

AN ANALYSIS METHODOLOGY



ANALYSIS ?

- MOST CRUCIAL PART OF ANY IT PROJECT !
- OBSERVING AND FORMALISING THE REAL WORLD TO COMPUTERISE.
- A STRONG COLLABORATION BETWEEN THE GENERAL CONTRACTOR AND THE CONTRACTORS IS NECESSARY
- OFTEN NEGLECTED, ESPECIALLY IN LARGE INTERNATIONAL COMPANIES ...
- OR DESCRIBED (AND USED) TOO VAGUELY (OR TOO COMPLEX)

BEFORE WE START ...

- THE PROPOSED SOLUTION IS SIMPLE
- ... AND COVERS 95% OF IT PROJECTS
- HENCE ± ALL IT PROJECTS: MANAGEMENT IT !
- DOES NOT NEED ANY SKILLS IN IT/COMPUTER SCIENCE
- TOTALLY INDEPENDENT FROM ANY TYPE OF DESIGN PARADIGM (CLASSICAL, OBJECT, ...)

LIFECYCLE OF AN IT PROJECT

■ FRENCH VISION:



■ AMERICAN VISION IN THE 90's:



■ AMERICAN VISION NOWADAYS:



GOALS

- **FIRST AND FOREMOST: UNDERSTAND THE PROBLEM !!**
- **COLLECT ALL NECESSARY INFORMATIONS USED BY DESIGN METHODS:**
 - **SYSTEM GEOMETRY**
 - **FUNCTIONAL REQUIREMENTS**
 - **EVENTS**
 - **FUNCTIONS (ACTIONS)**
 - **DATA DICTIONNARY**

WHEN TO USE ?

- TWO AREAS:
 - PROJECT “FROM SCRATCH”
 - SYSTEMS MIGRATION
- PROJECTS “FROM SCRATCH” TEND TO DISAPPEAR ...
- MIGRATIONS HAVE VAST IMPACTS ON:
 - FUNCTIONAL REQUIREMENTS
 - SYSTEM GEOMETRY
- NONETHELESS, EFFORTS MUST BE PUT ON ALL SIDES OF THE METHODOLOGY !

SYSTEM GEOMETRY

- WILL THE SYSTEM MODEL A VERTICAL OR HORIZONTAL “BUSINESS MODEL” ?
- HORIZONTAL: SYSTEMS ARE SEPARATED INTO INDEPENDENT “BOXES” (BILLING, ACCOUNTING, ETC).
- VERTICAL: ONE SYSTEM INTEGRATED FOR ALL BUSINESS UNITS.

RELEVANCE ?

- NONE (OR NEARLY) WHEN STARTING “FROM SCRATCH”.
- CRITICAL FOR MIGRATIONS: HORIZONTAL SYSTEMS TEND TO BE MIGRATED INTO VERTICAL ONES ...
- WITH MAJOR IMPACTS ON FUNCTIONAL REQUIREMENTS, TECHNICAL ATTRIBUTES, AND THEN ON THE DESIGN PHASE.

FUNCTIONAL REQUIREMENTS

- T1: TIME AND SYNCHRONISATION
- T2: USAGE AND SECURITY APPLIED TO HUMAN INTERACTIONS
- T3: NETWORK ET PHYSICAL SPACE
- T4: STORAGE
- T5: LINK BETWEEN ARTEFACTS

EXAMPLES

- **T1: THE SYSTEM MUST PROCESS ALL ACCOUNT RECEIVABLES AT MIDNIGHT, AND THEN STARTS ITS DAILY BACKUP.**
- **T2: THE SYSTEM MUST ONLY ALLOW HR DEPARTMENT TO MODIFY THE SALARY OF AN EMPLOYEE.**
- **T3: THE SYSTEM MUST UPDATE ITS PAYMENT BLACKLIST VIA THE WEB SERVICE WEB AT HTTP://...**
- **T4: THE SYSTEM MUST AUTOMATICALLY MOVE ANY BILL OLDER THAN 10 YEARS TO A SEPARATE BACKUP SYSTEM.**
- **T5: THE SYSTEM MUST ALLOW A BILL TO BE COMPOSED FROM 1 TO N PRODUCTS.**

REMEMBER ...

