



# TIME TRAVELLING DATA: SQL SERVER TEMPORAL TABLES

# neo

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business systems

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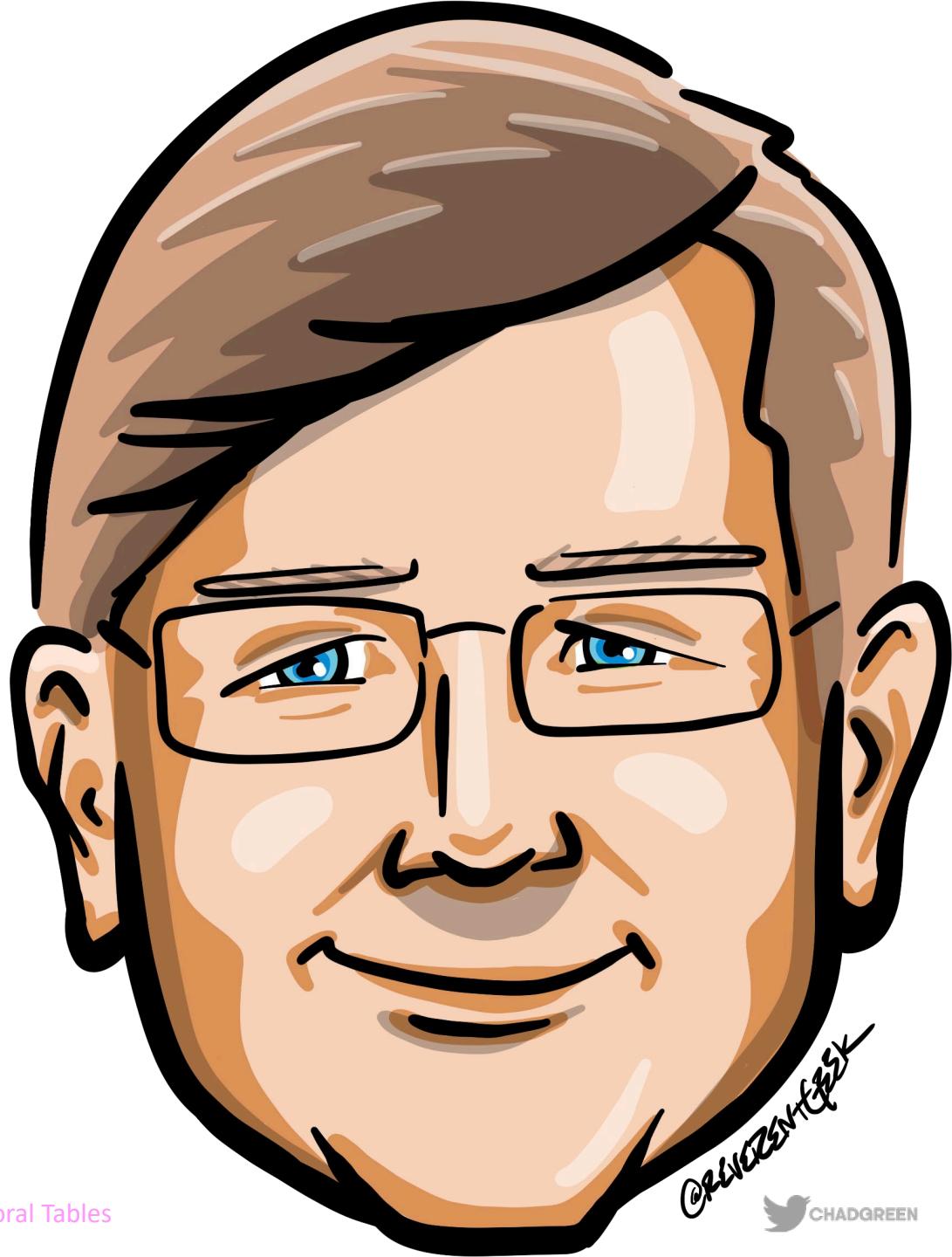
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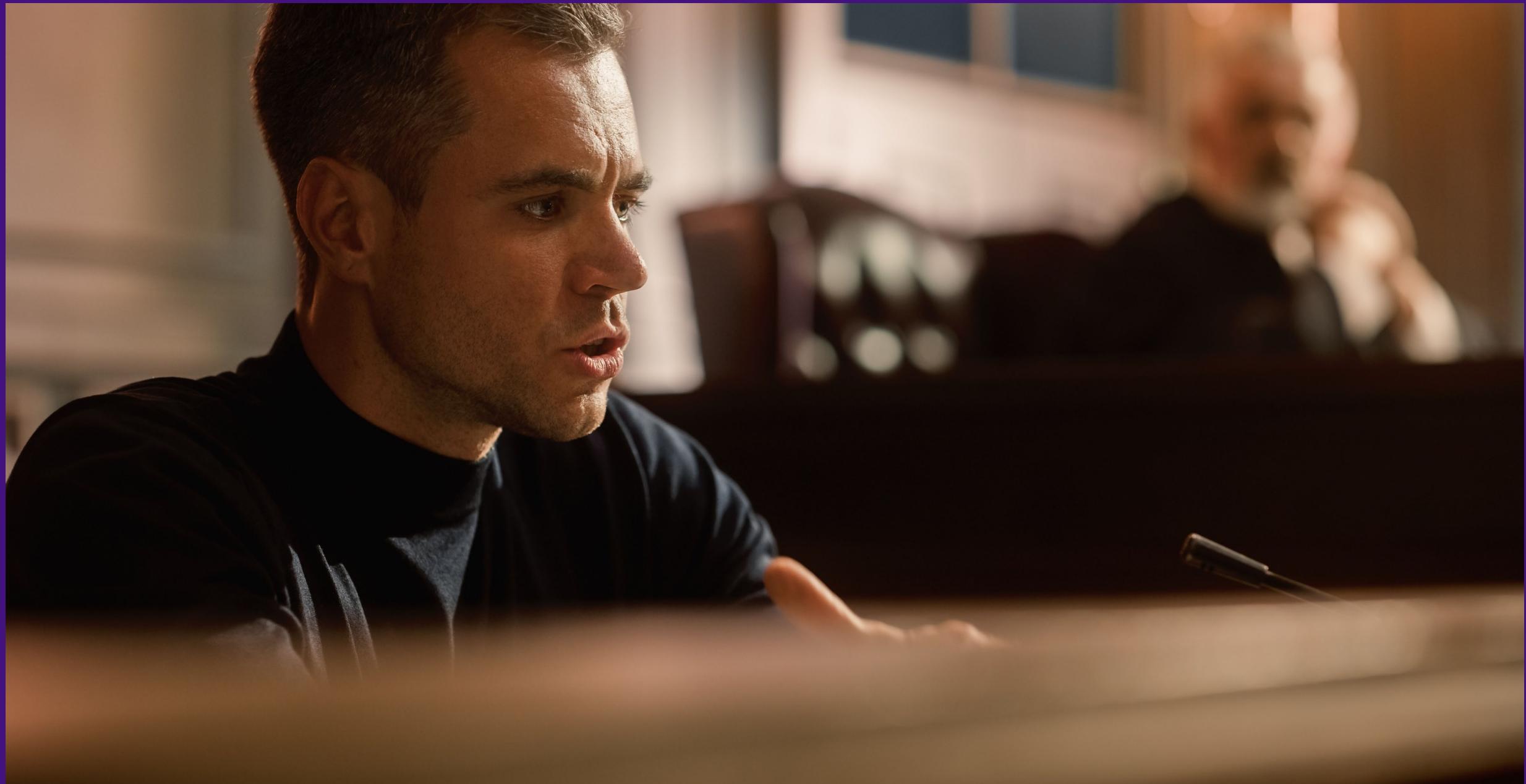
  
