

FMSync

An Open Source Solution for Synchronising Distributed Archaeological Databases
in a Centralised Open Access System

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CAA 2018, Tübingen

21 March 2018

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Motivation

FileMaker is widespread across archaeological projects. **Problems:**

- 1 FileMaker products have **expensive license** concepts (Apple)
⇒ everyone just uses the **offline** license FM Pro
- 2 FM Pro does not include mechanisms for sharing or publishing data
⇒ everyone has **independent** database instances
- 3 Independent FM Pro databases cannot simply be merged

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FileMaker Pro: Sharing Data



FileMaker A



FileMaker B

FileMaker Pro: Sharing Data

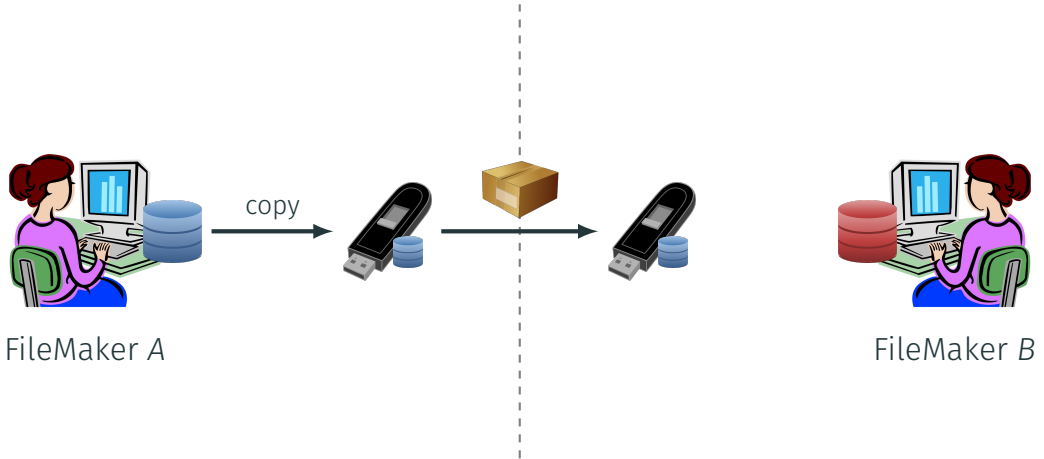


FileMaker A

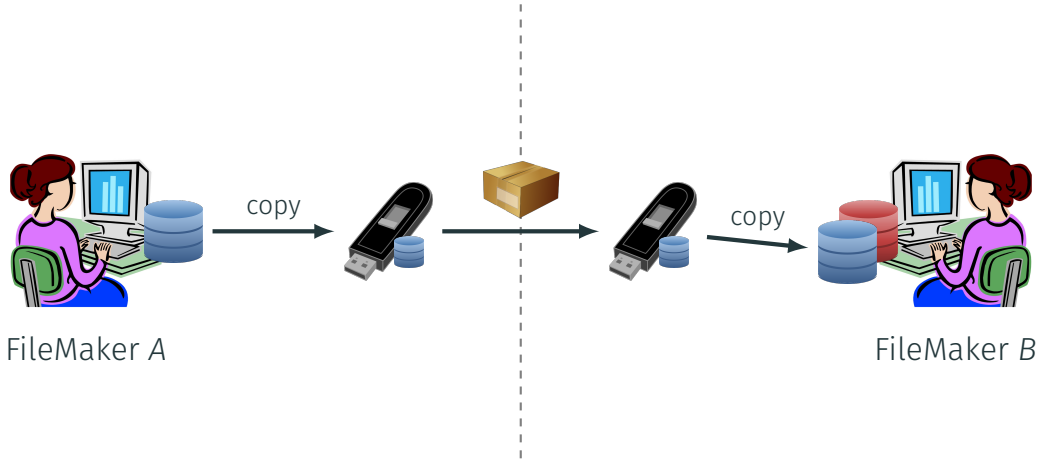


FileMaker B

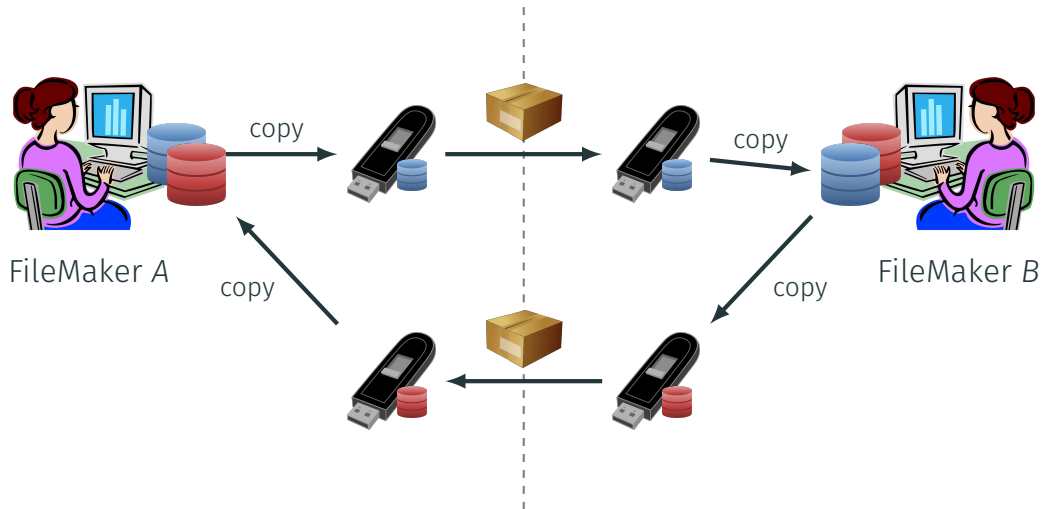
FileMaker Pro: Sharing Data



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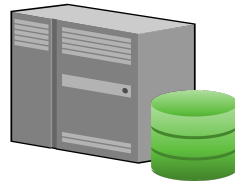
FileMaker Pro: Sharing Data



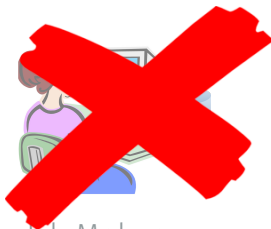
FileMaker Pro: Publishing Data



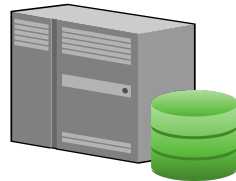
FileMaker



MySQL / Oracle / ...

