

Subtipos

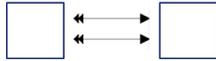
Uma visão integradora

GeneXus™

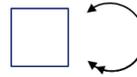
Os subtipos permitem indicar a GeneXus como associar diferentes nomes de atributo a um mesmo conceito.

Cases of Subtypes

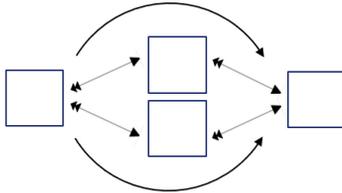
Direct references



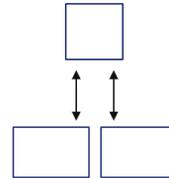
Recursive Subtypes



Indirect references



Specialization



Em cursos anteriores, analisamos e estudamos diferentes casos em que definimos grupos de subtipos para resolver os conflitos ou ambiguidades que surgem em nossas aplicações.

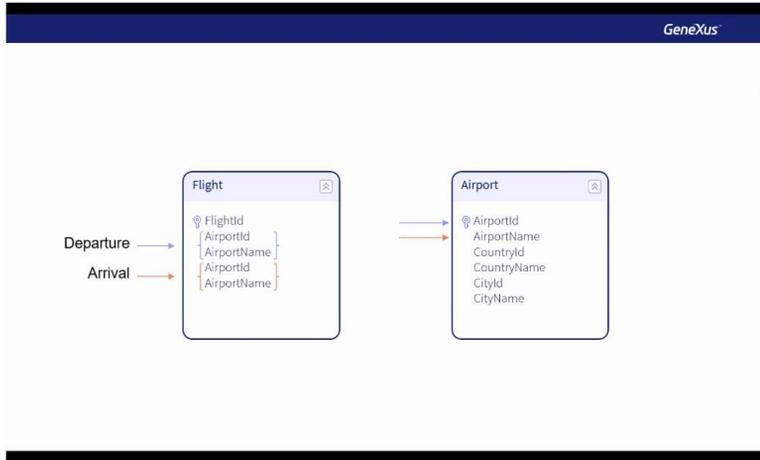
GeneXus Core course

Version: GeneXus 17

Definition of Subtypes

Introduction of the concept of subtype to enable the use of an existing attribute with a change of name, and a usage example where from a flights transaction we must record the departure airport and the arrival airport.

Twitter Facebook LinkedIn Email
Total length of videos: 12h



- Transactions
 - Designing the First Transaction
 - Running the application for the first time
 - Attributes and domains
 - Related transactions
 - Transactions with more than one level
 - Attribute nomenclature
 - Rules definition
 - Using patterns
 - Base and Extended table.
 - Definition of Subtypes
 - Defining Attributes as Formulas
 - Rule Triggering Events in Transactions
 - Indexes
 - Normalization of Tables: A Case Study
 - Relations between actors of reality

Introduction of the concepts of: group of subtypes, subtype and supertype, consistency controls (referential integrity) and selection lists, table diagrams, attribute describing a transaction and Contextual Title property of an attribute. The case of usage studied in the multiple reference of a transaction to another. Other usage cases not studied are also presented.

Começamos com o exemplo mais simples, onde tínhamos uma dupla referência a um mesmo conceito, mas com diferentes roles.

GeneXus Core course - Ver: ...

training.geneXus.com/en/learning/courses/geneXus/v17/core/definition-of-subtypes

GeneXus Core course

Version: GeneXus 17

Definition of Subtypes

Introduction of the concept of subtype to enable the use of an existing attribute with a change of name, and a usage example where from a flights transaction we must record the departure airport and the arrival airport.