**RICHARDSON**

# Who is Chad Green

**Director of Architecture  
Louisville, KY**











# What are system- versioned temporal tables?

Time Travelling Data: SQL Server Temporal Tables

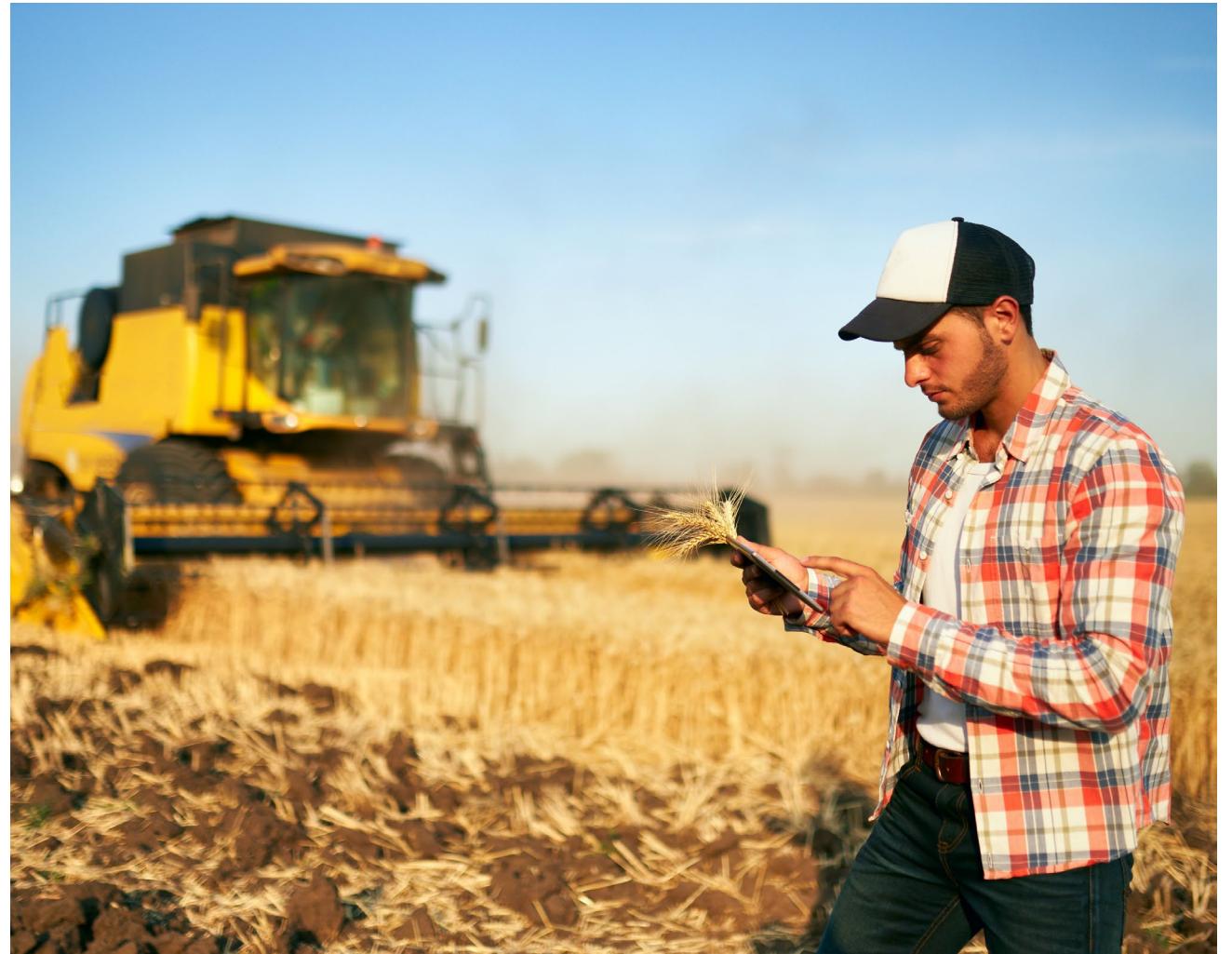
# Track Changes

What are system-versioned temporal tables?



