PRÁCTICA SEMANA 15 - CARLOS JOSÉ TORRE GARCÍA

1. SQL Server Management Studio (SSMS)

- **Activity Monitor**: Muestra procesos activos, uso de CPU, bloqueos, consultas costosas, etc.
- **Query Store**: Guarda el historial de ejecución de consultas, planes de ejecución y estadísticas de rendimiento.

EJEMPLOS DE ACTIVITY MONITOR: Consultas que consumen más CPU:

```
SELECT TOP 10
    qs.total_worker_time AS total_cpu_time,
    qs.execution_count,
    qs.total_worker_time / qs.execution_count AS avg_cpu_time_per_execution,
    SUBSTRING(st.text, (qs.statement_start_offset / 2) + 1,
        ((CASE qs.statement_end_offset
            WHEN -1 THEN DATALENGTH(st.text)
            ELSE qs.statement_end_offset
        END - qs.statement_start_offset) / 2) + 1) AS statement_text,
    DB_NAME(st.dbid) AS database_name,
    qp.query_plan
FROM
    sys.dm_exec_query_stats AS qs
CROSS APPLY
    sys.dm_exec_sql_text(qs.sql_handle) AS st
CROSS APPLY
    sys.dm_exec_query_plan(qs.plan_handle) AS qp
ORDER BY
    qs.total_worker_time DESC;
```

75 %

Results | Messages

	total_cpu_time	execution_count	avg_cpu_time_per_execution	statement_text	database_name	query_plan
1	79929	1	79929	SELECT SCHEMA_NAME(udf.schema_id) AS [Schema], ud...	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...
2	71120	3	23706	SELECT dtb.name AS [Name], dtb.database_id AS [ID], CA...	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...
3	63204	1	63204	SELECT SCHEMA_NAME(v.schema_id) AS [Schema], v.na...	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...
4	53656	2	26828	SELECT SCHEMA_NAME(sp.schema_id) AS [Schema], sp....	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...
5	52244	5	10448	SELECT dtb.name AS [Name], dtb.database_id AS [ID], CA...	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...
6	48669	3	16223	SELECT udf.name AS [Name], udf.object_id AS [ID], udf.cr...	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...
7	34899	1	34899	SELECT SCHEMA_NAME(sp.schema_id) AS [Schema], sp....	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...
8	26784	1	26784	SELECT t1.resource_type, DB_NAME(t1.resource_dat...	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...
9	24624	2	12312	SELECT SCHEMA_NAME(udf.schema_id) AS [Schema], ud...	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...
10	14200	2	7100	SELECT i.name AS [Name], CAST(i.index_id AS int) AS [ID],...	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...

EJEMPLOS DE QUERY STORE: Top 10 Consultas por Duración

```
USE tiendaInformatica;
GO
SELECT TOP 10
    q.query_id,
    qt.query_sql_text,
    p.plan_id,
    rs.avg_duration AS AverageDurationMicroseconds, -- Duración promedio en microsegundos
    rs.avg_cpu_time AS AverageCpuTimeMicroseconds, -- Tiempo de CPU promedio en microsegundos
    rs.avg_logical_io_reads AS AverageLogicalReads, -- Lecturas lógicas promedio
    rs.count_executions AS ExecutionCount, -- Número de ejecuciones
    q.last_execution_time AS LastExecutionTime -- Última vez que se ejecutó la consulta
FROM
    sys.query_store_query AS q
JOIN
    sys.query_store_query_text AS qt ON q.query_text_id = qt.query_text_id
JOIN
    sys.query_store_plan AS p ON q.query_id = p.query_id
JOIN
    sys.query_store_runtime_stats AS rs ON p.plan_id = rs.plan_id
ORDER BY
    rs.avg_duration DESC; -- Ordena por duración promedio de forma descendente
```

