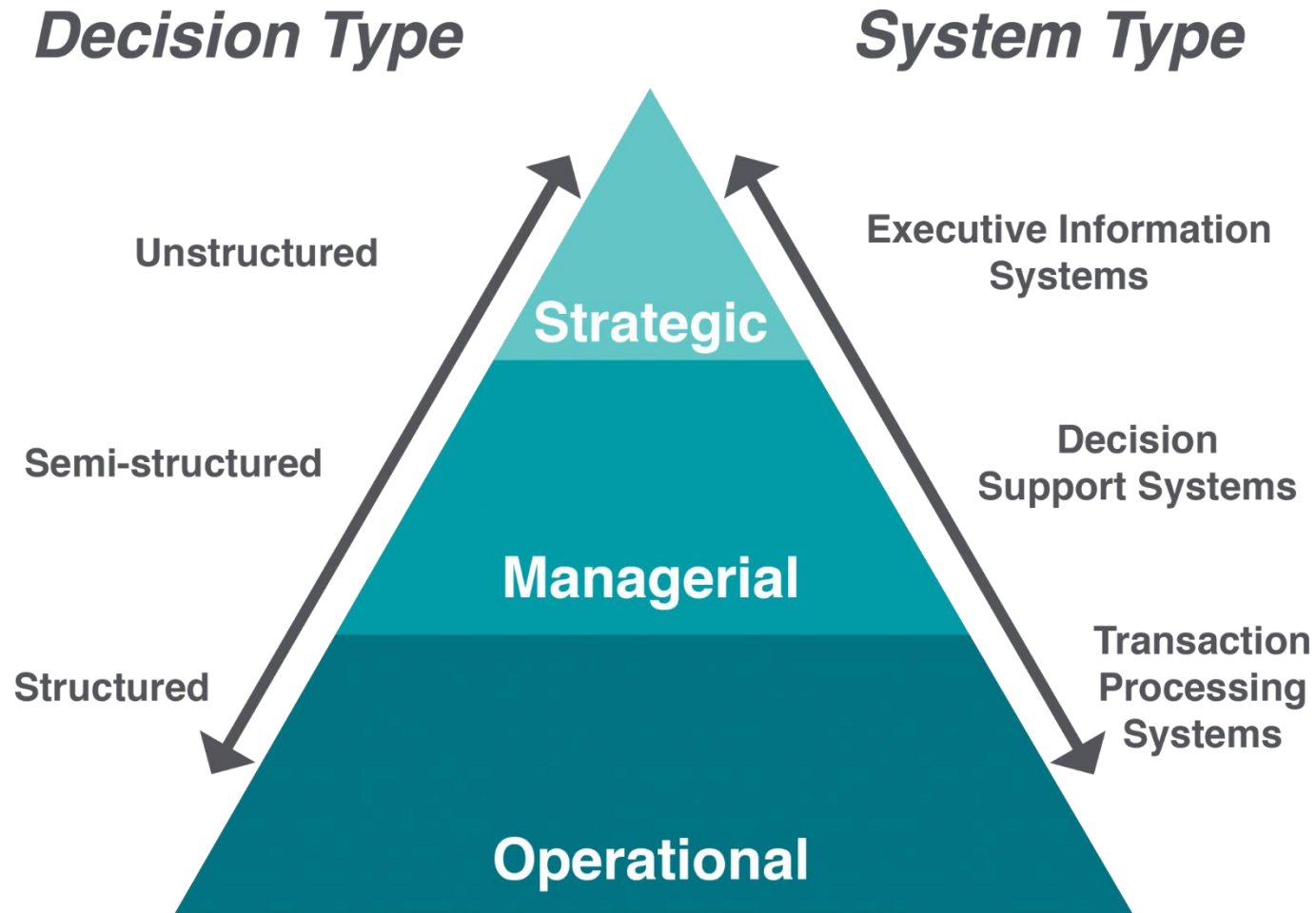
The formula bar shows the formula $=C14/30$ for cell C15.

https://www.exceldemy.com/daily-loan-interest-calculator-in-excel/#google_vignette

DECISION MAKING

- **“Decision-making** is the action or process of thinking through possible options and selecting one.”
- For example
 - Pursuing a new technology or product line.
- Good decision vs. poor decision

DECISION TYPE (1/2)



DECISION TYPE (2/2)

Level of Decision	Examples of Decision	Who Typically Makes Decisions
Strategic Decisions	Should we merge with another company? Should we pursue a new product line? Should we downsize our organization?	Top Management Teams, CEOs, and Boards of Directors
Tactical Decisions	What should we do to help facilitate employees from the two companies working together? How should we market the new product line? Who should be let go when we downsize?	Managers
Operational Decisions	How often should I communicate with my new coworkers? What should I say to customers about our new product? How will I balance my new work demands?	Employees throughout the organization

DISCUSSION

BUY WHICH ONE?