- ON LARGE SYSTEMS AND MIGRATIONS, AN EXHAUSTIVE ANALYSIS OF T1 TO T4 REQUIREMENTS IS MANDATORY.
- IN ANY CASE, T5 REQUIREMENT HAVE TO BE LISTED, AS THEY ARE THE BEST SUPPORT FO:
 - THE DESIGN PHASE
 - THE DD TECHNICAL ATTRIBUTES
(AND T4 TO A LESSER EXTEND)

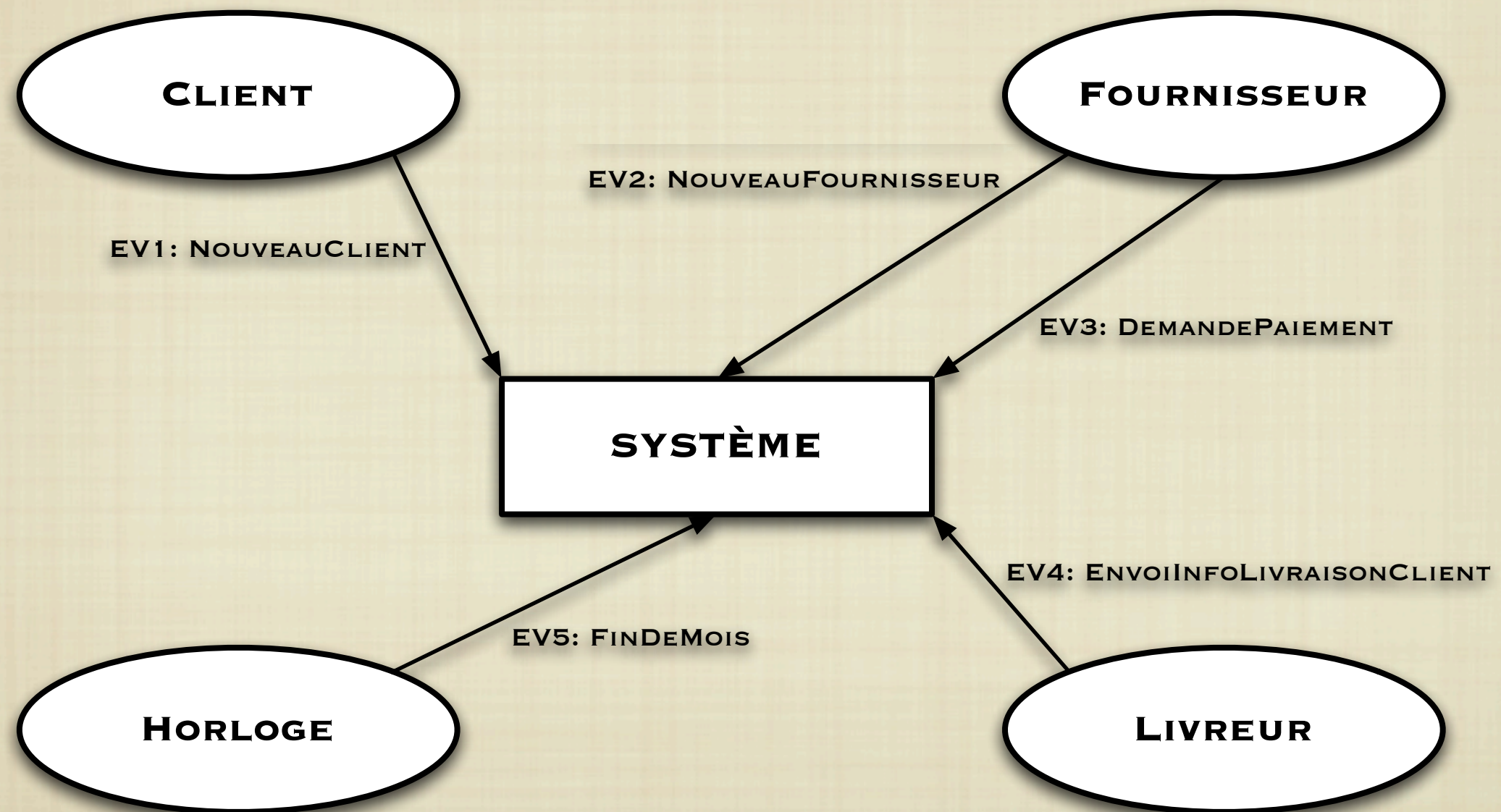
EVENTS

- AN EVENT IS AN EXTERNAL INFORMATION FLOW RECEIVED BY THE SYSTEM.
- INPUT FROM A SYSTEM STAKEHOLDER (HENCE THE NOTION OF EXTERNALITY) ...
- BUT IT CAN BE SOMETIMES USEFUL, IN LARGE SYSTEMS, TO CONSIDER SUB-SYSTEMS AS “STAKEHOLDERS”.