# System-Versioned

What are system-versioned temporal tables?



# Rule of Two

What are system-versioned temporal tables?



# Availability

What are system-versioned temporal tables?



# Why use temporal tables?

Time Travelling Data: SQL Server Temporal Tables

# Why use temporal tables?

Immutable History

Built-In Time-Travelling  
Query Support

Better DML  
Performance

Minimal Maintenance  
Costs

# Auditing

Common Uses Cases



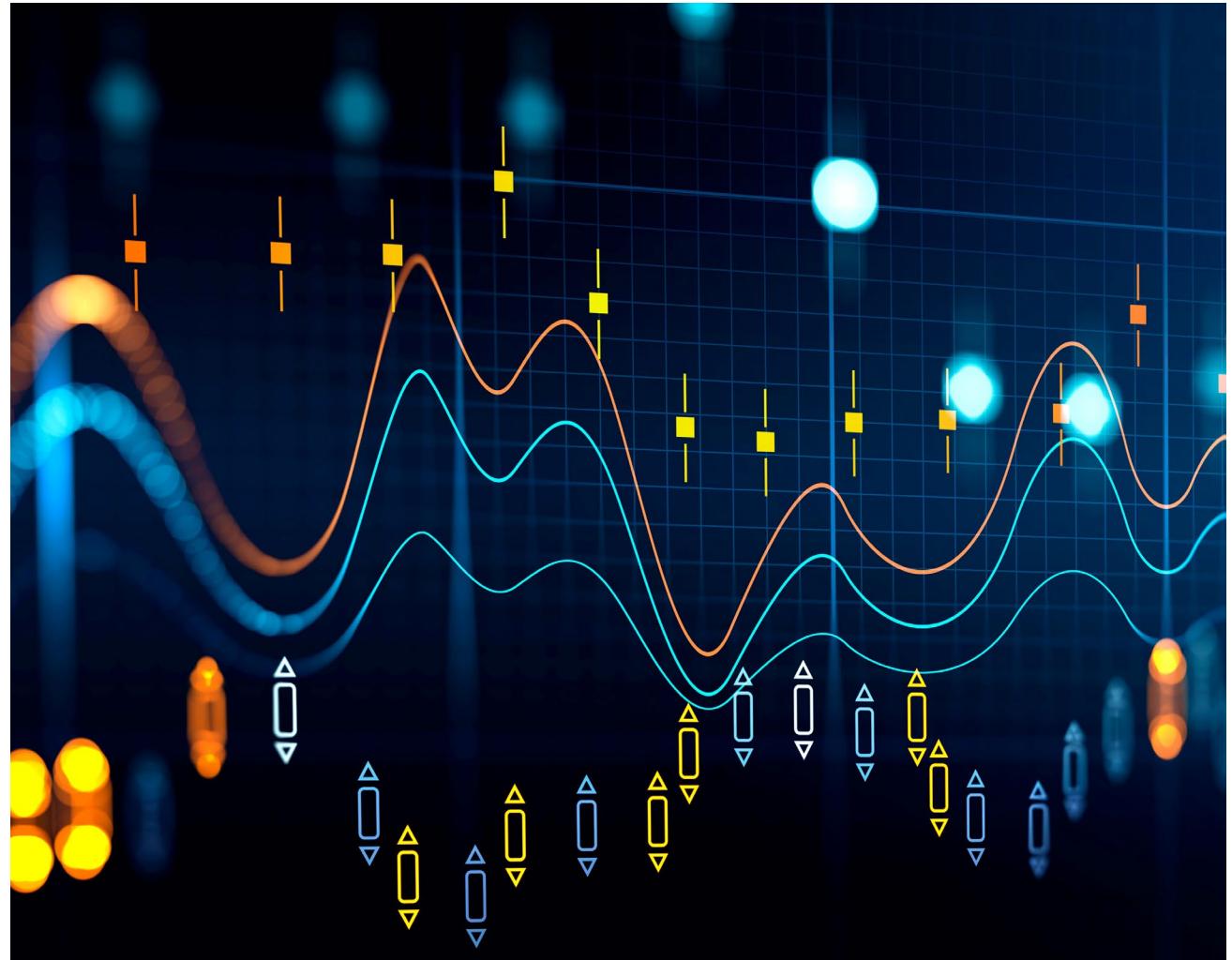
# Reconstructing State

Common Uses Cases



# Calculating Trends

Common Uses Cases



# Slowly Changing Dimensions

Common Uses Cases



# Accidental Recovery

Common Uses Cases



# How do temporal tables work?

Time Travelling Data: SQL Server Temporal Tables

# How do temporal tables work?

| Database Table   |
|--|
| PrimaryKeyId  |
| Name   |
| ForeignKeyId  |

# How do temporal tables work?

| Temporal Table (Current) |   |