Total length of videos: 12h

```

classDiagram
    class Flight {
        FlightId
        AirportId
        AirportName
        CountryName
        City
        CityName
    }
    class Airport {
        AirportId
        AirportName
        CountryName
        City
        CityName
    }
    Flight --> Airport : Departure (to AirportId)
    Flight --> Airport : Arrival (to AirportName)
  
```

Transactions

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Era o caso em que nos solicitaram poder registrar tanto o aeroporto de partida como o aeroporto de chegada de determinado voo:

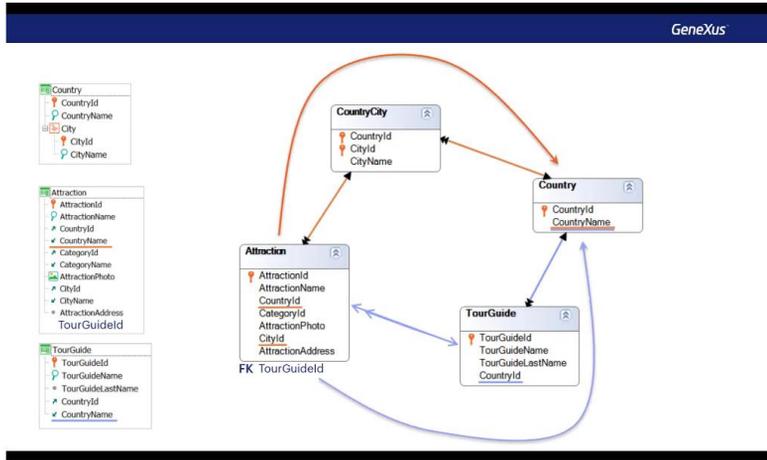
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Subtypes: Multiple References and Specialization

A case of indirect multiple references and a specialization case are presented.

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Total length of videos: 9h



Transactions

- Rules: Review and Client Side Validation
- More Rules to Define Behavior
- Rule Triggering Events in Transactions (continued)
- Evaluation Tree of Triggering of Rules and Formulas
- Rule Triggering Events in Transactions (ending)
- Allowing Null Values in Part of a Compound Foreign Key
- Subtypes: Multiple References and Specialization
- More Use Cases of Subtypes
- Formula vs assignment rule
- Horizontal formulas
- Aggregation formulas
- Compound formulas
- Dynamic Transactions
- Events in Transactions

Here is a case of indirect multiple references that occurs when you want to use the Attraction transaction to reference the country of each attraction and at the same time the country of the tour guide, who also belongs to a country. A specialization case working with clients, passengers and employees, which are specializations of the Person transaction, is also presented.

Mais adiante, estudamos um caso de referências múltiplas indiretas, pois, dada uma tabela, tínhamos dois caminhos para chegar a outra:



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Subtypes: Multiple References and Specialization

A case of indirect multiple references and a specialization case are presented.

Country

- CountryId
- CountryName
- City
- Child
- CityName

Attraction

- AttractionId
- AttractionName
- CountryId
- Category
- AttractionPhoto
- City
- AttractionAddress
- TourGuideId

TourGuide

- TourGuideId
- TourGuideName
- CountryId
- CountryName

```

graph TD
    CountryCity[CountryCity] --> Country[Country]
    Attraction[Attraction] --> CountryCity
    TourGuide[TourGuide] --> Country
    Attraction --> TourGuide
  
```

Transactions

Rules: Review and Client Side Validation

More Rules to Define Behavior

Rule Triggering Events in Transactions (continued)

Evaluation Tree of Triggering of Rules and Formulas

Rule Triggering Events in Transactions (ending)

Allowing Null Values in Part of a Compound Foreign Key

Subtypes: Multiple References and Specialization

More Use Cases of Subtypes

Formula vs assignment rule

Horizontal formulas

Aggregation formulas

Compound formulas

Dynamic Transactions

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Era o caso em que devíamos registrar a informação dos guias turísticos, onde nos eram apresentados dois caminhos para chegar ao atributo CountryId para identificar seu país.

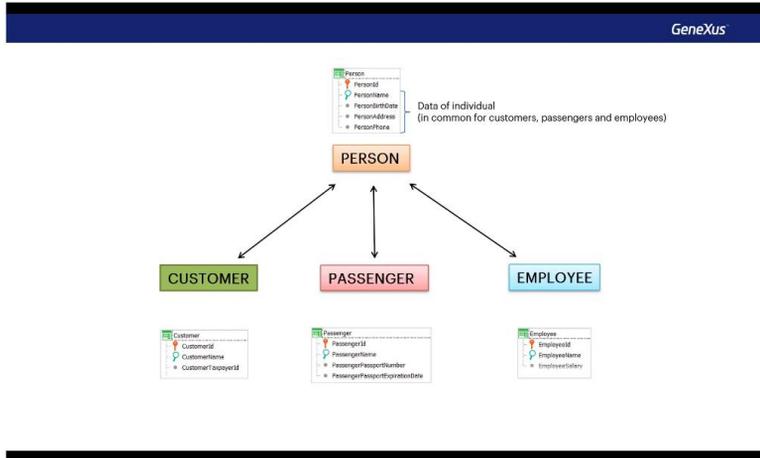
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Neste mesmo vídeo, vimos um caso de uso de subtipos para representar uma especialização, onde uma transação registrava a informação comum das pessoas, e outras transações (especializações da primeira) registravam a informação particular.

