Guidelines for legacy repository migration

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Who are we?

- 6 years ago a research group inside an university computer science dep.:
  - 15 years experience with archives: developing solutions, migrations, …
- Last 6 years: a software company
  - Solutions for archives: finding-aids, digital assets management (images, audio, video, etc), electronic balcony, interventions management, etc;
  - Solutions for libraries: catalog, lowns, etc;
  - Solutions for museums;
  - Solutions for agreggation portals: harvesters supporting, etc;
  - Solutions for Digital Preservation: RODA, CRiB;
  - Open-source contributors: RODA, Koha
  - Commited to research:
    - 2 European projects: SCAPE and 4C;
    - Many other national projects;
    - Undergoing Phds and Msc thesis.

Find out more:
KEEP SOLUTIONS Lda
http://www.keep.pt

This work was partially supported by the SCAPE Project.
The SCAPE project is co-funded by the European Union under FP7 ICT-2009.4.1 (Grant Agreement number 270137).

Motivation

- Today we have a 30-40 years information systems legacy;
- Technological evolution has never been so fast and with such big steps;
- We have a rapid data growth giving rise to new problems and paradigms: “Big Data Problems”;
- Data or system migration is not an option, it is a necessity and it is potentially complex.

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Why shall we migrate?

- Repository system does not cope well with current business needs;
- Budget cuts: more financially sustainable repository is adopted;
- The repository vendor or supporter ceased to exist;
- Repository vendor or supporter does not provide a satisfactory level of support services;
- The technological environment needed by the repository system is no longer supported.

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What is migration?

x = old system

y = new system

f(x) = y

About f:

- Complete or partial?
- How long does it take?
- Does time matter?
- Is it reliable?
- …

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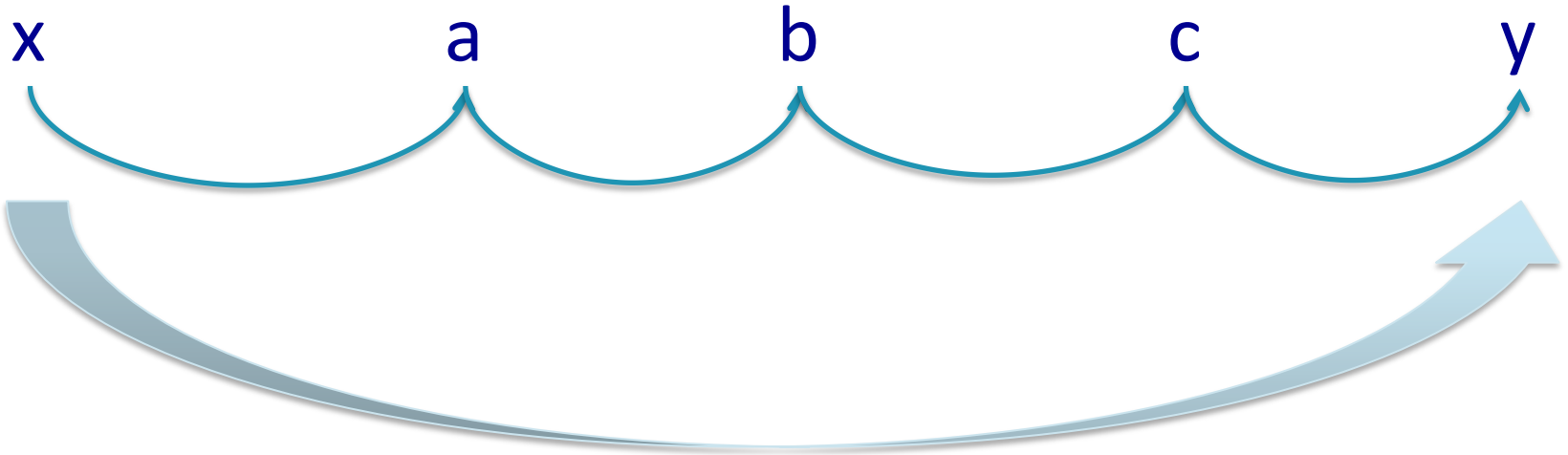
Legacy system migration