|--------------------------|---|
| PrimaryKeyId             | 🔑 |
| Name                     |   |
| ForeignKeyId             | 🔑 |
| ValidFrom                |   |
| ValidTo                  |   |



| History Table |  |
|---------------|--|
| PrimaryKeyId  |  |
| Name          |  |
| ForeignKeyId  |  |
| ValidFrom     |  |
| ValidTo       |  |

# How do temporal tables work?

| Temporal Table (Current)   |                     |
|--|---------------------|
| PrimaryKeyId  | 123                 |
| Name   | TaleLearnCode       |
| ForeignKeyId  | 456                 |
| ValidFrom  | 2022-08-06 18:00:00 |
| ValidTo  | 9999-12-31 23:59:59 |

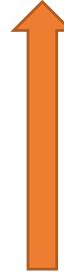
| History Table |  |
|---------------|--|
| PrimaryKeyId  |  |
| Name          |  |
| ForeignKeyId  |  |
| ValidFrom     |  |
| ValidTo       |  |



Insert

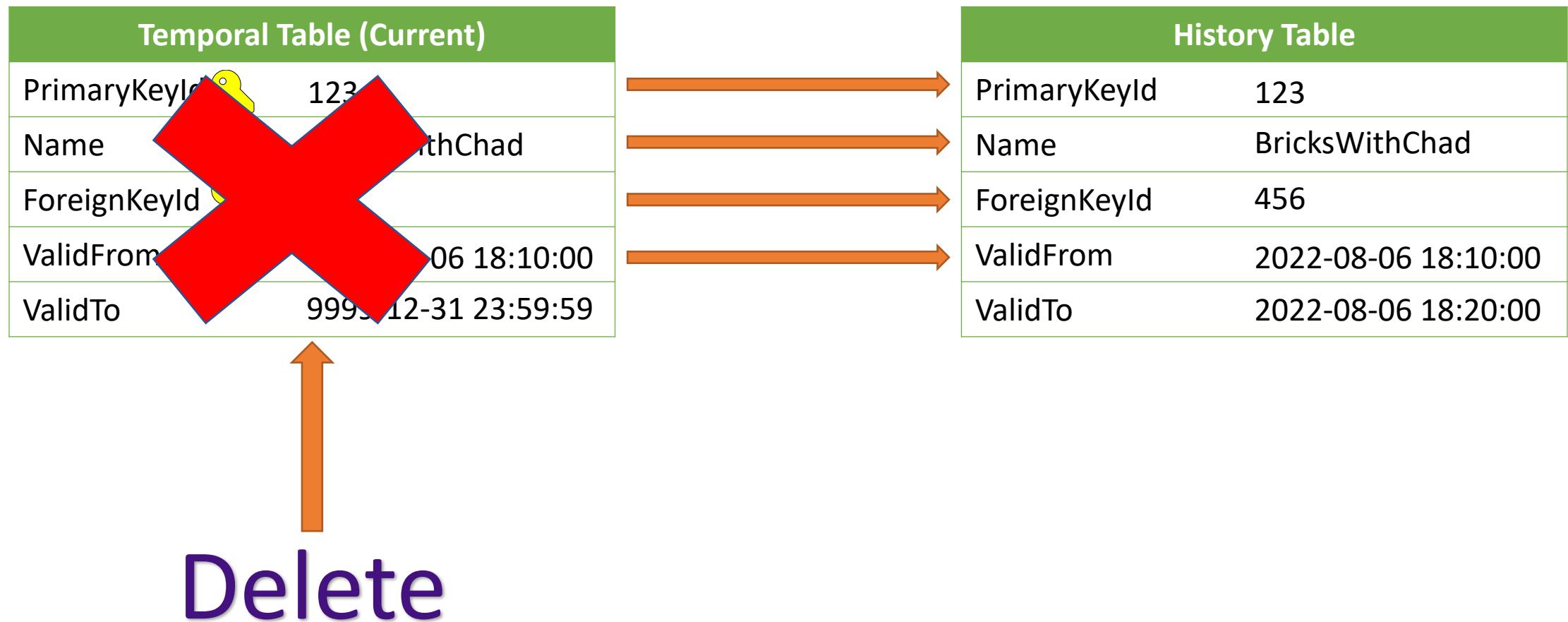
# How do temporal tables work?