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Version: GeneXus 17

More Use Cases of Subtypes

Another case of indirect multiple reference and a use case of recursive subtypes are presented.



Total length of videos: 9h



Indirect Multiple References



[Here](#) we offer you an xpz so you can easily try. We will analyze a case of indirect multiple reference that occurs when the concept of CityTour is introduced to reality, since the tour takes place in a certain country and city and has attractions, which are also found in a country and city.

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Neste outro vídeo, aprofundamos ainda mais em um caso de referência múltipla indireta, quando tivemos que registrar os tours oferecidos aos clientes da agência de viagens para visitar as atrações turísticas de uma cidade determinada.

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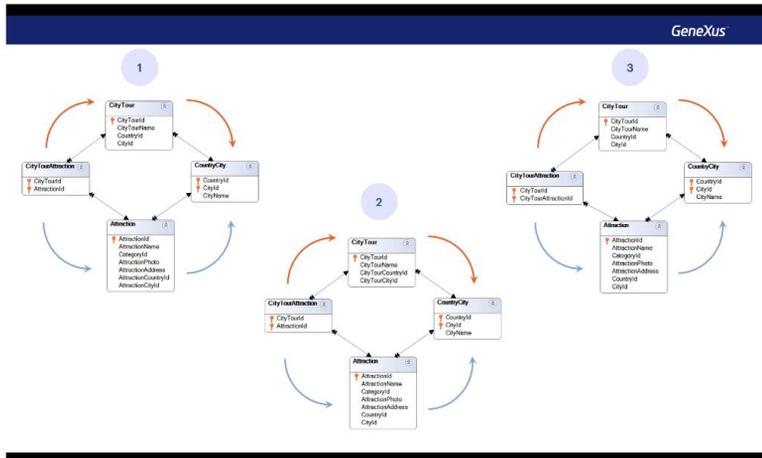
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Neste exemplo, analisamos amplamente o problema com suas diferentes soluções, cada uma com suas vantagens e desvantagens, destacando a importância de estudar cada caso particular e determinar utilizar subtipos realmente quando e onde forem necessários e não arbitrariamente.

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More Use Cases of Subtypes

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RECURSIVE SUBTYPES



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Apresentamos também um caso de uso de subtipos recursivos, onde uma entidade devia autorreferenciar-se:

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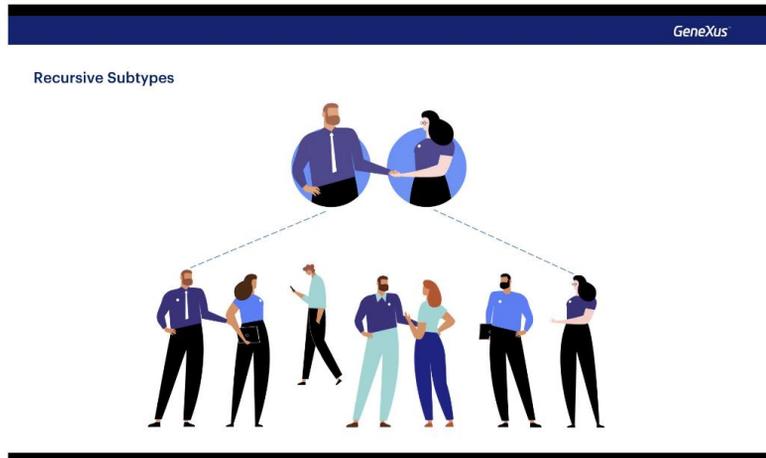
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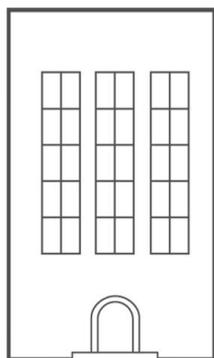
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Tratava-se da realidade em que representávamos a informação dos funcionários da agência de viagens, onde cada funcionário poderia ser, por sua vez, gerente de outro ou outros funcionários.

