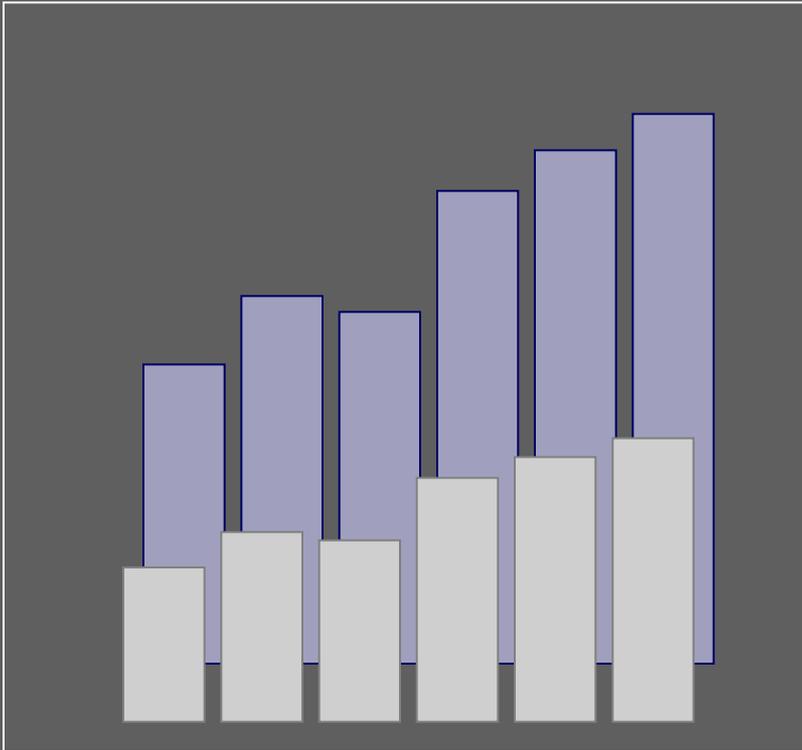
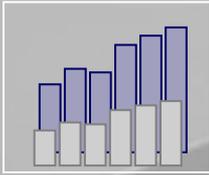


# Alternate Buffer Pool OpenEdge 10.2B



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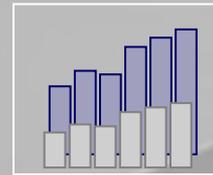
# Альтернативный буферный пул



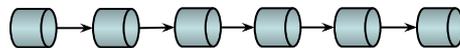
- ❑ Только для Enterprise License
- ❑ Доступен начиная с 10.2B
- ❑ Для чего?
  - ▢ Обеспечивает контроль над использованием памяти
  - ▢ Уменьшает LRU конкуренцию и издержки Ввода/Вывода
    - ✓ Активно используемые таблицы
    - ✓ Активно используемые индексы
    - ✓ Зашифрованные объекты
- ❑ Параметр запуска базы данных
  - ▢ `proserve <dbname> -B2`
  - ▢ Буферный пул базы данных = (-B) + (-B2)



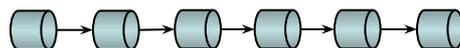
# Как работает?



Доступные буферы  
базы данных



LRU: политика замещения буферов



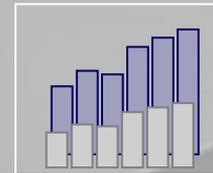
FIFO / LRU2

**PROUTIL INCREASESETO -B2**

- ✓ Уменьшение I/O активности
- ✓ Исключение издержек шифрования



# Использование Альтернативного буферного пула



- ❑ Работа с областями хранения (**SAT-I / SAT-II**)

```
proutil <dbname> -C enableB2 <AreaName>
```

- ❑ Работа с отдельными объектами базы данных (SAT-II)

Data Admin

OpenEdge SQL DDL

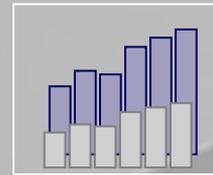
- ❑ Отчет по областям и объектам

- ❑ Статистика по использованию Альтернативного буферного пула

```
promon <dbname>
```



# PROUTIL ENABLEB2



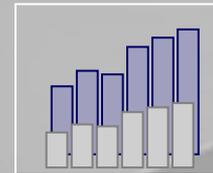
**proutil** <dbname> -C **enableB2** <AreaName>