| Temporal Table (Current) |                     | History Table |                     |
|--------------------------|---------------------|---------------|---------------------|
| PrimaryKeyId             | 123                 | PrimaryKeyId  | 123                 |
| Name                     | TaleLearnCode       | Name          | TaleLearnCode       |
| ForeignKeyId             | 456                 | ForeignKeyId  | 456                 |
| ValidFrom                | 2022-08-06 18:00:00 | ValidFrom     | 2022-08-06 18:00:00 |
| ValidTo                  | 9999-12-31 23:59:59 | ValidTo       | 2022-08-06 18:10:00 |



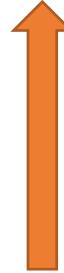
Update

# How do temporal tables work?



# How do temporal tables work?

| Temporal Table (Current) |                     | History Table |                     |
|--------------------------|---------------------|---------------|---------------------|
| PrimaryKeyId             | 123                 | PrimaryKeyId  | 123                 |
| Name                     | BricksWithChad      | Name          | BricksWithChad      |
| ForeignKeyId             | 456                 | ForeignKeyId  | 456                 |
| ValidFrom                | 2022-08-06 18:10:00 | ValidFrom     | 2022-08-06 18:10:00 |
| ValidTo                  | 9999-12-31 23:59:59 | ValidTo       | 2022-08-06 18:20:00 |



Merge

# How do temporal tables work?

| Temporal Table (Current)   |                     |
|--|---------------------|
| PrimaryKeyId  | 123                 |
| Name   | BricksWithChad      |
| ForeignKeyId  | 456                 |
| ValidFrom  | 2022-08-06 18:10:00 |
| ValidTo  | 9999-12-31 23:59:59 |

| History Table |                     |
|---------------|---------------------|
| PrimaryKeyId  | 123                 |
| Name          | TaleLearnCode       |
| ForeignKeyId  | 456                 |
| ValidFrom     | 2022-08-06 18:00:00 |
| ValidTo       | 2022-08-06 18:10:00 |

Regular queries  
(current data)



FOR SYSTEM\_TIME  
ALL, AS OF, BETWEEN..AND, FROM..TO, CONTAINED IN

# Query

# How do temporal tables work?

```
SELECT * FROM DemoTable  
FOR SYSTEM_TIME  
BETWEEN '2022-08-05 00:00:00' AND '2022-08-06 23:59:59'  
WHERE Id = 123  
ORDER BY ValidFrom
```

| PrimaryKeyId | Name           | ForiegnKeyId | ValidFrom           | ValidTo             |
|--------------|----------------|--------------|---------------------|---------------------|
| 123          | BricskWithChad | 456          | 2022-08-06 18:10:00 | 9999-12-31 23:59:59 |
| 123          | TaleLearnCode  | 456          | 2022-08-06 18:00:00 | 2022-08-06 18:10:00 |

