

# Stored Procedures vs Functions vs Views vs CTE

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## Overview

This presentation compares the main SQL Server objects: - Stored Procedures - Functions - Views - Common Table Expressions (CTE)

We compare them by features, performance, complexity, and real use cases.

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## Feature Comparison

Feature	Stored Procedure	Function	View	CTE
Returns Value	Optional (Result Sets)	Required	No	No
Used in SELECT	✗ No	✓ Yes	✓ Yes	✓ Yes
Modify Data	✓ Yes	✗ No	✗ No	✗ No
Accept Parameters	✓ Yes	✓ Yes	✗ No	✗ No
Multiple Result Sets	✓ Yes	✗ No	✗ No	✗ No
Scope	Database Object	Database Object	Database Object	Query Only

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## Time & Space Complexity

Object	Time Complexity	Space Complexity
Stored Procedure	Optimized, depends on indexes	Medium
Function	Slower inside SELECT	Low
View	Same as base query	Very Low
CTE	Recomputed every execution	Very Low

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## Performance (After First Execution)

Object	Execution Plan	Performance
Stored Procedure	Cached	 Best
Function	Partial caching	
View	Inline query	
CTE	No caching	

## Stored Procedure

### When to Use

- Business logic
- Insert / Update / Delete
- High performance
- Backend APIs

### Example

```
CREATE PROCEDURE GetActiveUsers
AS
BEGIN
    SELECT * FROM Users WHERE IsActive = 1;
END;
```

## Function

### When to Use

- Calculations
- Reusable logic
- Inside SELECT statements

### Example

```
CREATE FUNCTION GetUserAge (@BirthDate DATE)
RETURNS INT
AS
BEGIN
```

```
    RETURN DATEDIFF(YEAR, @BirthDate, GETDATE());
END;
```

## View

### When to Use

- Simplify complex queries
- Security (hide columns)
- Reporting & dashboards

### Example

```
CREATE VIEW v_ActiveUsers
AS
SELECT Id, Name FROM Users WHERE IsActive = 1;
```

## CTE (Common Table Expression)

### When to Use

- Temporary results
- Recursive queries
- Improve readability

### Example

```
WITH ActiveUsers AS (
    SELECT Id, Name FROM Users WHERE IsActive = 1
)
SELECT * FROM ActiveUsers;
```

## Quick Decision Guide

Scenario	Best Choice
Business Logic & Performance	Stored Procedure
Calculations in SELECT	Function

Scenario	Best Choice
Read-only Data Abstraction	View
Temporary / Recursive Query	CTE

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## Final Summary

- **Stored Procedure:** Best performance & logic
  - **Function:** Calculations only
  - **View:** Data abstraction
  - **CTE:** Query readability
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## Thank You