Trả góp 0%



Lenovo Yoga Duet 7 13ITL6 i7
1165G7 (82MA003UVN)

RAM 16 GB SSD 1 TB

~~35.990.000đ~~

35.190.000đ

Quà 300.000đ

★★★★★ 7

- Màn hình: 13", 2K
- CPU: i7, 1165G7, 2.8GHz
- Card: Intel Iris Xe
- Pin: 41 Wh
- Khối lượng: 1.168 kg

[+ So sánh](#)

Trả góp 0%



SALE TO ĐÓN TẾT
Lenovo Ideapad 3 15ITL6 i3
1115G4 (82H801NEVN)

RAM 8 GB SSD 512 GB

~~13.990.000đ~~

13.690.000đ

Quà 100.000đ

★★★★★ 40

- Màn hình: 15.6", Full HD
- CPU: i3, 1115G4, 3GHz
- Card: Intel UHD
- Pin: 38 Wh
- Khối lượng: 1.65 kg

[+ So sánh](#)

Trả góp 0%



INTEL GEN 12
Lenovo Ideapad 3 15IAU7 i3
1215U (82RK005LVN)

RAM 8 GB SSD 256 GB

~~13.890.000đ~~

13.590.000đ

Quà 100.000đ

★★★★★ 20

- Màn hình: 15.6", Full HD
- CPU: i3, 1215U, 1.2GHz
- Card: Intel UHD
- Pin: 45Wh
- Khối lượng: 1.63 kg

[+ So sánh](#)

Trả góp 0%



Lenovo Ideapad 5 15ITL05 i5
1135G7 (82FG01H7VN)

RAM 8 GB SSD 512 GB

~~18.790.000đ~~

18.390.000đ

Quà 200.000đ

★★★★★ 41

- Màn hình: 15.6", Full HD
- CPU: i5, 1135G7, 2.4GHz
- Card: Intel Iris Xe
- Pin: 45Wh
- Khối lượng: 1.66 kg

[+ So sánh](#)



Lenovo ThinkBook 14 G3 ACL
R5 5500U (21A200CPVN)

RAM 8 GB SSD 512 GB

18.190.000đ

Quà 400.000đ

★★★★★ 29

- Màn hình: 14", Full HD
- CPU: Ryzen 5, 5500U, 2.1GHz
- Card: Radeon
- Pin: 45Wh
- Khối lượng: 1.4 kg

[+ So sánh](#)