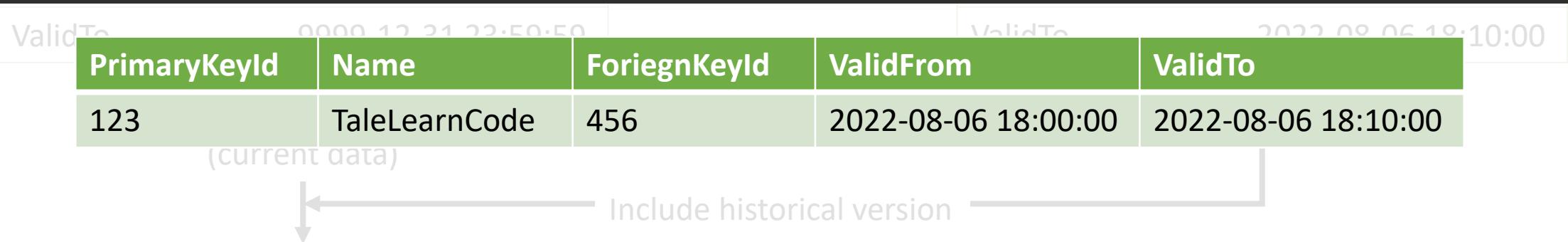


Query

FOR SYSTEM\_TIME  
ALL, AS OF, BETWEEN..ADN, FROM..TO, CONTAINED IN

# How do temporal tables work?

```
SELECT * FROM DemoTable  
FOR SYSTEM_TIME  
AS OF '2022-08-06 18:05:00'  
WHERE Id = 123
```



# Query

```
FOR SYSTEM_TIME  
ALL, AS OF, BETWEEN..ADN, FROM..TO, CONTAINED IN
```

# Temporal Query Expressions

**AS OF *date\_time***

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**AS OF** *date\_time*

**FROM** *start\_date\_time* **TO**  
*end\_date\_time*

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**FROM *start\_date\_time* TO  
*end\_date\_time***

**BETWEEN *start\_date\_time* AND  
*end\_date\_time***

# Temporal Query Expressions

**AS OF *date\_time***

**FROM *start\_date\_time* TO  
*end\_date\_time***

**BETWEEN *start\_date\_time* AND  
*end\_date\_time***

**CONTAINED IN (*start\_date\_time*,  
*end\_date\_time*)**

# Temporal Query Expressions

**AS OF** *date\_time*

**FROM** *start\_date\_time* **TO**  
*end\_date\_time*

**BETWEEN** *start\_date\_time* **AND**  
*end\_date\_time*

**CONTAINED IN** (*start\_date\_time*,  
*end\_date\_time*)

**ALL**

# What are common use cases for using temporal tables?

Time Travelling Data: SQL Server Temporal Tables

*Time to*  
**ENGAGE**



# Time to Engage

- Let's create some temporal tables
- INSERTs, UPDATEs, and DELETEs, oh my
- Roads? Where we are going we don't need roads

# Temporal Tables in Entity Framework

Time Travelling Data

# Temporal Tables in Entity Framework

Support added in EF Core 6.0



# Temporal Tables in Entity Framework



shivajiraot commented on Mar 3, 2016 • edited by divega ▾

Does EF Core support code first approach for Temporal tables?  
Looking to find a way to use Temporal tables with EF Core code first approach. Please guide me to the article if any existing already.  
Thank you.