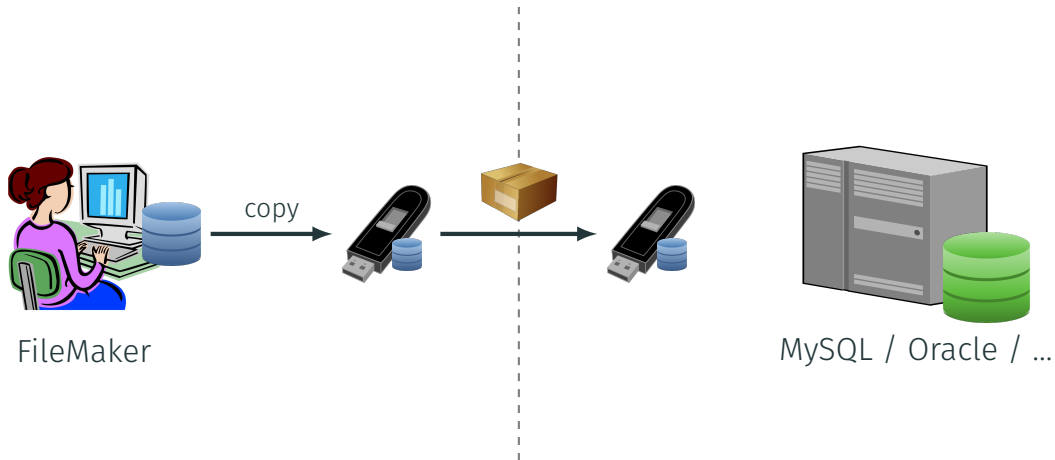


FileMaker

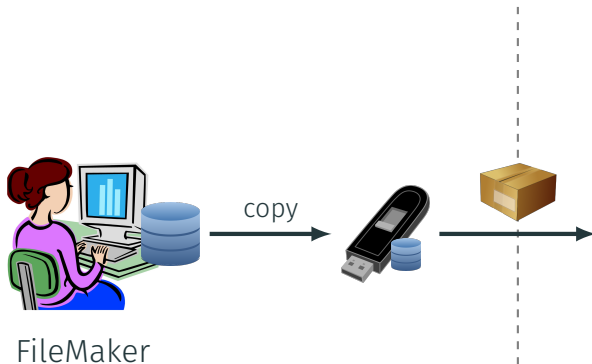


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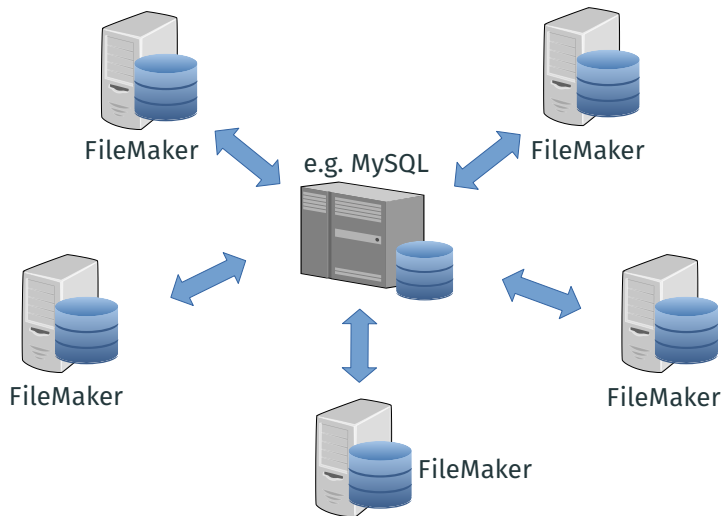


FileMaker Pro: Publishing Data



Approach

FMSync: Topology



Yo, Felix! 'Tis nuthin nu.

*SymmetricDS supports [...] **Oracle**, **MySQL**, MariaDB, **PostgreSQL**, MS SQL Server (including Azure), IBM DB2 (UDB, iSeries, and zSeries), H2, HSQLDB, Derby, Firebird, Interbase, Informix, Greenplum, **SQLite**, Sybase ASE, Sybase ASA (SQL Anywhere), Amazon Redshift, **MongoDB**, and VoltDB databases.*

<https://www.symmetricds.org/>

Wait a second!

Yo, Felix! 'Tis nuthin nu.

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<https://www.symmetricds.org/>



Purchase Quote

Quote Date **2018-03-09**
Quote Number
Expiration **2018-04-08**

Product		QTY	Unit Price	Extended Price
FM160277LL	FileMaker Server 16 FLT Perpetual Volume License + 1 Year Maintenance (10 users)	1	US\$4,284.00	US\$4,284.00
			Subtotal:	US\$4,284.00
			Shipping:	US\$0.00
			Estimated Tax:	US\$0.00
			Total:	US\$4,284.00

- Proprietary, badly written software
- Still totally not worth the price

... is better than the existing ones, since

- it is **open source** (GPL 3 license)
- it is free
- it allows **open access** scenarios
- it is Java-based, thus **platform-independent** and flexible
- it is user-friendly
- it allows to already **keep data in sync** while collecting