- Работает только в Offline
- Используется только для областей хранения
- PROUTIL VIEWB2
- PROUTIL DISABLEB2

proutil <dbname> -C **disableB2** <AreaName>



# Использование Альтернативного буферного пула



- ❑ Работа с областями хранения (**SAT-I / SAT-II**)

**proutil** <dbname> -C **enableB2** <AreaName>

- ❑ Работа с отдельными объектами базы данных (SAT-II)

Data Admin

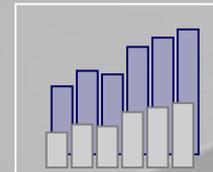
OpenEdge SQL DDL

- ❑ Отчет по областям и объектам

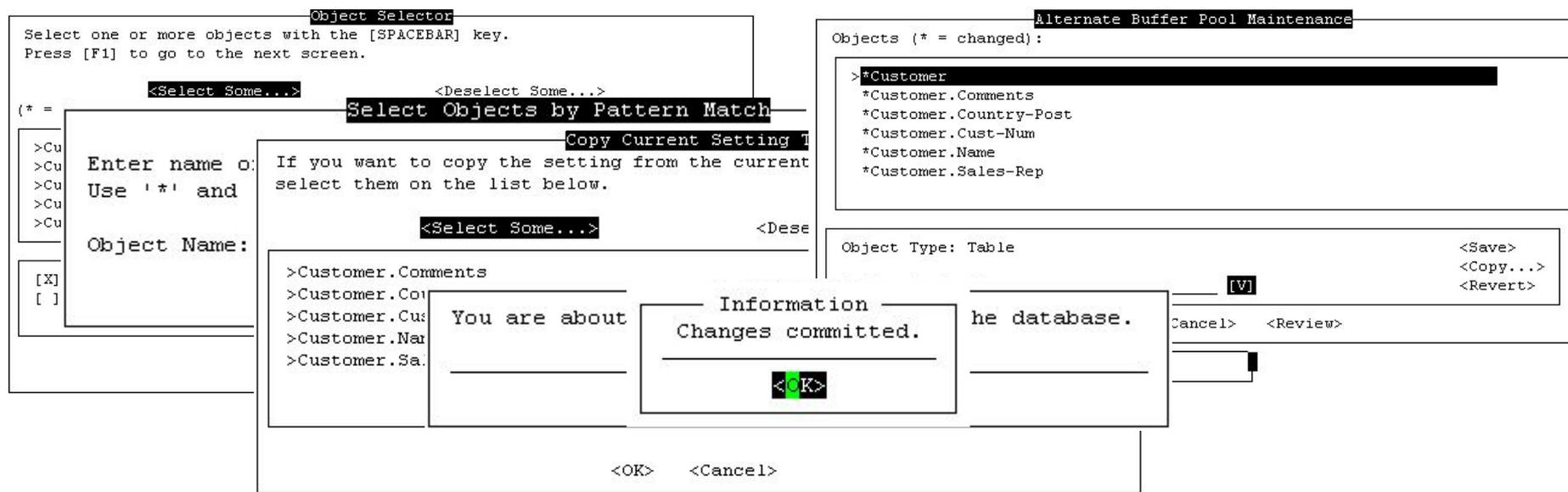
- ❑ Статистика по использованию Альтернативного буферного пула

**promon** <dbname>

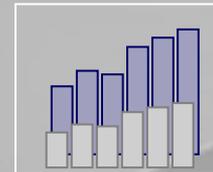




## Меню: Admin -> Alternate Buffer Pool -> Alternate Buffer Pool Maintenance



# OpenEdge SQL DDL



```
CREATE TABLE PUB.tblb2
(fld1 int, fld2 int, fld3 varchar(25))
AREA "TestArea2"
BUFFER_POOL ALTERNATE;
COMMIT;
```

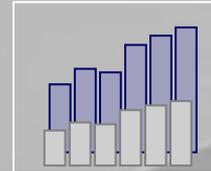
```
CREATE TABLE PUB.tblblob2
(bfld BLOB BUFFER_POOL ALTERNATE,
cfld CLOB BUFFER_POOL ALTERNATE,
otherfld int)
AREA "TestArea2";
COMMIT;
```

```
CREATE INDEX idx1
ON PUB.tblb2
(fld1, fld2)
AREA "TestArea2"
BUFFER_POOL ALTERNATE;
COMMIT;
```

```
ALTER TABLE PUB.tblb4
SET BUFFER_POOL ALTERNATE;
COMMIT;
```

```
ALTER TABLE PUB.tblb2
ALTER INDEX idx3
SET BUFFER_POOL ALTERNATE;
COMMIT;
```