$$y = f_{c2y} \circ f_{b2c} \circ f_{a2b} \circ f_{x2a}$$

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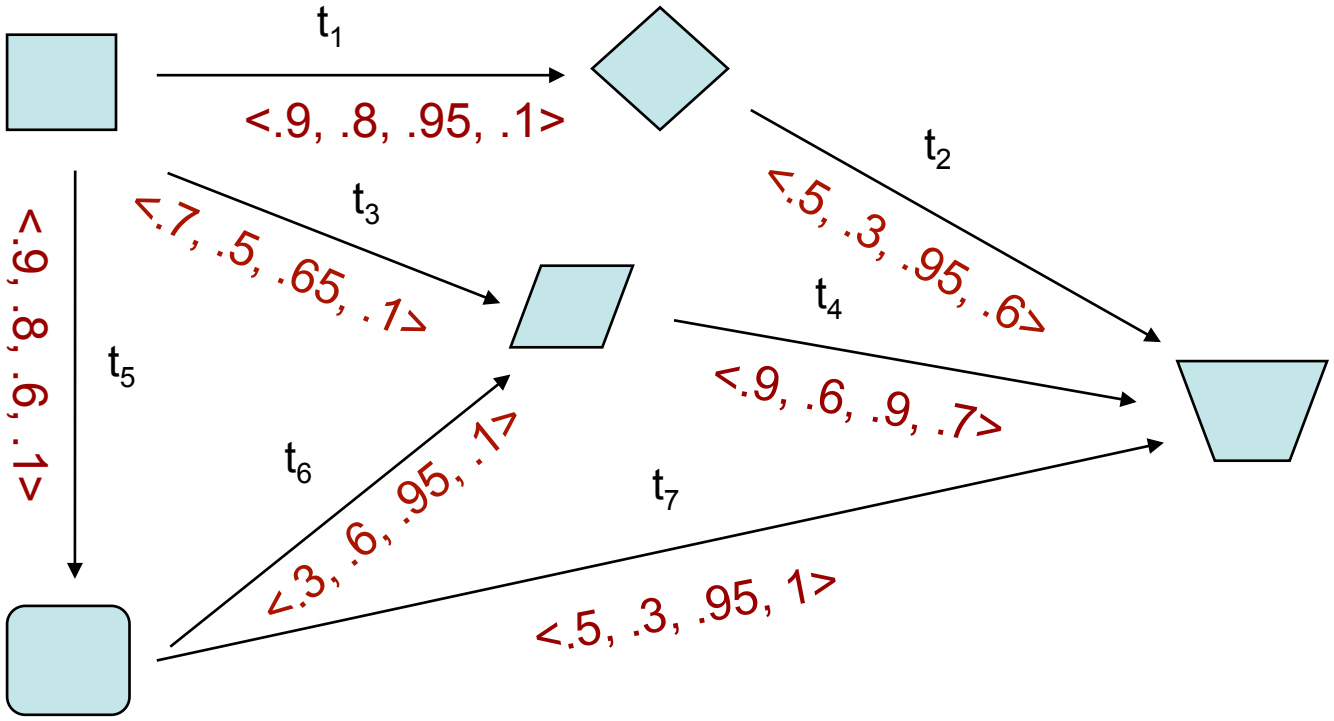
Migration Service

CRiB project: http://crib.dsi.uminho.pt



History

- Migration (CALM): all Portuguese National Archives document funds - several millions of records, a few thousand funds and associated digital representations, …
- Migration (ARQBASE): all Azores document funds: Ponta Delgada, Angra do Heroísmo e Faial;
- Several migrations from other archive platforms;
- Migration: several libraries from medium to large: ISCTE, UBI, Lusíada, etc;
- Migration/Upgrade: several Dspace repositories .