%

Results | Messages

	query_id	query_sql_text	plan_id	AverageDurationMicroseconds	AverageCpuTimeMicroseconds	AverageLogicalReads	ExecutionCount	LastExecutionTime
1	33	(@_msparam_0 nvarchar(4000),@_msparam_1 nvarchar...	1	828.5	828.5	68.5	2	2025-07-02 16:33:16.0570000 +00:00
2	33	(@_msparam_0 nvarchar(4000),@_msparam_1 nvarchar...	1	597.666666666667	597.333333333333	61.3333333333333	3	2025-07-02 16:33:16.0570000 +00:00
3	42	(@1 varchar(8000))INSERT INTO [Fabricante] values(@1)	2	19	18.75	3	16	2025-07-02 16:40:23.6970000 +00:00
4	2	(@1 varchar(8000),@2 int,@3 int)INSERT INTO [Produc...	3	7.76923076923077	7.76923076923077	5	13	2025-07-02 16:40:23.7000000 +00:00

2. Dynamic Management Views (DMVs)

- Vistas del sistema que permiten consultar información en tiempo real.
- Ejemplos:
  - sys.dm_exec_requests: consultas en ejecución.
  - sys.dm_exec_query_stats: estadísticas de ejecución.
  - sys.dm_os_wait_stats: tipos de espera del sistema.

Identificar Consultas que Consumen Más CPU

```
SELECT TOP 10
    qs.total_worker_time AS total_cpu_time,
    qs.execution_count,
    qs.total_worker_time / qs.execution_count AS avg_cpu_time_per_execution,
    SUBSTRING(st.text, (qs.statement_start_offset / 2) + 1,
              ((CASE qs.statement_end_offset
                  WHEN -1 THEN DATALENGTH(st.text)
                  ELSE qs.statement_end_offset
              END - qs.statement_start_offset) / 2) + 1) AS statement_text,
    DB_NAME(st.dbid) AS database_name,
    qp.query_plan
FROM
    sys.dm_exec_query_stats AS qs
CROSS APPLY
    sys.dm_exec_sql_text(qs.sql_handle) AS st
CROSS APPLY
    sys.dm_exec_query_plan(qs.plan_handle) AS qp
ORDER BY
    qs.total_worker_time DESC;
```