# Data Definition File (.df)



## □ UPDATE TABLE

□ **BUFFER-POOL "Alternate"**

## □ DEFINITION TRAILER

□ **bufpool=yes**

```
UPDATE TABLE "Customer"  
BUFFER-POOL "Alternate"
```

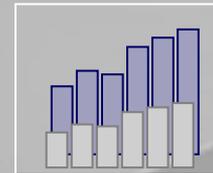
```
UPDATE TABLE "Order-Line"  
ENCRYPTION YES  
CIPHER-NAME AES_CBC_128  
BUFFER-POOL "Alternate"
```

```
UPDATE INDEX "Comments" OF "Customer"  
BUFFER-POOL "Alternate"
```

```
.  
PSC  
encpolicy=yes  
bufpool=yes  
cpstream=ibm866  
.  
0000000058
```

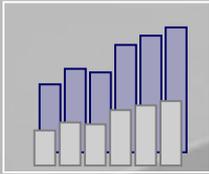


# Использование Альтернативного буферного пула



- ❑ Работа с областями хранения (**SAT-I / SAT-II**)  
`proutil <dbname> -C enableB2 <AreaName>`
- ❑ Работа с отдельными объектами базы данных (SAT-II)  
Data Admin  
OpenEdge SQL DDL
- ❑ Отчет по областям и объектам
- ❑ Статистика по использованию Альтернативного буферного пула  
`promon <dbname>`





## Database -> Reports -> Alternate Buffer Pool

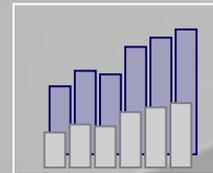
30/09/09 16:35:55    PROGRESS Report  
Alternate Buffer Pool information

List of object-level assignable objects that are assigned to the alternate buffer pool at the object level

Object Name	Area Name
Customer	Customer/Order Area
- Comments (Index)	Customer Index Area
- Country-Post (Index)	Customer Index Area
- Cust-Num (Index)	Primary Index Area
- Name (Index)	Customer Index Area
- Sales-Rep (Index)	Customer/Order Area
TBLB2	TestArea2
- IDX3 (Index)	TestArea2
TBLB4	TestArea2
TBLBLOB2 (*)	
- BFLD (Blob)	TestArea2
- CFLD (Clob)	TestArea2

(\*) Table not assigned to the alternate buffer pool at the object level





❑ proutil <dbname> -C viewB2

## Area 12: "Misc" - Alternate Buffer Pool

Object Enablement Type Object Id: Name

Object Enablement	Type	Object Id: Name
Default	Table	5: PUB.Salesrep
Default	Table	7: PUB.LocalDefault
Default	Table	8: PUB.RefCall
Default	Index	8: InvoiceNum (PUB.Invoice)
Default	Index	9: CustNum (PUB.Invoice)
Default	Index	10: InvoiceDate (PUB.Invoice)

## Area 13: "TESTB2" - Alternate Buffer Pool

Object Enablement Type Object Id: Name

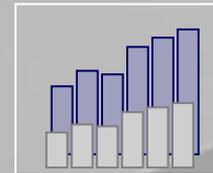
Object Enablement	Type	Object Id: Name
Default	Table	1: PUB.Invoice
Default	Table	6: PUB.State
Alternate	Table	9: PUB.Feedback

## Area 14: "IDXB2" - Primary Buffer Pool

Object Enablement Type Object Id: Name

Object Enablement	Type	Object Id: Name
Alternate	Index	33: Comments (PUB.Feedback)
Alternate	Index	34: Company (PUB.Feedback)
Default	Index	36: Rating (PUB.Feedback)

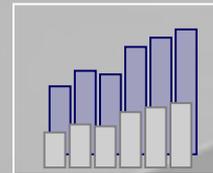
# Использование Альтернативного буферного пула



- ❑ Работа с областями хранения (**SAT-I / SAT-II**)  
`proutil <dbname> -C enableB2 <AreaName>`
  - ❑ Работа с отдельными объектами базы данных (SAT-II)
    - Data Admin
    - OpenEdge SQL DDL
  - ❑ Отчет по областям и объектам
- ❑ Статистика по использованию Альтернативного буферного пула  
`promon <dbname>`