<https://www.thegioididong.com/laptop-lenovo>

DISCUSSION



Examples of ERP Systems

ORACLE
ENTERPRISE
RESOURCE PLANNING
CLOUD

 **Acumatica**

SAP S/4 HANA

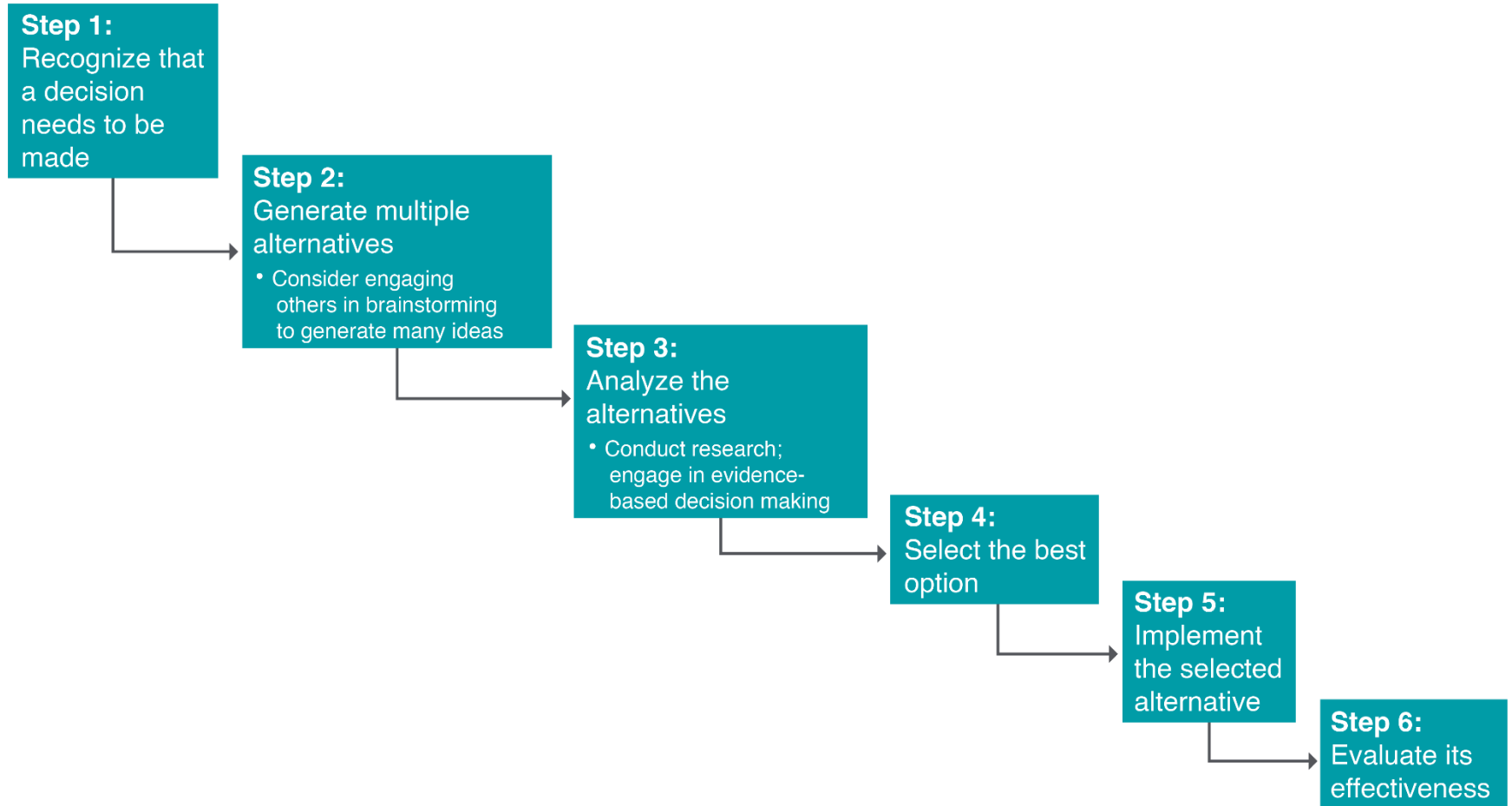
BizAutomation

**ORACLE
NETSUITE**

 **SelectHub**

SHOULD WE HAVE AN ERP SYSTEM?

DECISION-MAKING PROCESS



DISCUSSION



WHY DO WE NEED A DSS?

DECISION SUPPORT SYSTEM (DSS)

■ Scenario

- ❑ It is hard to monitor all business operations
- ❑ Strong competition increases
- ❑ IT team may be too busy
- ❑ Information needs to be in time, accurate, and up-to-date
- ❑ Trying to reduce costs
- ❑ The trend of personalization and computation

DECISION SUPPORT SYSTEM (DSS)

■ The necessity

- ❑ Improving computation performance
- ❑ Enhancing productivity
- ❑ Boosting the quality of decision making
- ❑ Upgrading competing capability
- ❑ Overcoming human limitation in information storage and processing

DECISION SUPPORT SYSTEM (DSS)

- “A DSS takes inputs regarding a known (or partially-known) decision making process and provide the information necessary to make a decision.”

DECISION SUPPORT SYSTEM (DSS)

■ Common DSS analysis techniques

Technique	Description
What if analysis	Outlines the impact of a change in a variable or assumption on the model.
Sensitivity Analysis	Outlines the impact when one variable is changed repeatedly.
Goal Seek Analysis	Goal seeking analysis-finds the inputs necessary to achieve a goal
Optimization Analysis	Optimization analysis -finds the optimum value for a target variable by repeatedly changing other variables

DSS MAIN COMPONENTS

- Knowledge base management
- Model management
- Data management
- User interface

DISCUSSION



CAN WE USE DSS WITHOUT
DWH?

SUMMARY

- An overview of DWH and DSS
 - Concept
 - Role
 - Benefit
 - General architecture

QUESTIONS AND ANSWERS



Picture from: <http://philadelphiaculpturegym.blogspot.com/2013/09/save-date-free-talk-and-q-on-affordable.html>

REFERENCES

1. Tobias Zwingmann, "AI-Powered Business Intelligence," Kindle Edition, O'reilly Press, 2022
2. Jiawei Han, Micheline Kamber, "Data Mining: Concepts and Techniques," Third Edition, Morgan Kaufmann Publishers, 2012.
3. David L. Olson, Dursun Delen, "Advanced Data Mining Techniques," Springer-Verlag, 2008.
4. Jeen Su Lim, John Heinrichs, "Digital Business Intelligence Management with Big Data Analytics," Kindle Edition, O'reilly Press, 2021.
5. William H. Inmon, "Building the Data Warehouse," Fourth Edition, Wiley Publishing, Inc., 2005.
6. R. Kimball, M. Ross, "The Data Warehouse ToolKit," 3rd Edition, Wiley Publishing, Inc., 2013.
7. Turban, E., Aronson, J.E., "Decision Support Systems and Intelligent Systems" - 7th Edition, Prentice-Hall, 2005.
8. Ramesh Sharda, Dursun Delen, Efraim Turban, "Analytics, Data Science, & Artificial Intelligence: Systems for Decision Support," 7th Edition, Pearson Education, Inc., 2020.