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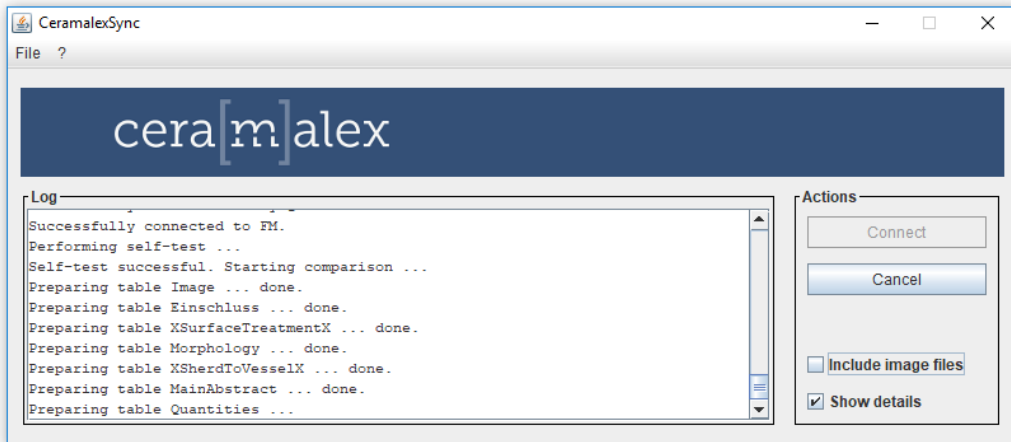
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Implementation

Main Window



Detail Window

The screenshot shows a 'Sync databases' window with a 'Filters' section on the left containing buttons for 'I=', 'X', 'Pairs', '=>', '<=', and 'Individuals'. The 'Options' section includes a 'Refetch tables' button and a checked checkbox for 'Show sync relevant fields'. On the right are 'Start!' and 'Cancel' buttons. The main area displays two side-by-side tables with columns: Fabric, Image, IsolatedSherdMainAbstract, Literaturzitat, MainAbstract, SurfaceTreatmentAction, XMorphologyX, A, ArachneEnt..., FS_MainAb..., FS_Morpho..., Level1, Level1_6, Level2, and Level3. A context menu is open over the table, showing options: 'Select all rows with C', 'Resolve conflict ...', and 'Resolve conflict ...'. The table data includes various archaeological items like 'Cooking W...', 'Domestic f...', 'Transport V...', 'Amphora', 'Terrakotta', 'Lamps', and 'Fine Ware'.

	Fabric	Image	IsolatedSherdMainAbstract	Literaturzitat	MainAbstract	SurfaceTreatmentAction	XMorphologyX	A	ArachneEnt...	FS_MainAb...	FS_Morpho...	Level1	Level1_6	Level2	Level3
C			14184	2099	Cooking W...	Cooking W...	Vessels fo...	lid or pan	C	22249	14184	2099	Cooking W...	Cooking W...	
C			30772	1541	Domestic f...	Domestic f...	Saqqiah po...		C	23697	30772	1541	Domestic f...	Domestic f...	
C			32121	2134	Transport V...	Transport ...	Amphora	AE 3	C	25046	32121	2134	Transport V...	Transport ...	
C			32945	2054	Transport V...	Transport ...	Amphora	AE 3	C	25870	32945	2054	Transport V...	Transport ...	Amphora
C			34829	1816	Transport V...	Transport ...	Amphorae		C	27754	34829	1816	Transport V...	Transport ...	
C			36712	1816	Transport V...	Transport ...	Amphorae		C	29637	36712	1816	Transport V...	Transport ...	
C			1	1771	Terrakotta	Terrakotta/...	Bes		C	30580	1	1771	Terrakotta	Terrakotta/...	
C			13	1697					C	30592	13	1697			
C			14	1699					C	30593	14	1699	Fine Ware	Fine Ware/////	
C			29	1721	Lamps	Lamps/////			C	30608	29	1721	Fine Ware	Fine Ware/////	
??									??	31934	100032	0			
UL					Fine Ware	Fine Ware/...	Plate								

Foreign Key Difficulty

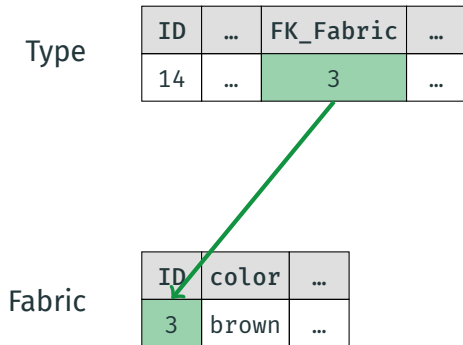
Type

ID	...	FK_Fabric	...
14	...	3	...

Fabric

ID	color	...
3	brown	...

Foreign Key Difficulty



Foreign Key Difficulty

Type

ID	...	FK_Fabric	...
14	...	3	...