75 %

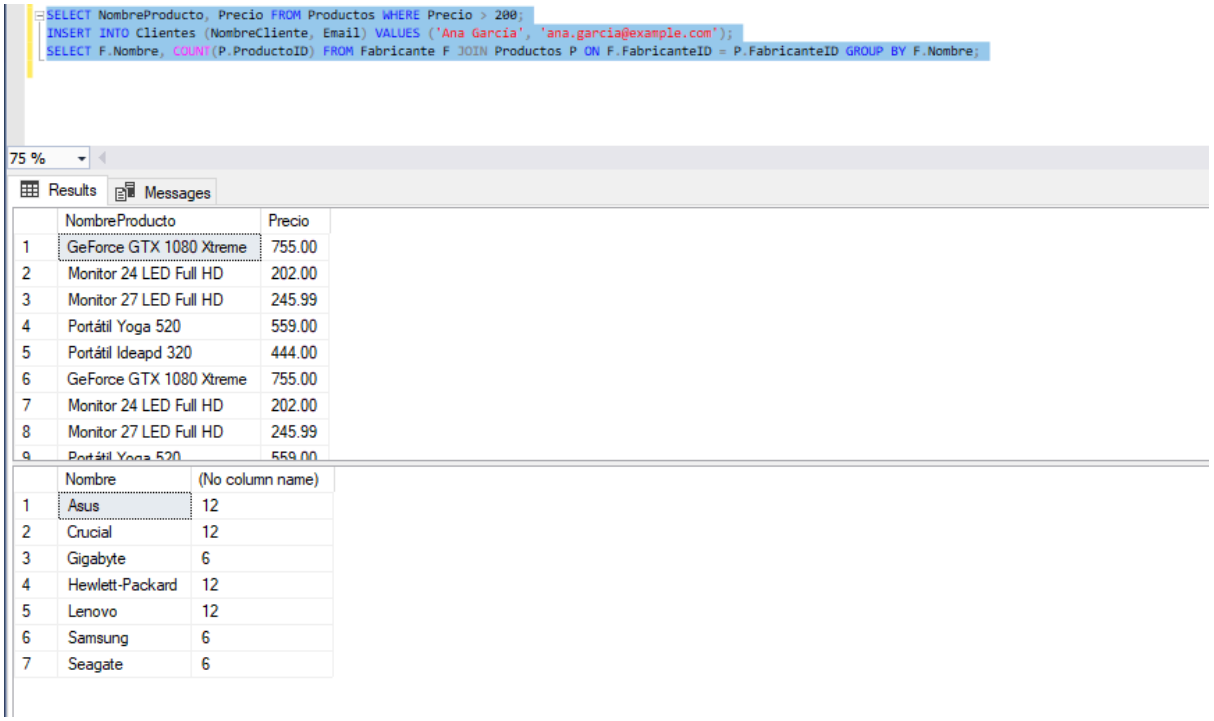
Results | Messages

	total_cpu_time	execution_count	avg_cpu_time_per_execution	statement_text	database_name	query_plan
1	165733	10	16573	SELECT dtb.name AS [Name], dtb.database_id AS [ID], CA...	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...
2	79929	1	79929	SELECT SCHEMA_NAME(udf.schema_id) AS [Schema], ud...	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...
3	71120	3	23706	SELECT dtb.name AS [Name], dtb.database_id AS [ID], CA...	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...
4	63204	1	63204	SELECT SCHEMA_NAME(v.schema_id) AS [Schema], v.na...	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...
5	53656	2	26828	SELECT SCHEMA_NAME(sp.schema_id) AS [Schema], sp....	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...
6	48669	3	16223	SELECT udf.name AS [Name], udf.object_id AS [ID], udf.cr...	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...
7	43966	1	43966	SELECT TOP 10 qs.total_worker_time AS total_cpu_tim...	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...
8	34899	1	34899	SELECT SCHEMA_NAME(sp.schema_id) AS [Schema], sp....	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...
9	26784	1	26784	SELECT t1.resource_type, DB_NAME(t1.resource_dat...	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...
10	24624	2	12312	SELECT SCHEMA_NAME(udf.schema_id) AS [Schema], ud...	NULL	<ShowPlanXML xmlns="http://schemas.microsoft.com...

3. SQL Server Profiler

- Herramienta para capturar eventos en tiempo real.
- Útil para auditoría, análisis de rendimiento y depuración.

Monitoreo de la actividad en tiempo real:



```
SELECT NombreProducto, Precio FROM Productos WHERE Precio > 200;
INSERT INTO Clientes (NombreCliente, Email) VALUES ('Ana Garcia', 'ana.garcia@example.com');
SELECT F.Nombre, COUNT(P.ProductoID) FROM Fabricante F JOIN Productos P ON F.FabricanteID = P.FabricanteID GROUP BY F.Nombre;
```

75 %

Results | Messages

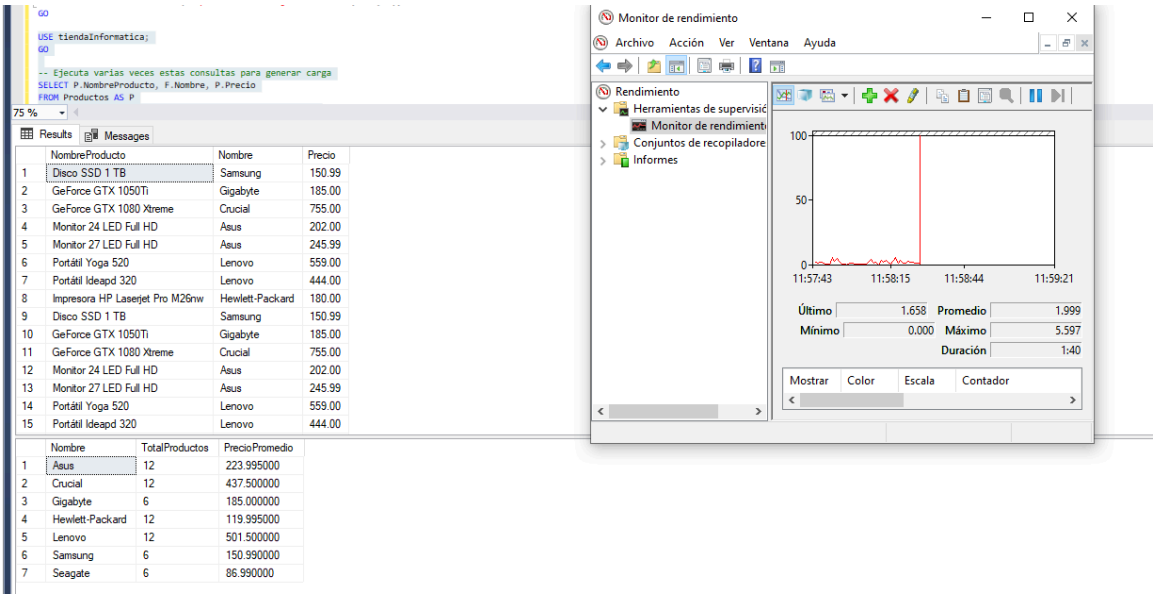
	NombreProducto	Precio
1	GeForce GTX 1080 Xtreme	755.00
2	Monitor 24 LED Full HD	202.00
3	Monitor 27 LED Full HD	245.99
4	Portátil Yoga 520	559.00
5	Portátil Ideapd 320	444.00
6	GeForce GTX 1080 Xtreme	755.00
7	Monitor 24 LED Full HD	202.00
8	Monitor 27 LED Full HD	245.99
9	Portátil Yoga 520	559.00