# PROMON



## Опция 5 – Activity

Buffer Hits 97 % Primary Hits 57 % Alternate Hits 99 %

## Опция 6 – Shared Resources

Number of database buffers (-B): 3000

Number of database alternate buffers (-B2): 10

## R&D - опция 1 (Status Display) -> Опция 12 (Startup Parameters)

Database alternate buffers: 10 (40 kb)

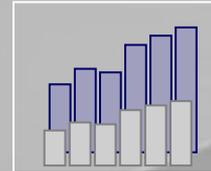
## R&D - опция 2 (Activity Display) -> Опция 1 (Summary)

Buffer Hits 93 % Primary Hits 87 % Alternate Hits 94 %

## R&D - опция 2 (Activity Display) -> Опция 3 (Buffer Cache)



# PROMON: R&D ->2 ->3



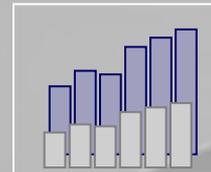
09/30/09 Activity: Buffer Cache  
 17:35:58 09/30/09 17:33 to 09/30/09 17:34 (24 sec)

	Total	Per Min	Per Sec	Per Tx
<b>Database Buffer Pool</b>				
Logical reads	560	1400	23.33	0.00
Logical writes	0	0	0.00	0.00
O/S reads	34	85	1.42	0.00
O/S writes	3	8	0.12	0.00
Checkpoints	0	0	0.00	0.00
Marked to checkpoint	0	0	0.00	0.00
Flushed at checkpoint	0	0	0.00	0.00
Writes deferred	0	0	0.00	0.00
LRU skips	0	0	0.00	0.00
LRU writes	0	0	0.00	0.00
APW enqueues	0	0	0.00	0.00
Database buffer pool hit ratio: 85 %				
<b>Primary Buffer Pool</b>				
Logical reads	66	165	2.75	0.00
Logical writes	0	0	0.00	0.00
O/S reads	8	20	0.33	0.00
O/S writes	0	0	0.00	0.00
Marked to checkpoint	0	0	0.00	0.00
Flushed at checkpoint	0	0	0.00	0.00
Writes deferred	0	0	0.00	0.00
LRU skips	0	0	0.00	0.00
LRU writes	0	0	0.00	0.00
APW enqueues	0	0	0.00	0.00
Primary buffer pool hit ratio: 87 %				
<b>Alternate Buffer Pool</b>				
Logical reads	494	1235	20.58	0.00
Logical writes	0	0	0.00	0.00
O/S reads	26	65	1.08	0.00
O/S writes	3	8	0.12	0.00
Marked to checkpoint	0	0	0.00	0.00
Flushed at checkpoint	0	0	0.00	0.00
Writes deferred	0	0	0.00	0.00
LRU2 skips	0	0	0.00	0.00
LRU2 writes	0	0	0.00	0.00
APW enqueues	0	0	0.00	0.00
Alternate buffer pool hit ratio: 94 %				
LRU swaps	0	0	0.00	0.00
LRU2 replacment policy disabled.				

**LRU2 replacement policy disabled**



# PROMON: R&D ->2 ->3



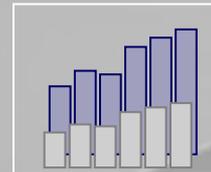
Переполнение –B2 приводит к активации LRU2

09/30/09 Activity: Buffer Cache		09/30/09 17:39 to 09/30/09 17:42 (3 min 26 sec)			
	Total	Per Min	Per Sec	Per Tx	
<b>Database Buffer Pool</b>					
Logical reads	16245	4732	78.86	0.00	
Logical writes	0	0	0.00	0.00	
O/S reads	2234	651	10.84	0.00	
O/S writes	3	1	0.01	0.00	
Checkpoints	0	0	0.00	0.00	
Marked to checkpoint	0	0	0.00	0.00	
Flushed at checkpoint	0	0	0.00	0.00	
Writes deferred	0	0	0.00	0.00	
LRU skips	0	0	0.00	0.00	
LRU writes	0	0	0.00	0.00	
APW enqueues	0	0	0.00	0.00	
Alternate buffer pool hit ratio:	85 %				
<b>Primary Buffer Pool</b>					
Logical reads	418	122	2.03	0.00	
Logical writes	0	0	0.00	0.00	
O/S reads	17	5	0.08	0.00	
O/S writes	0	0	0.00	0.00	
Marked to checkpoint	0	0	0.00	0.00	
Flushed at checkpoint	0	0	0.00	0.00	
Writes deferred	0	0	0.00	0.00	
LRU skips	0	0	0.00	0.00	
LRU writes	0	0	0.00	0.00	
APW enqueues	0	0	0.00	0.00	
Primary buffer pool hit ratio:	95 %				
<b>Alternate Buffer Pool</b>					
Logical reads	15827	4610	76.83	0.00	
Logical writes	0	0	0.00	0.00	
O/S reads	2217	646	10.76	0.00	
O/S writes	3	1	0.01	0.00	
Marked to checkpoint	0	0	0.00	0.00	
Flushed at checkpoint	0	0	0.00	0.00	
Writes deferred	0	0	0.00	0.00	
LRU2 skips	0	0	0.00	0.00	
LRU2 writes	0	0	0.00	0.00	
APW enqueues	0	0	0.00	0.00	
Alternate buffer pool hit ratio:	85 %				
LRU swaps	0	0	0.00	0.00	
LRU2 replacment policy enabled.					