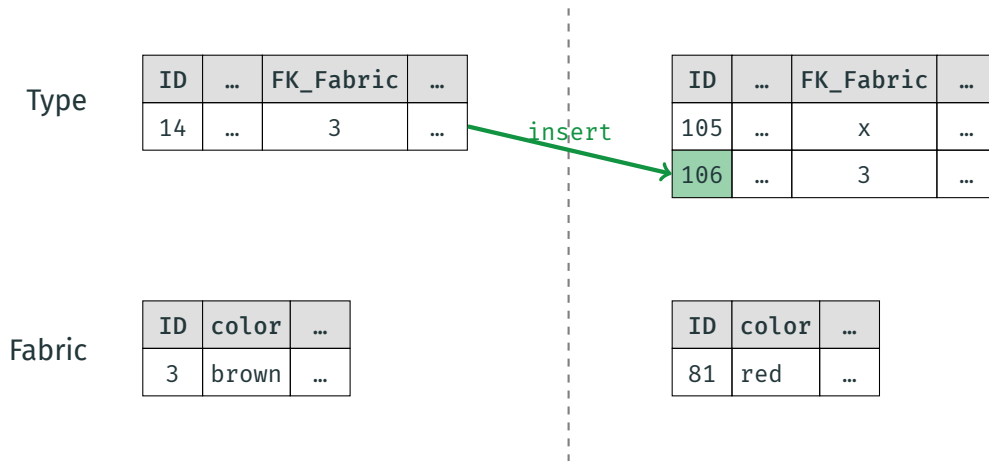
Fabric

ID	color	...
3	brown	...

ID	...	FK_Fabric	...
105	...	x	...

ID	color	...
81	red	...

Foreign Key Difficulty



Foreign Key Difficulty

Type

ID	...	FK_Fabric	...
14	...	3	...

ID	...	FK_Fabric	...
105	...	x	...
106	...	3	...

Fabric

ID	color	...
3	brown	...

insert

ID	color	...
81	red	...
82	brown	...

Foreign Key Difficulty

Type

ID	...	FK_Fabric	...
14	...	3	...

Fabric

ID	color	...
3	brown	...

ID	...	FK_Fabric	...
105	...	x	...
106	...	3	...

ID	color	...
81	red	...
82	brown	...

Foreign Key Difficulty

Type

ID	...	FK_Fabric	...
14	...	3	...

Fabric

ID	color	...
3	brown	...

ID	...	FK_Fabric	...
105	...	x	...
106	...	3	...

ID	color	...
81	red	...
82	brown	...

Foreign Key Difficulty

Type

ID	...	FK_Fabric	...
14	...	3	...

Fabric

ID	color	...
3	brown	...

ID	...	FK_Fabric	...
105	...	x	...
106	...	3	...

...

ID	color	...
81	red	...
82	brown	...

Solution Example

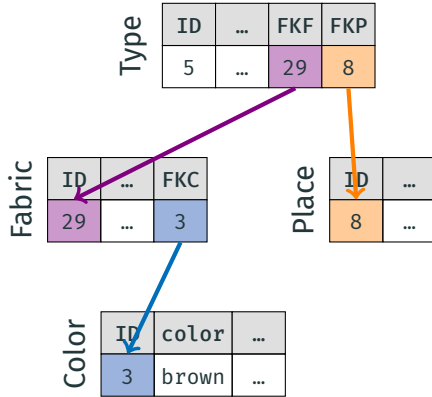
Type	ID	..	FKF	FKP
	5	..	29	8

Fabric	ID	..	FKC
	29	..	3

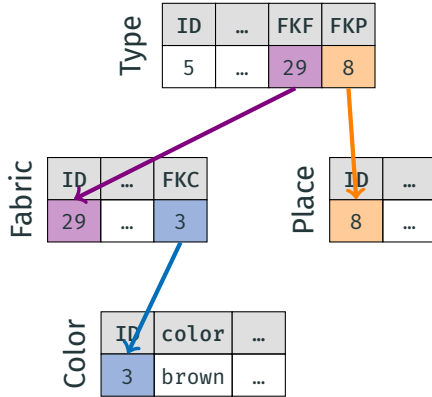
Place	ID	..
	8	..