	Nombre	(No column name)
1	Asus	12
2	Crucial	12
3	Gigabyte	6
4	Hewlett-Packard	12
5	Lenovo	12
6	Samsung	6
7	Seagate	6

4. Performance Monitor (PerfMon)

- Herramienta de Windows que permite monitorear contadores del sistema operativo y SQL Server (uso de CPU, memoria, disco, etc.).

Uso de Performance Monitor (PerfMon) para Monitorear SQL Server



```
GO
USE tiendaInformatica;
GO
-- Ejecuta varias veces estas consultas para generar carga
SELECT P.NombreProducto, F.Nombre, P.Precio
FROM Productos AS P
```

75 %

Results | Messages

	NombreProducto	Nombre	Precio
1	Disco SSD 1 TB	Samsung	150.99
2	GeForce GTX 1050Ti	Gigabyte	185.00
3	GeForce GTX 1080 Xtreme	Crucial	755.00
4	Monitor 24 LED Full HD	Asus	202.00
5	Monitor 27 LED Full HD	Asus	245.99
6	Portátil Yoga 520	Lenovo	559.00
7	Portátil Ideapd 320	Lenovo	444.00
8	Impresora HP Laserjet Pro M26nw	Hewlett-Packard	180.00
9	Disco SSD 1 TB	Samsung	150.99
10	GeForce GTX 1050Ti	Gigabyte	185.00
11	GeForce GTX 1080 Xtreme	Crucial	755.00
12	Monitor 24 LED Full HD	Asus	202.00
13	Monitor 27 LED Full HD	Asus	245.99
14	Portátil Yoga 520	Lenovo	559.00
15	Portátil Ideapd 320	Lenovo	444.00

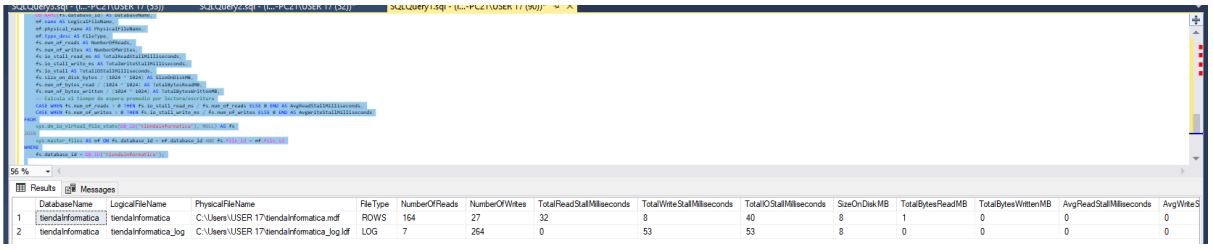
	Nombre	TotalProductos	PrecioPromedio
1	Asus	12	223.995000
2	Crucial	12	437.500000
3	Gigabyte	6	185.000000
4	Hewlett-Packard	12	119.995000
5	Lenovo	12	501.500000
6	Samsung	6	150.990000
7	Seagate	6	86.990000

b) Métricas clave de rendimiento

Estas métricas ayudan a identificar el estado y eficiencia del servidor:

Métrica	Descripción
CPU Usage	Alta CPU puede indicar consultas ineficientes o falta de recursos.
Memory Usage	SQL Server usa memoria para caché de datos y planes de ejecución.
Disk I/O	Lecturas/escrituras lentas afectan el rendimiento general.
Wait Statistics	Indican en qué está esperando SQL Server (bloqueos, recursos, etc.).
Query Execution Time	Tiempo que tarda una consulta en ejecutarse.
Blocking Sessions	Consultas que bloquean a otras.
Deadlocks	Dos procesos que se bloquean mutuamente.

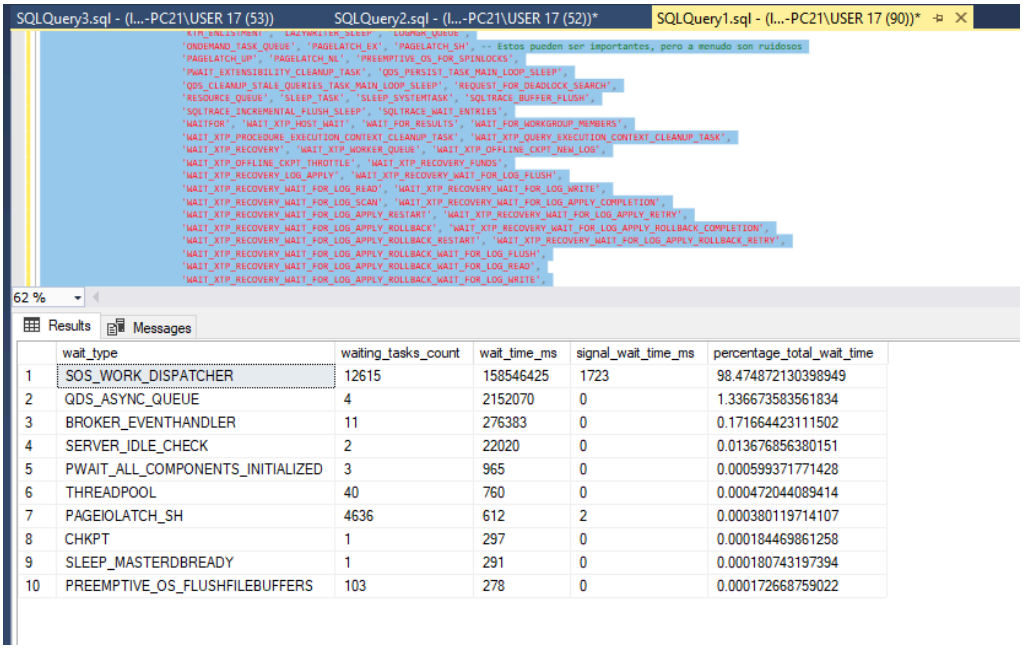
Ejemplo aplicando Query execution time:



D. Buscar bloqueos y deadlocks

```
SELECT
    blocking_session_id, session_id, wait_type, wait_time, wait_resource
FROM sys.dm_exec_requests
WHERE blocking_session_id <> 0;
```

EJEMPLO DE BUSCAR BLOQUEOS Y DEADLOCKS



	wait_type	waiting_tasks_count	wait_time_ms	signal_wait_time_ms	percentage_total_wait_time
1	SOS_WORK_DISPATCHER	12615	158546425	1723	98.474872130398949
2	QDS_ASYNC_QUEUE	4	2152070	0	1.336673583561834
3	BROKER_EVENTHANDLER	11	276383	0	0.171664423111502
4	SERVER_IDLE_CHECK	2	22020	0	0.013676856380151
5	PWAIT_ALL_COMPONENTS_INITIALIZED	3	965	0	0.000599371771428
6	THREADPOOL	40	760	0	0.000472044089414
7	PAGEIOLATCH_SH	4636	612	2	0.000380119714107
8	CHKPT	1	297	0	0.000184469861258
9	SLEEP_MASTERDBREADY	1	291	0	0.000180743197394
10	PREEMPTIVE_OS_FLUSHFILEBUFFERS	103	278	0	0.000172668759022