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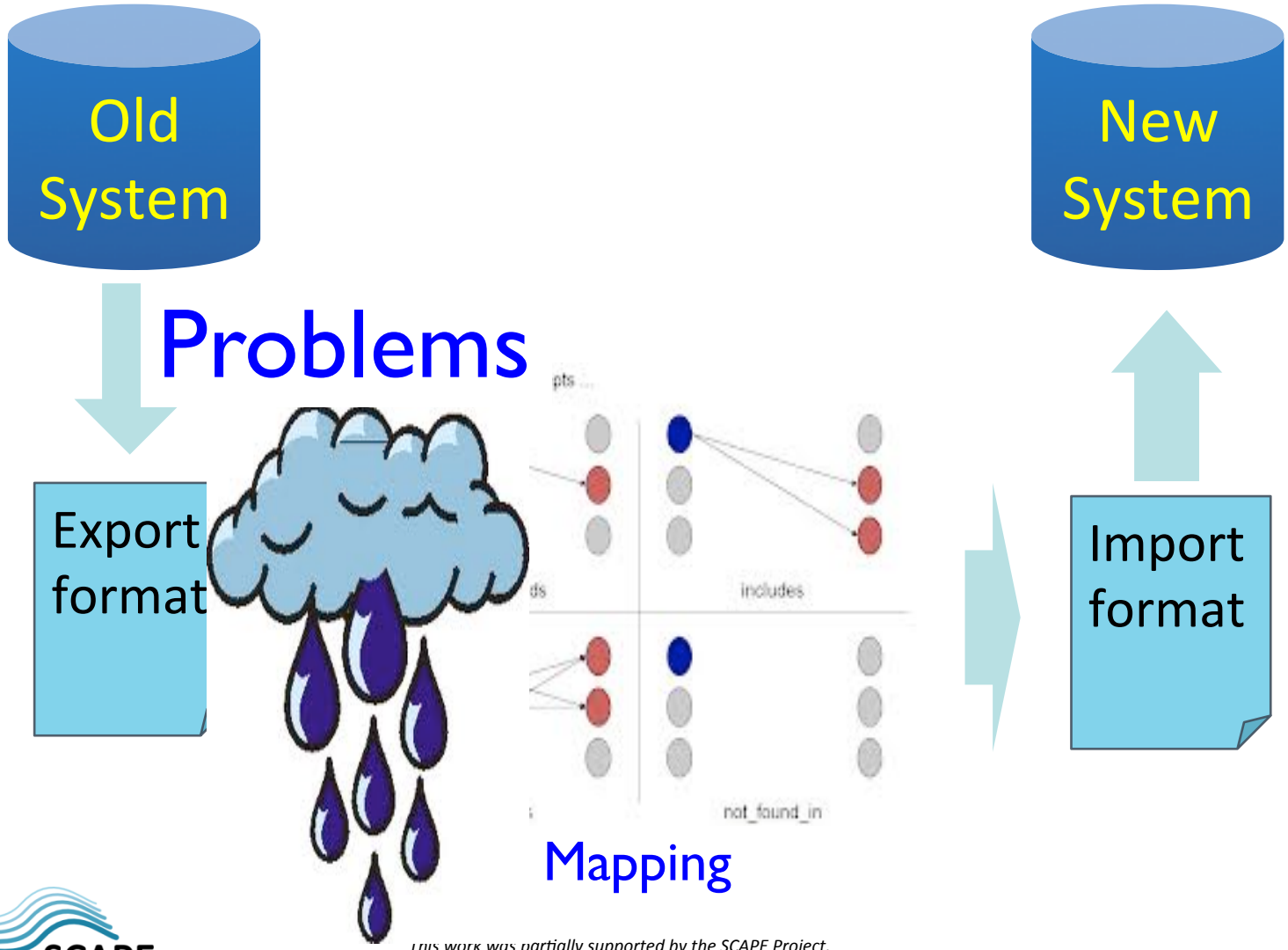
Perfect scenario



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Detected Problems

Import/Export features:

- Not implemented or not working properly;
- Rarely tested during acquisition (no data, lack of experience);
- When they are needed it is too late…