Color	ID	color	..
	3	brown	..

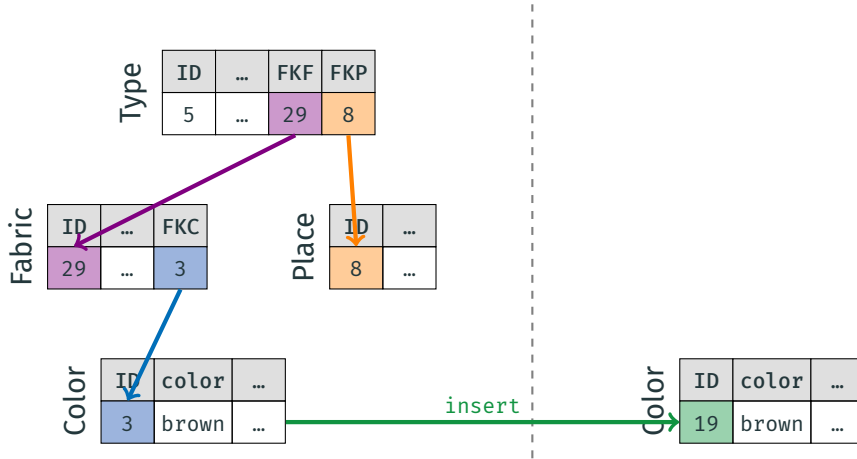
Solution Example



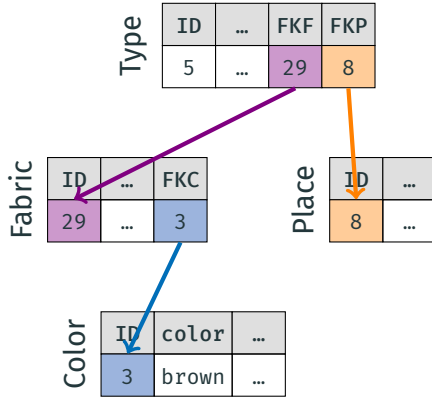
Solution Example



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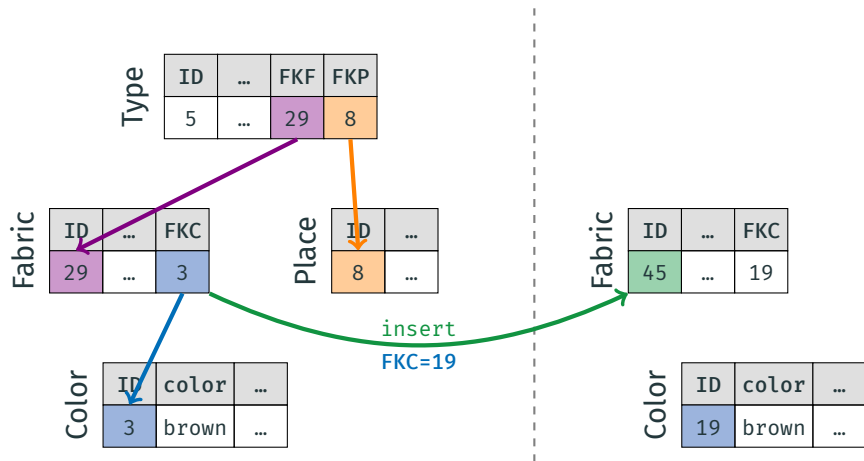


Solution Example

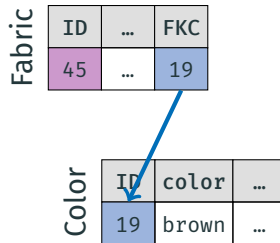
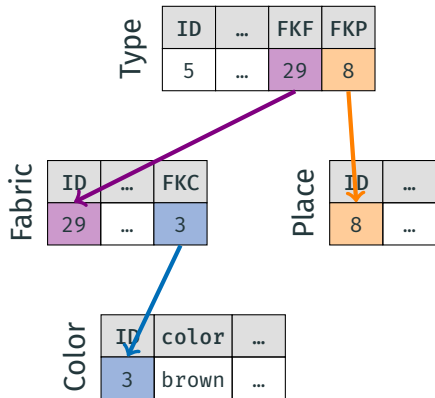


ID	color	...
19	brown	...