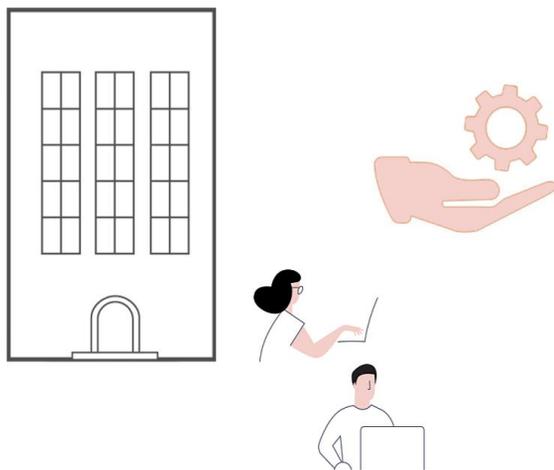
New case: Avoid referential relationship



Vamos estudar agora um último exemplo em que devemos evitar a relação referencial.

Suponhamos que devemos modelar as transações para uma realidade em que existem empresas e serviços que elas podem contratar (como, por exemplo, um serviço de emergência médica). Por sua vez, as empresas têm funcionários que também podem ter contratados serviços que não têm de coincidir com os da empresa para a qual trabalham. Nos interessa registrar esses serviços dos funcionários porque assim, por exemplo, se muitos funcionários contrataram determinado serviço de emergência médica, pode-se tentar um convênio com esse serviço para obter algum benefício.

New case: Avoid referential relationship

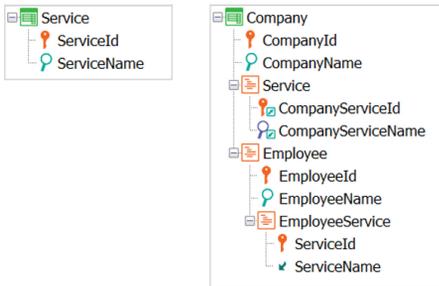


Employees can only work in one company, but they are not to be represented as a strong entity, but as dependent on the company.

Em nossa realidade, os funcionários só podem trabalhar em uma empresa, mas não querem que sejam representados como uma entidade forte, mas dependente da empresa. Vejamos estas duas soluções propostas, onde uma está correta e a outra não está.

Two possible solutions

Solution A)

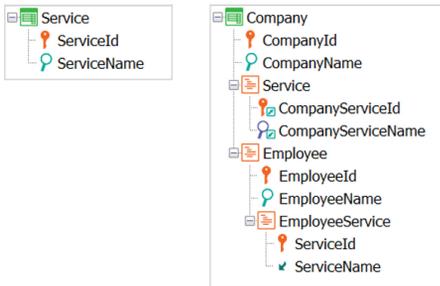


Subtype	Description	Supertype	Description
CompanyService			
• CompanyServiceId	Company Service Id	ServiceId	Service Id
• CompanyServiceName	Company Service Name	ServiceName	Service Name

A) A primeira solução seria criando estas duas transações e o seguinte grupo de subtipos:

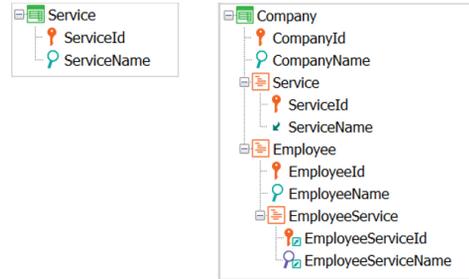
Two possible solutions

Solution A)



Subtype	Description	Supertype	Description
CompanyService			
• CompanyServiceId	Company Service Id	ServiceId	Service Id
• CompanyServiceName	Company Service Name	ServiceName	Service Name

Solution B)