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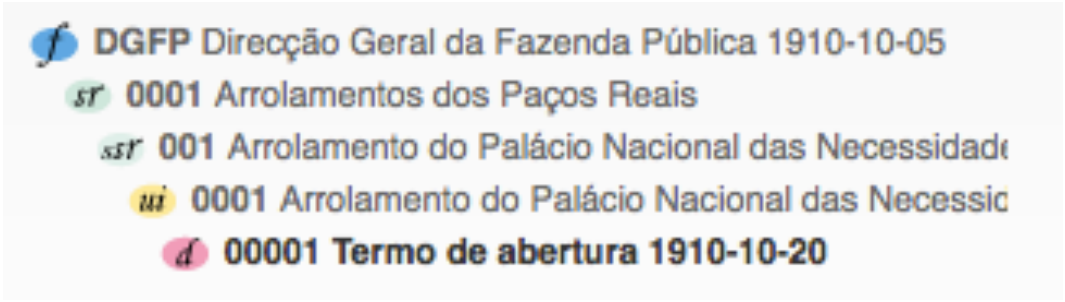
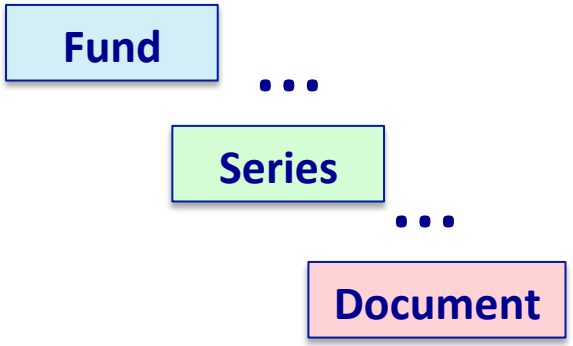
Detected problems (Archives)





- Today's restrictions did not apply yesterday…
- Example: hierarchical structural invariants
  - Not supported by the platforms from which we migrate;
- Exporters functioning with problems;
- Lack of information: data creators are no long available.

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Example: Portuguese National Archives

```
<calmreg>
  <Date>1894-1910</Date>
  <CatalogueStatus>Valida��o</CatalogueStatus>
  <UserText2>Estante 1, prateleira 1, volume 4</UserText2>
  <AltRefNo>Arquivo das Congrega��es, liv. 4</AltRefNo>
  <ArchNote>Descri��o elaborada por Luisa Dias (ANTT), a partir
  <UserText3>Julho de 2008</UserText3>
  <Repository>ANTT</Repository>
  <Title>"Col�gio de Santa Clara"</Title>
  <Extent>1 liv.</Extent>
  <RefNo>PT-TT-AC/L4</RefNo>
  <Level>Documento Composto</Level>
```

- 2 millions of records:
  - More than 20 date formats;
  - Lots of free fields (that should have had controlled vocabularies);
  - 70.000 structural errors:
    - Intermediate level records did not exist;
    - Many orphan registers

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Example: Portuguese National Archives

```
<calmreg>
  <Date>1894-1910</Date>
  <CatalogueStatus>Valida
  <UserText2>Estante 1, pr
  <AltRefNo>Arquivo das Co
  <ArchNote>Descri  o ela
  <UserText3>Julho de 2008
  <Repository>ANTT</Reposit
  <Title>"Col gio de Santo
  <Extent>1 liv.</Extent>
  <RefNo>PT-TT-AC/L4</RefN
  <Level>Documento Composto
```

erros.txt

```
290467; UI; PT/TT/AOS/D/E/12/2/19; Imposto de selo. Alterações à tabela aprovada pelo
Decreto-Lei n.º 21916/32, de 28 de Novembro.; Inconsistência hierárquica
290554; UI; PT/TT/AOS/D/E/17/2/2; Baixela Germain; Inconsistência hierárquica
290099; DC; PT/TT/AOS/D/E/3/3/1; Correspondente do Banco de Portugal em Santa Comba Dão.;
Inconsistência hierárquica
290110; DC; PT/TT/AOS/D/E/3/3/12; Negociações com a Alemanha para a liquidação de
pagamentos.; Inconsistência hierárquica
290111; DC; PT/TT/AOS/D/E/3/3/13; Recondução de Álvaro Pedro de Sousa e de Carlos de
Barros Soares Branco nos lugares de vice-governadores do Banco de Portugal.;
Inconsistência hierárquica
290112; DC; PT/TT/AOS/D/E/3/3/14; Suspensão da convertibilidade do franco francês.;
Inconsistência hierárquica
290113; DC; PT/TT/AOS/D/E/3/3/15; Pontos de vista e opiniões recolhidas por Carlos de
Barros Soares Branco em Londres.; Inconsistência hierárquica
290114; DC; PT/TT/AOS/D/E/3/3/16; Pagamento de material de guerra alemão a fornecer a
Portugal.; Inconsistência hierárquica
290115; DC; PT/TT/AOS/D/E/3/3/17; Acordos de compensação celebrados entre o Governo
Português e os vários governos estrangeiros.; Inconsistência hierárquica
```