**LRU2 replacement policy enabled**



# PROMON: R&D ->2 ->3

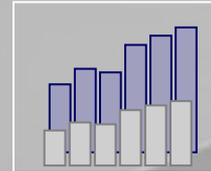


После выполнения команды  
PROUTIL INCREASETO  
механизм LRU2 отключается  
автоматически

	Total	Per Min	Per Sec	Per Tx
09/30/09 Activity: Buffer Cache				
17:51:41 09/30/09 17:39 to 09/30/09 17:51 (12 min 39 sec)				
<b>Database Buffer Pool</b>				
Logical reads	27522	2176	36.26	0.00
Logical writes	0	0	0.00	0.00
O/S reads	2885	228	3.80	0.00
O/S writes	3	0	0.00	0.00
Checkpoints	0	0	0.00	0.00
Marked to checkpoint	0	0	0.00	0.00
Flushed at checkpoint	0	0	0.00	0.00
Writes deferred	0	0	0.00	0.00
LRU skips	0	0	0.00	0.00
LRU writes	0	0	0.00	0.00
APW enqueues	0	0	0.00	0.00
Primary Buffer Pool				
Logical reads	746	59	0.98	0.00
Logical writes	0	0	0.00	0.00
O/S reads	17	1	0.02	0.00
O/S writes	0	0	0.00	0.00
Marked to checkpoint	0	0	0.00	0.00
Flushed at checkpoint	0	0	0.00	0.00
Writes deferred	0	0	0.00	0.00
LRU skips	0	0	0.00	0.00
LRU writes	0	0	0.00	0.00
APW enqueues	0	0	0.00	0.00
Primary buffer pool hit ratio:	97 %			
<b>Alternate Buffer Pool</b>				
Logical reads	26776	2117	35.28	0.00
Logical writes	0	0	0.00	0.00
O/S reads	2868	227	3.78	0.00
O/S writes	3	0	0.00	0.00
Marked to checkpoint	0	0	0.00	0.00
Flushed at checkpoint	0	0	0.00	0.00
Writes deferred	0	0	0.00	0.00
LRU2 skips	0	0	0.00	0.00
LRU2 writes	0	0	0.00	0.00
APW enqueues	0	0	0.00	0.00
Alternate buffer pool hit ratio:	89 %			
LRU swaps	0	0	0.00	0.00
LRU2 replacment policy disabled.				

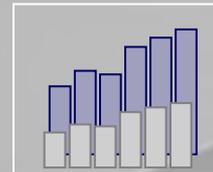
**LRU2 replacement policy disabled**

# Изменения в VST



- `_ActBuffer` – Информация о буферной активности
  - Запись 1: Информация о Первичном и Альтернативном пулах
  - Запись 2: Первичный буферный пул
  - Запись 3: Альтернативный буферный пул
- `_BuffStatus` – Информация о статусе буфера
  - `_BfStatus-LRU` : количество буферов в LRU цепочке
- `_IndexStat` – статистика по каждому индексу
  - `_IndexStat-OsRead`: количество чтений индекса из ФС
- `__TableStat`
  - `TableStat-OsRead`: количество чтений таблицы из ФС
- `_Startup` – параметры запуска базы
  - `_Startup-Alternate_Buffs`:размер B2

**ВНИМАНИЕ!**



**управляя информацией**

**OpenEdge 10.2B: Alternate Buffer Pool**

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[www.openedge.ru](http://www.openedge.ru)