EVENTS

- DISCOVERY EASED BY THE FUNCTIONAL REQUIREMENTS, ESPECIALLY T1 TO T3.
- A CONTEXT DIAGRAM CAN BE USEFUL TO START.
- AN ETHNOGRAPHIC APPROACH CAN BE USED TO COMPLETE THE ANALYSIS.

CONTEXT DIAGRAM



FUNCTIONS

- A FUNCTION IS A SET OF ACTIONS:
 - TRIGGERED BY THE ARRIVAL OF AN EVENT ...
 - AND FOR WHICH THE RESULTS ARE OBSERVABLE
“OUTSIDE” THE SYSTEM
- HENCE A FINE GRANULARITY IS MOSTLY IMPOSSIBLE ...
- MOST OF THE TIME, ANALYSIS IS SIMPLIFIED BY DEFINING ONE FUNCTION WITH A FEW CONCISE ACTIONS FOR ONE EVENT.

EVENT/FUNCTION LINK

- 1 TO 1 LINK. ONE EVENT IS MATCHED TO ONE FUNCTION. (95% OF CASES)
- N TO 1 LINK. N EVENTS ARE MATCHED TO THE SAME FUNCTION. EVENTS MAY BE FUSIONNED TO GO BACK TO CASE 1-1.
- 1-N LINK. FORBIDDEN BY THE FUNCTION DEFINITION, UNLESS THE FUNCTIONS ARE INDEPENDENTS. (RARE)

EVTS/FONCTIONS CHART

| <u>CODE</u> | EVENT | FUNCTION | COMMENTS |
|-------------|----------------------|----------------|--|
| <u>EV1</u> | NEWCUSTOMER | CREATECUSTOMER | MUST CHECK THAT MANDATORY ATTRIBUTES ARE PROVIDED |
| <u>EV2</u> | CUSTOMERMODIFICATION | MODIFYCUSTOMER | IMPLIES AN EXISTENCE CHECK |
| <u>EV3</u> | NEWSUPPLIER | CREATESUPPLIER | MUST CHECK THAT MANDATORY ATTRIBUTES ARE PROVIDED |
| <u>EV4</u> | PAYEMENTREQUEST | PAYSUPPLIER | MUST CHECK TO RELATED BILL EXIST, MARKED AS "AWAITING PAYMENT" AND ITS MATURITY IS VALID |
| <u>EV5</u> | CUSTOMERPAYMENT | SETTLEBILL | MUST CHECK TO RELATED BILL EXIST AND MARKED AS "AWAITING PAYMENT" |

SCREEN PROTOTYPES

- A SCREEN PROTOTYPE MAY VALIDATE THE ANALYSIS OF A FUNCTION.
- SCREEN PROTOTYPES ARE DESIRABLE:
 - SIMPLE FOR THE GENERAL CONTRACTOR
 - MAY HELP FOR THE DD ANALYSIS
- COMMON PRACTICE SINCE:
 - ADVANCED GUIs
 - THE WEB

DATA DICTIONARY

- **“RAW” LIST OF ALL SYSTEM ATTRIBUTES**
- **ATTRIBUTE IS UNDERSTOOD IN ITS “RELATIONAL” DEFINITION:
A NAME AND A TYPE**
- **BUT ATTRIBUTES CAN ALSO BE QUALIFIED AS “TECHNICAL” OR “BUSINESS LOGIC”**
- **NO DESIGN CONCEPTS (ENTITY, ASSOCIATION, KEY, ...) MUST ENTER IN THE DD ANALYSIS PHASE !**

HOW ?