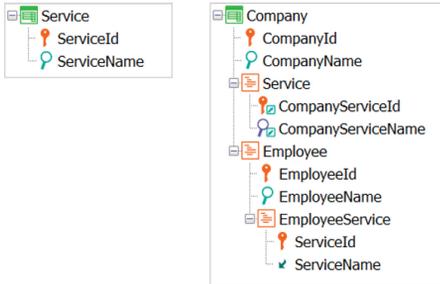


Subtype	Description	Supertype	Description
EmployeeService			
• EmployeeServiceId	Employee Service Id	ServiceId	Service Id
• EmployeeServiceName	Employee Service Name	ServiceName	Service Name

B) e a segunda solução seria criando estas duas transações e o seguinte grupo de subtipos:

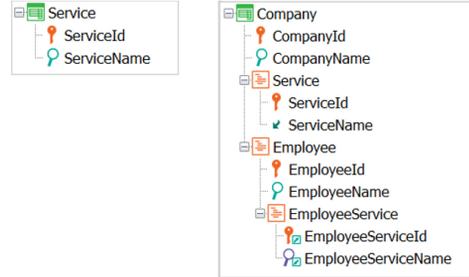
Two possible solutions

Solution A)



Subtype	Description	Supertype	Description
CompanyService			
• CompanyServiceId	Company Service Id	ServiceId	Service Id
• CompanyServiceName	Company Service Name	ServiceName	Service Name

Solution B)

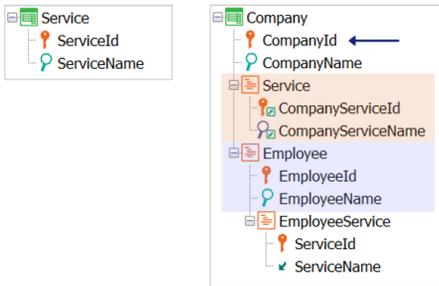


Subtype	Description	Supertype	Description
EmployeeService			
• EmployeeServiceId	Employee Service Id	ServiceId	Service Id
• EmployeeServiceName	Employee Service Name	ServiceName	Service Name

A solução correta é a A) e não a B).

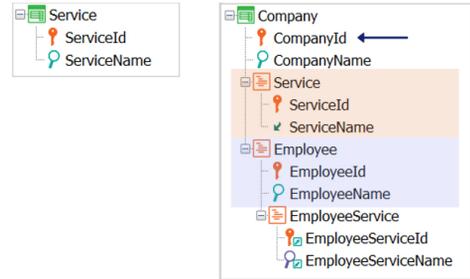
Two possible solutions

Solution A)



Subtype	Description	Supertype	Description
CompanyService			
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Solution B)