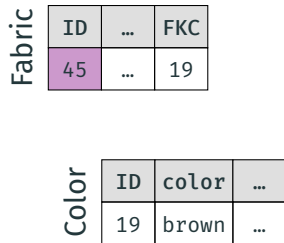
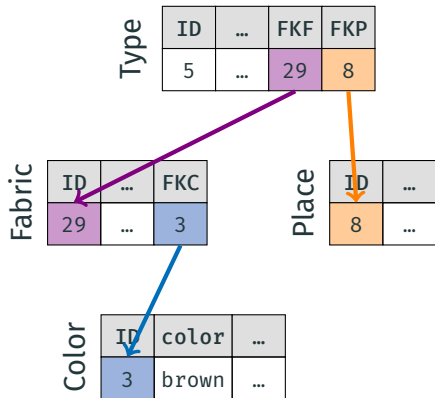
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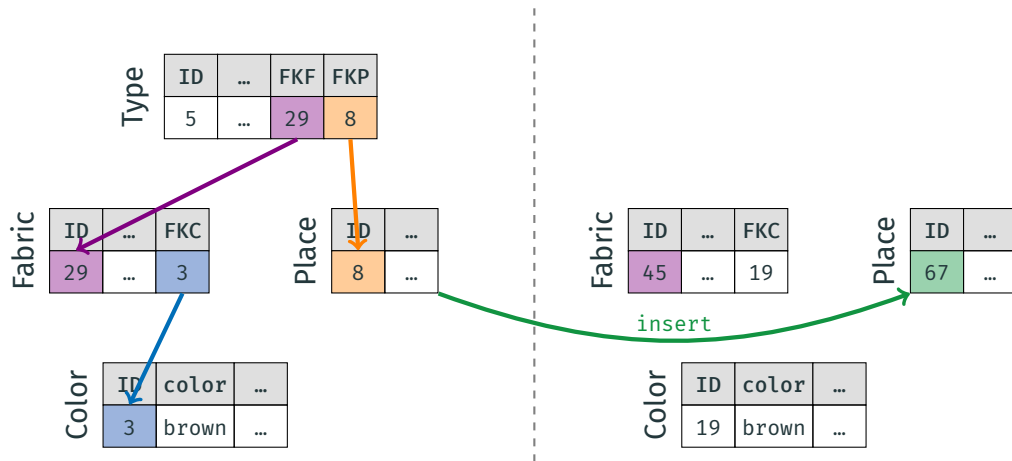
Solution Example