Solution:

- Error reporting tool development;
- Several task forces were created locally;
- 3 month iterative work:
  - correct->report->correct->…

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Example: Azores (ARQBASE)

```
<RECORD>

<Tag_99>5.0. </Tag_99>
<Tag_101><Tag_101_a>BPARPD</Tag_101_a></Tag_101>
<Tag_201><Tag_201_a>FAM</Tag_201_a></Tag_201>
<Tag_301><Tag_301_a>ADCM</Tag_301_a><Tag_301_b>Arquivo Dias do Canto e Medeiros</Tag_301_b></Tag_301>
<Tag_501><Tag_501_a>Lv</Tag_501_a><Tag_501_b>001</Tag_501_b></Tag_501>
<Tag_601><Tag_601_a>1</Tag_601_a></Tag_601>
<Tag_603><Tag_603_a>Ponta Delgada</Tag_603_a><Tag_603_b>Carta de inquirição</Tag_603_b><Tag_603_c>António Jacinto
Mendes (Escrivão)</Tag_603_c><Tag_603_e>Carta de inquirição cível de testemunhas, relativa à sucessão da
instituição de Luís do Canto de Vasconcelos que opôs João Silvério Vaz Pacheco de Castro a António de Faria do
Canto e Maia e a Jacinto Pacheco de Castro. Contém inquirição do embargante Jacinto Pacheco de Castro, a
descendência de D. Isabel do Canto, de André Diogo Dias do Canto e Medeiros, e de Luís do Canto de
Vasconcelos.</Tag_603_e><Tag_603_f>Pública-forma</Tag_603_f></Tag_603>
<Tag_607>1830. </Tag_607>
<Tag_609>25 (p.1-43). António de Faria do Canto e Maia tb. é designado noutros docs. por António de Faria do
Canto Machado e Maia ou António de Faria do Canto e Medeiros. <Tag_609_a>25 (p.1-43). <Tag_609_d>Bom.
<Tag_609_e>Datas do doc. orig.: 1830.03.22-1830.04.14. António de Faria do Canto e Maia tb. é designado noutros
docs. por António de Faria do Canto Machado e Maia ou António de Faria do Canto e Medeiros.</Tag_609_e></Tag_609>
</RECORD>
```

- Export format was bad XML;
- Data creators unavailable;
- Lots of structural errors, semantic errors and normalization errors.

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Example: Azores (ARQBASE)

```
13 <RECORD>
14
15 <Tag_99>5.0. </Tag_99>
16 <Tag_101><Tag_101_a>BPARPD</Tag_101_a></Tag_101>
17 <Tag_201><Tag_201_a>FAM</Tag_201_a></Tag_201>
18 <Tag_301><Tag_301_a>ADCM</Tag_301_a><Tag_301_b>Arquivo Dia
19 <Tag_501><Tag_501_a>Lv</Tag_501_a><Tag_501_b>001</Tag_501_
20 <Tag_601><Tag_601_a>1</Tag_601_a></Tag_601>
21 <Tag_603><Tag_603_a>Ponta Delgada</Tag_603_a><Tag_603_b>Ca
21 Mendes (Escrivão)</Tag_603_c><Tag_603_e>Carta de inquiriçã
21 instituição de Luís do Canto de Vasconcelos que opôs João
21 Canto e Maia e a Jacinto Pacheco de Castro. Contém inquiri
21 descendência de D. Isabel do Canto, de André Diogo Dias do
21 Vasconcelos.</Tag_603_e><Tag_603_f>Pública-forma</Tag_603_
22 <Tag_607>1830. </Tag_607>
23 <Tag_609>25 (p.1-43). António de Faria do Canto e Maia tb.
23 Canto Machado e Maia ou António de Faria do Canto e Medeir
23 <Tag_609_e>Datas do doc. orig.: 1830.03.22-1830.04.14. Ant
23 docs. por António de Faria do Canto Machado e Maia ou Antó
24 </RECORD>
```