378 5 32 13 13

# Temporal Tables in Entity Framework

- Creation of temporal tables using EF Core migrations
- Transformations of existing tables into temporal tables
- Querying historical data
- Restoring data from some point in the past

# LINQ Extension Methods

**TemporalAll**

**TemporalAsOf**

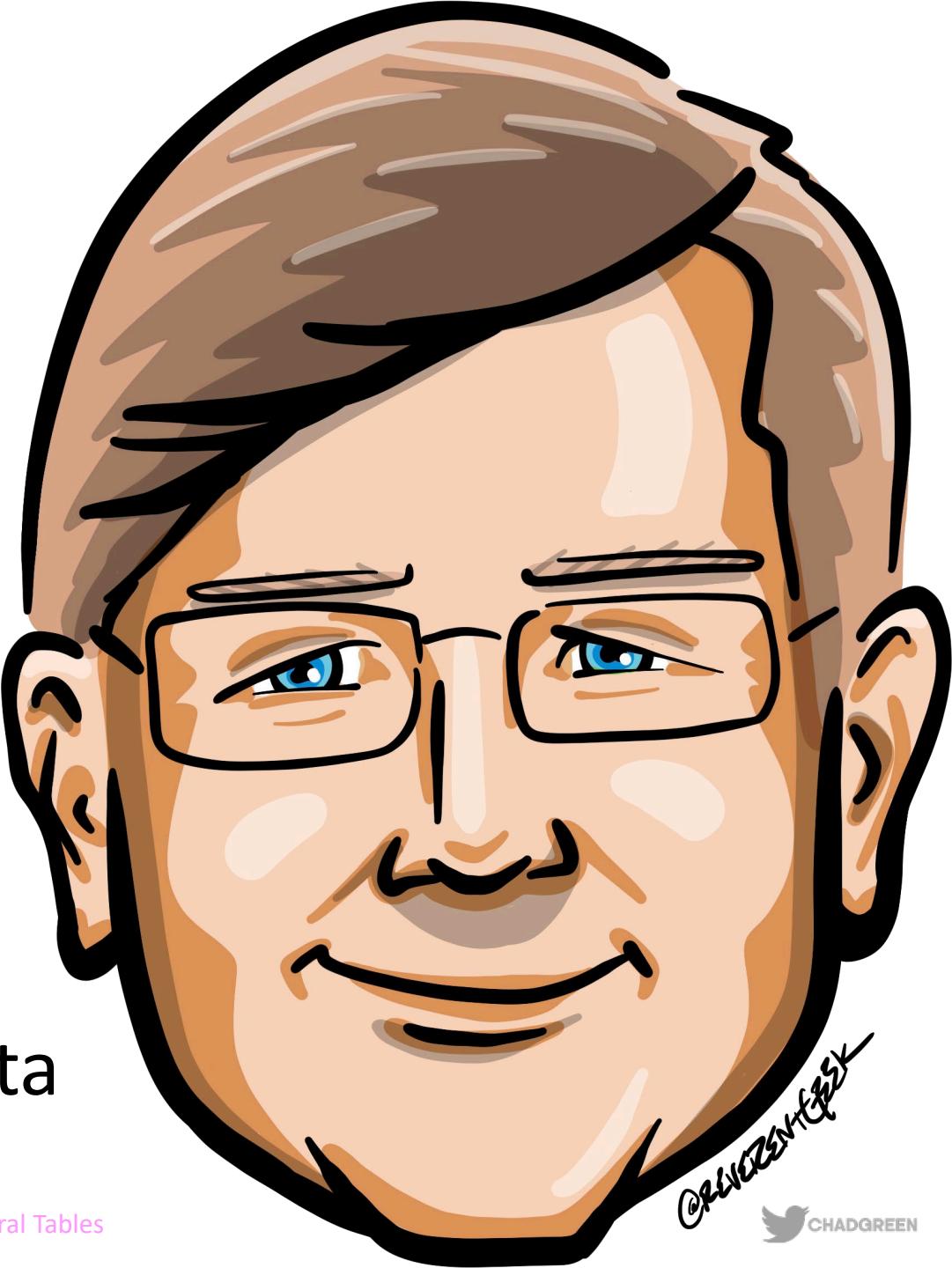
**TemporalFromTo**

**TemporalBetween**

**TemporalContainedIn**

# Thank You!

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