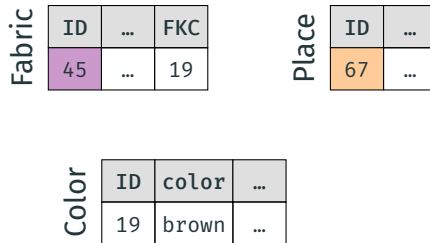
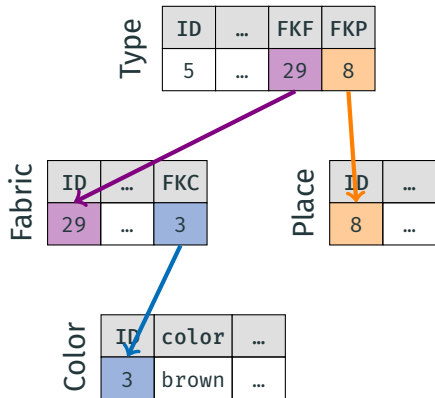
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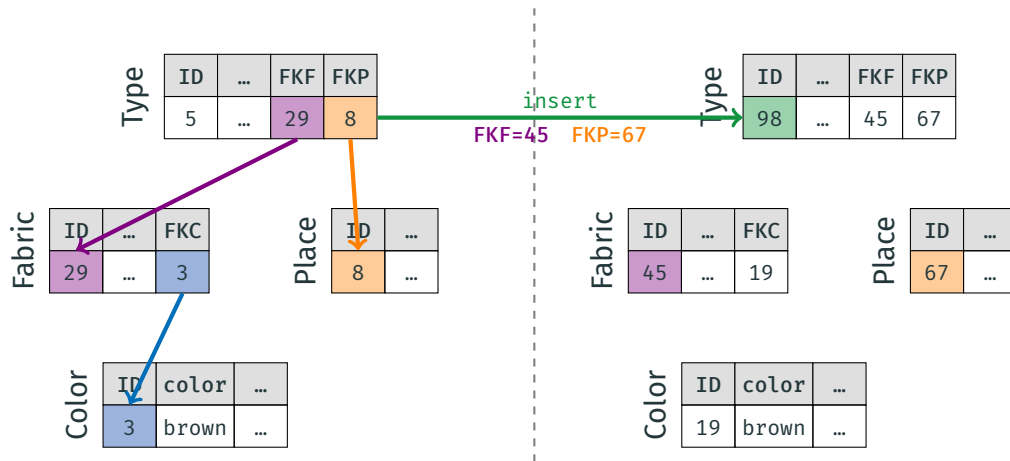
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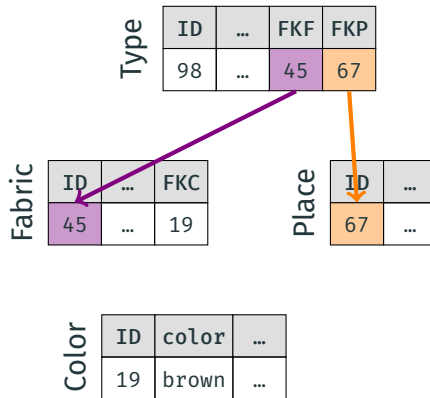
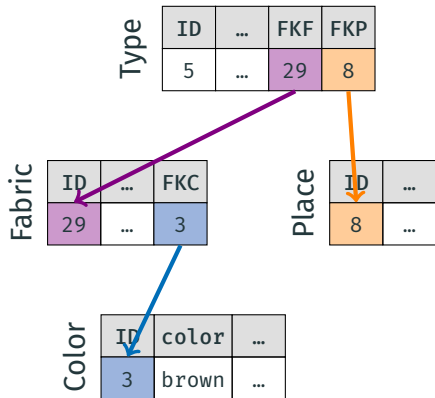
Solution Example



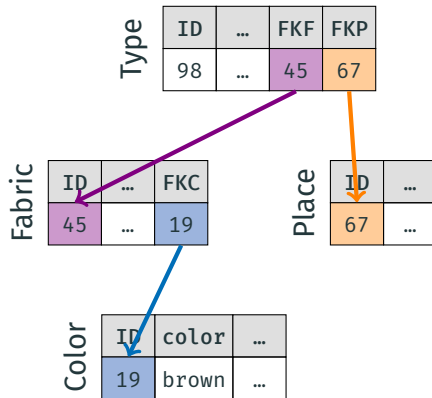
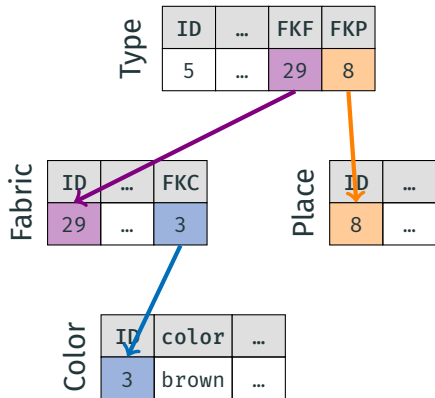
Solution Example



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FMSync is in an **early alpha** state.

- Foreign key handling is *not* implemented yet
- Currently designed for CeramEgypt and Arachne, needs generalisation!
- Many things to optimise, e.g. UI behaviour



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Thank you very much for your attention!

Questions?

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Foreign Key Difficulty: Solution (simplified)

For each new row:

If row contains further FK's, then for each FK:

Jump into referenced table, start over;

Else:

Check for duplicates in target DB and insert row;

Replace returned ID in parent row's FK field;