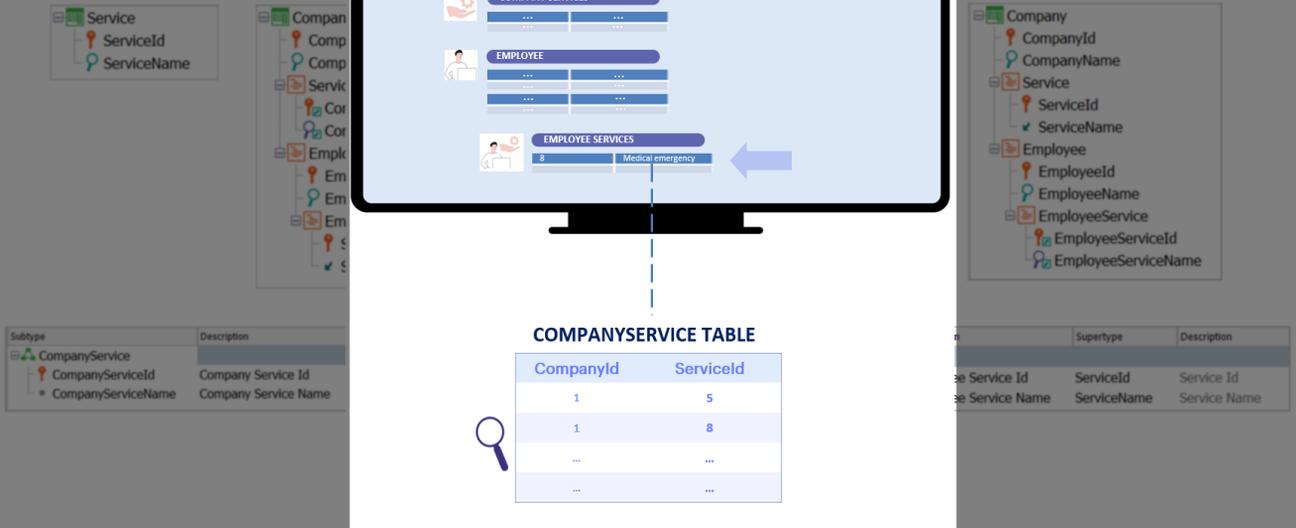


Subtype	Description	Supertype	Description
EmployeeService			
• EmployeeServiceId	Employee Service Id	ServiceId	Service Id
• EmployeeServiceName	Employee Service Name	ServiceName	Service Name

Se observarmos com atenção, na transação Company temos dois níveis paralelos: Service e Employee. Isto significa que tudo o que for inferido de qualquer um desses níveis corresponderá à mesma empresa. No entanto, não queremos que o serviço do funcionário exista como serviço da empresa, pois em nossa realidade o funcionário poderia ter contratado serviços diferentes daqueles da empresa para a qual trabalha.

Two possible solutions

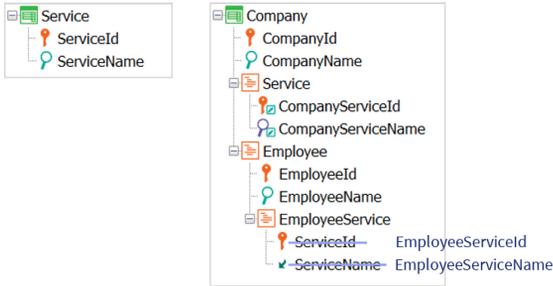
Solution A)



Em outras palavras: não queremos que seja verificado quando o usuário insere no grid de serviços do funcionário que o serviço inserido exista como registro na tabela correspondente a Company.Service.

Two possible solutions

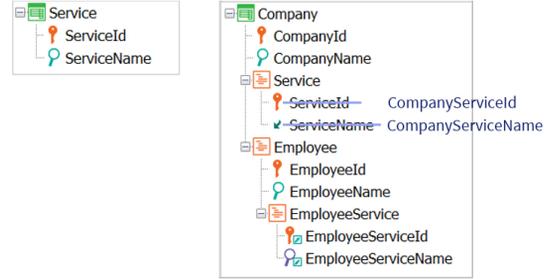
Solution A)



Subtype	Description	Supertype	Description
CompanyService			
• CompanyServiceId	Company Service Id	ServiceId	Service Id
• CompanyServiceName	Company Service Name	ServiceName	Service Name

EmployeeService			
EmployeeServiceId	...	ServiceId	...
EmployeeServiceName	...	ServiceName	...

Solution B)



Subtype	Description	Supertype	Description
EmployeeService			
• EmployeeServiceId	Employee Service Id	ServiceId	Service Id
• EmployeeServiceName	Employee Service Name	ServiceName	Service Name

CompanyService			
CompanyServiceId	...	ServiceId	...
CompanyServiceName	...	ServiceName	...

É claro que precisamos definir um grupo de subtipos, já que na mesma transação GeneXus não nos permitirá repetir o mesmo nome de atributo. A pergunta que surge então é: dá no mesmo defini-lo em um nível que no outro? A resposta é não. Poderíamos definir dois grupos de subtipos e acabaríamos com o problema, mas, como já vimos em vídeos anteriores, não é boa prática definir mais subtipos do que os estritamente necessários, pois nunca é exatamente igual ter o subtipo que ter o supertipo, como ficará claro com este exemplo.