- THE DATA DICTIONARY IS THE PILLAR OF ANY IT SYSTEM, HENCE THE MOST DIFFICULT TO ANALYSE ...
- THERE IS NO METHOD TO FIND IT OUT ...
- BUT IT HAS TO BE FULLY EXHAUSTIVE
- SOME “GOOD PRACTICES” MAY EASE ITS DISCOVERY.

DD: ARTEFACTS

- **AN ARTEFACT:**
 - **ANY DOCUMENT USED WITHIN THE ORGANISATION WHEN THE SYSTEM IS BUILT “FROM SCRATCH”.**
 - **ANY “OUTPUT” PRODUCED BY AN EXISTING SYSTEM.**
- **AN ARTEFACT MAY BE MATERIAL (A BILL) OR ABSTRACT/VIRTUAL (AN E-MAIL)**
- **ARTEFACTS ARE THE MAJOR SOURCE OF “BUSINESS LOGIC” ATTRIBUTES.**

DD: DOMAINS

- **SYSTEM DOMAINS ARE ESTABLISHED DURING THE STUDY OF EVENTS.**
- **USING “DOMAIN SPECIALISTS” MAY BE DESIRABLE.**
- **IF NO SPECIALIST AVAILABLE**
 - ➔ **DOCUMENTATION WORK BEFORE STARTING THE DD**

DD: EXAMPLE

| <u>ATTRIBUTES</u> | TYPE | SIZE | CATEGORY | COMMENTS |
|-------------------------|---------|------|----------------|--|
| <u>CUSTOMERID</u> | INTEGER | 20 | TECHNICAL | IDENTIFY A CUSTOMER UNIQUELY |
| <u>CUSTOMERADDRESS</u> | TEXT | 1000 | BUSINESS LOGIC | |
| <u>CUSTOMERPOSTCODE</u> | TEXT | 255 | BUSINESS LOGIC | MORE THAN 6 CHARACTERS TO ACCOMODATE FOREIGN POSTCODES |
| <u>CUSTOMERCITY</u> | TEXT | 255 | BUSINESS LOGIC | |
| <u>COUNTRYCODE</u> | INTEGER | 15 | TECHNICAL | COUNTRY ISO CODE |
| <u>COUNTRYNAME</u> | TEXT | 255 | BUSINESS LOGIC | COUNTRY NAME |

ETHNOGRAPHY

- **BRANCH OF ANTHROPOLOGY SPECIALISED IN COLLECTING INFORMATION “ON SITE”.**
- **PROVIDE A SET OF TOOLS AND GOOD-PRACTISES RATHER THAN AN METHOD**
- **USEFUL IN LARGE PROJECTS, WHEN TIME AND MONEY ARE AVAILABLE**
 - ➡ **LONG AND COSTLY**

APPROACH

- SILENT OBSERVATION OF DAY-TO-DAY BEHAVIOUR OF THE SYSTEM STAKEHOLDERS IN THEIR WORKPLACE.
- INTERVIEWS AT ALL LEVELS OF FORMALITIES AND HIERARCHY.
- PERMANENT DIALOG WITH “COMMUNITIES LEADERS”.
- LONG INTERVIEWS WITH THE SYSTEM KEY-STAKEHOLDERS.
- DETAILED STUDY OF THE ORGANISATION CULTURE.
- STUDY OF ORGANISATION OF THE SYSTEM MAIN PHYSICAL SITES.
- MARKET STUDY OF THE ORGANISATION, AS WELL AS ITS OWN MARKET VIEW AND UNDERSTANDING.

USAGE

- **OBSERVATIONS AND INTERVIEWS HELP TO GATHER ATTRIBUTES AND EVENTS.**
- **THE STUDIES EASE ANALYSIS OF FUNCTIONS, FUNCTIONAL REQUIREMENTS AND GEOMETRY.**
- **NEVERTHELESS, EXPERIENCE, RIGOUR AND SOCIAL SKILLS ARE MANDATORY.**

CONCLUSION

- WHEN DO WE KNOW THE ANALYSIS PHASE IS OVER ?
- WHEN WE KNOW “WHAT” BUT NOT YET “HOW” ...
- THE CONTRACTOR(S) DO(ES) NOT NEED INVOLVEMENT AND HELP OF THE GENERAL CONTRACTOR.