ARQBASE Reporting Utility (v1.0

General Data

Total number of records	59
Funds	1
Sections	3
Series	8
SubSeries	0
Units	24
Documents	23

Number of Registers by Fund

VN 59

Integrity Testing

Series

PT/BPARJJG/PSS/VN/AI/01

Tabela 3.2: Registos criados por fundo

Fundo	Nível	Designação
APRT	Secção	VDC
DFDPRT	Secção	RFPRT FRSTS
TCPRT	Secção	DC
	Série	068 158 160 161 162 163 184

Solution:

- Error reporting tool development;
- Automatic correction (there was no one to validate…).

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Detected problems (Libraries)

- Information access:
  - Exporters do not work properly;
  - Suppliers don't give access to information;
- Format Problems: Marc21, UniMarc, XML;
- Encoding Problems: representation format hard to identify;
- Lots of structural changes:
  - Field folding;
  - Field unfolding;
  - Structural changes.

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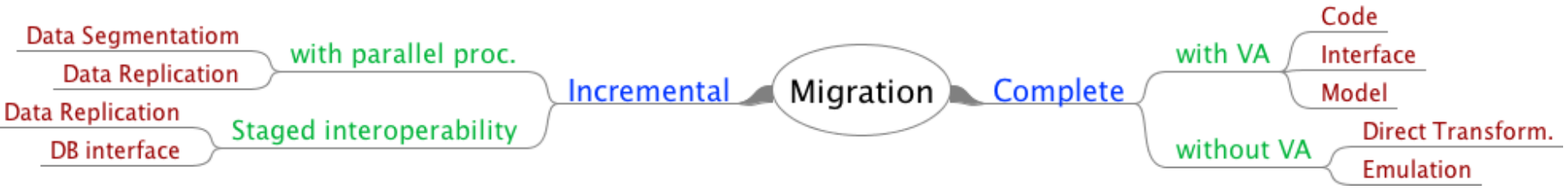
Migration Strategies



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Migration anatomy (part I)

1. Analysis & consultation

1A
Characterization of legacy environment

1B
Characterization of target environment

1C
Data analysis

1D
Strategic planning

1E
Requirements Specification

Expected outcomes:

- preservation plan;
- business goals;
- preservation requirements;
- evaluated alternatives;
- decision process results.

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Migration anatomy (part II)

2. Planning & design

2A
Project planning

2B
Design of migration routines

2C
Design of test plan

Expected outcomes:

- Project plan:
  - Who?
  - What?
  - When?

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Migration anatomy (part III)

3. Development

3A
Development of migration routines

3B
Development of testing routines

Expected outcomes:

- Code…

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Migration anatomy (part IV)

4. Setup & testing

4A
Target environment provisioning

4B
Rehearsal & testing

Expected outcomes:

- Installed target system;
- Verified and tested system.

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Migration anatomy (part V)

5. Execution

5A
Execution of migration routines

Expected outcomes:

- Migrated System .

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Migration anatomy (part VI)

6. Validation

6A
Execution of testing routines

6B
Reporting

6C
Cut-over

Expected outcomes:

- Reports from test scripts.

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Migration anatomy (part VII)

7. Wrap-up

7A
Training

7B
Documenting

7C
Supporting

Expected outcomes:

- All reports related to the process:
  - migration;
  - tests;
  - training materials;
  - manuals, …

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Summary

1. Analysis
2. Planning
3. Development
4. Setup & testing
5. Execution
6. Validation
7. Wrap-up

If you follow these steps things will run…

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Conclusion

1. Migration is complex,
2. Migration consumes resources,
3. Migration can go wrong,
4. Migration without planning is caotic,
5. Migration is inevitable.

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SCAlable Preservation Environments

Questions?

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