Two possible solutions

Solution A)

```
Service
{
  ServiceId
  ServiceName
}
```

```
Company
{
  CompanyId
  CompanyName
  Service
  {
    ServiceId
    ServiceName
  }
  Employee
  {
    EmployeeId
    EmployeeName
    EmployeeService
    {
      ServiceId
      ServiceName
    }
  }
}
```



PK {CompanyId, ServiceId}

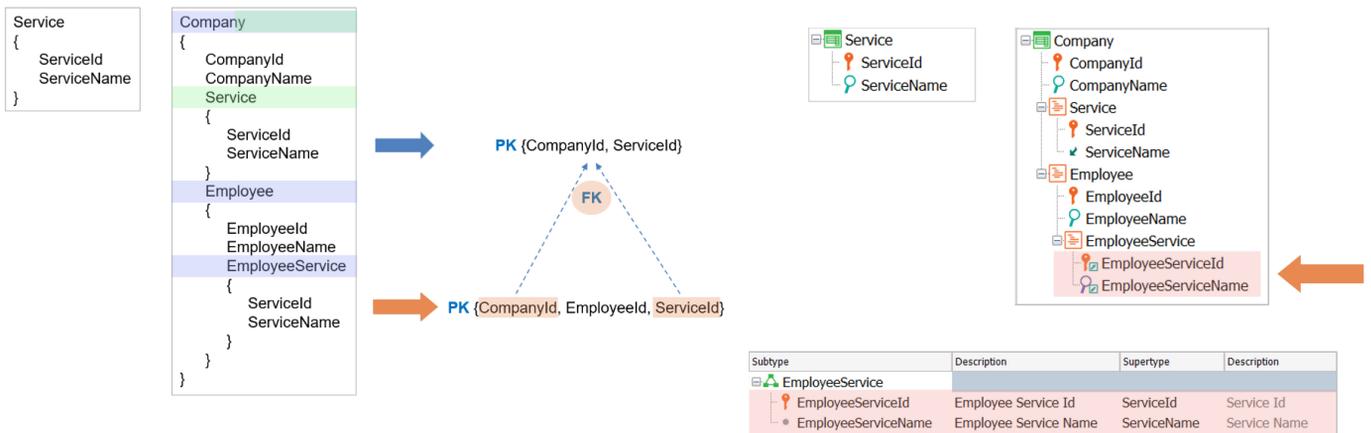


PK {CompanyId, EmployeeId, ServiceId}

FK

Portanto, para resolver o problema basta com um único grupo. Por que, então, a solução correta é a A) e não a B)? É que, se GeneXus nos permitisse repetir o mesmo nome de atributo, claramente encontraria que na tabela associada ao nível Company.Employee.EmployeeService, de chave primária {CompanyId, EmployeeId, ServiceId} os atributos {CompanyId, ServiceId} formariam uma chave estrangeira para a tabela correspondente ao nível Company.Service (já que sua chave primária seria {CompanyId, ServiceId}).

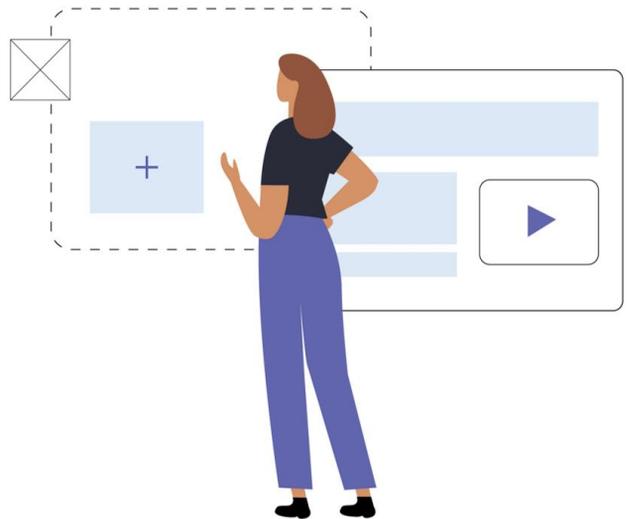
Two possible solutions



This does not delete for GeneXus its referential function

Mas se o que fazemos é alterar o nome (com um subtipo) de ServiceId na tabela em que este atributo faz parte de uma chave estrangeira, isto não elimina para GeneXus sua função referencial.

Subtypes are a compromise solution to solve problems and should be used cautiously.



Tanto esses casos mais complexos quanto os mais simples são comuns em aplicações da vida real, e é o desenvolvedor quem deverá analisar os prós e contras das diferentes soluções para encontrar a que melhor se adequa a cada caso em particular, lembrando sempre que os subtipos são uma solução de compromisso para resolver problemas e que devem ser usados com cautela.

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