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## Original Query

**SELECT cr.customer\_id AS id, pt.phone\_type\_name**

**FROM genesys.campaign\_records cr**

**INNER JOIN genesys.call\_attempts ca ON ca.record\_id = cr.id**

**AND ca.created\_at > NOW() - INTERVAL '60 DAYS'**

**INNER JOIN customers c ON c.id = cr.customer\_id**

**INNER JOIN genesys.phone\_types pt ON pt.id = cr.contact\_info\_type\_id**

**LEFT OUTER JOIN genesys.record\_statuses rs ON rs.id = ca.call\_result\_id**

**WHERE rs.record\_status = 'Busy'**

**AND ( (SELECT MAX(ca2.created\_at) FROM genesys.campaign\_records cr2**

**INNER JOIN genesys.call\_attempts ca2 ON ca2.record\_id = cr2.id**

**AND ca2.created\_at > NOW() - INTERVAL '60 DAYS'**

**LEFT OUTER JOIN genesys.record\_statuses rs ON rs.id = ca.call\_result\_id**

**WHERE rs.record\_status <> 'Busy'**

**) IS NULL OR**

**(SELECT MAX(ca3.created\_at) FROM genesys.campaign\_records cr3**

**INNER JOIN genesys.call\_attempts ca3 ON ca3.record\_id = cr3.id**

**AND ca3.created\_at > NOW() - INTERVAL '60 DAYS'**

**LEFT OUTER JOIN genesys.record\_statuses rs3 ON rs.id = ca3.call\_result\_id**

**WHERE rs3.record\_status <> 'Busy'**

**) <**

**(SELECT MIN(created\_at)**

**FROM (SELECT ca4.created\_at**

**FROM genesys.campaign\_records cr4**

**INNER JOIN genesys.call\_attempts ca4 ON ca4.record\_id = cr.id**

**AND ca4.created\_at > NOW() - INTERVAL '60 DAYS'**

**LEFT OUTER JOIN genesys.record\_statuses rs4 ON rs4.id = ca4.call\_result\_id**

**WHERE rs4.record\_status = 'Busy'**

**AND cr4.customer\_id = c.id**

**ORDER BY ca4.created\_at DESC**

**LIMIT 10**

**) AS bad )**

**) GROUP BY cr.customer\_id, pt.phone\_type\_name**

**HAVING count(cr.customer\_id) > 10;**

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## Main Challenges

**SELECT**

**cr.customer\_id**

**, cr.contact\_info\_type\_id**

**, cr.contact\_info**

**, ca.id AS call\_attempt\_id**

**, ca.record\_id**

**, ca.created\_at AS call\_attempted\_at**

**, ca.call\_result\_id**

**, rs.record\_status**

**/\* to add a new 'bad code', append to the in-list \*/**

**, (CASE WHEN LOWER(rs.record\_status) IN ( 'stale', 'busy', 'fax detected', 'no answer', 'sit detected', 'sit nc(no circuit)', 'sit ic(intercept)', 'sit ro(reorder)', 'sit unknown call state', 'sit vc(vacant code)')**

**THEN 'false'**

**ELSE 'true'**

**END)::boolean AS is\_good\_code**

**/\* for each bad code, you can configure the minimum quantity of occurrences desired, here ... \*/**

**, (CASE WHEN LOWER(rs.record\_status) = 'stale' THEN 10**

**WHEN LOWER(rs.record\_status) = 'busy' THEN 10**

**WHEN LOWER(rs.record\_status) = 'fax detected' THEN 10**

**WHEN LOWER(rs.record\_status) = 'no answer' THEN 10**

**WHEN LOWER(rs.record\_status) = 'sit detected' THEN 10**

**WHEN LOWER(rs.record\_status) = 'sit nc(no circuit)' THEN 10**

**WHEN LOWER(rs.record\_status) = 'sit ic(intercept)' THEN 10**

**WHEN LOWER(rs.record\_status) = 'sit ro(reorder)' THEN 10**

**WHEN LOWER(rs.record\_status) = 'sit unknown call state' THEN 10**

**WHEN LOWER(rs.record\_status) = 'sit vc(vacant code)' THEN 10**

**ELSE 0**

**END) AS rule\_quantity**

**/\* for each bad code, you can configure the number of days back to require the occurrences to exist, here ... \*/**

**, (CASE WHEN LOWER(rs.record\_status) = 'stale' THEN 60**

**WHEN LOWER(rs.record\_status) = 'busy' THEN 60**

**WHEN LOWER(rs.record\_status) = 'fax detected' THEN 60**

**WHEN LOWER(rs.record\_status) = 'no answer' THEN 60**

**WHEN LOWER(rs.record\_status) = 'sit detected' THEN 60**

**WHEN LOWER(rs.record\_status) = 'sit nc(no circuit)' THEN 60**

**WHEN LOWER(rs.record\_status) = 'sit ic(intercept)' THEN 60**

**WHEN LOWER(rs.record\_status) = 'sit ro(reorder)' THEN 60**

**WHEN LOWER(rs.record\_status) = 'sit unknown call state' THEN 60**

**WHEN LOWER(rs.record\_status) = 'sit vc(vacant code)' THEN 60**

**ELSE 0**

**END) AS rule\_period**

**FROM genesys.campaign\_records cr**

**INNER JOIN genesys.call\_attempts ca ON cr.id = ca.record\_id**

**/\* maximum days back, to grab all pertinent data \*/**

**AND ca.created\_at > NOW() - INTERVAL '60 DAYS'**

**LEFT OUTER JOIN genesys.record\_statuses rs ON ca.call\_result\_id = rs.id**

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## Output for total\_attempts column

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| customer\_id | contact\_info\_type\_id | contact\_info | call\_attempted\_at | call\_result\_id | record\_status | is\_good\_code | rule\_quantity | rule\_period | total\_attempts |
| 1000020 | 1 | 442086671545 | 2014-01-03 14:55:31 | 6 | Busy | f | 10 | 60 | 1 |
| 1000020 | 3 | 442087749392 | 2014-01-08 15:07:02 | 9 | Answering Machine Detected | t | 0 | 0 | 2 |
| 1000020 | 3 | 442087749392 | 2014-01-07 14:56:52 | 9 | Answering Machine Detected | t | 0 | 0 | 2 |
| 1000020 | 4 | 447577680379 | 2014-01-08 15:07:53 | 7 | No Answer | f | 10 | 60 | 2 |
| 1000020 | 4 | 447577680379 | 2014-01-07 14:57:28 | 7 | No Answer | f | 10 | 60 | 2 |
| 1000804 | 1 | 447932253897 | 2014-02-24 13:23:49 | 7 | No Answer | f | 10 | 60 | 3 |
| 1000804 | 1 | 447932253897 | 2014-02-18 13:24:09 | 9 | Answering Machine Detected | t | 0 | 0 | 3 |
| 1000804 | 1 | 447932253897 | 2014-01-27 11:30:47 | 7 | No Answer | f | 10 | 60 | 3 |

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## Output for contact\_type\_rownum column

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| customer\_id | contact\_info\_type\_id | contact\_info | call\_attempted\_at | record\_status | is\_good\_code | rule\_quantity | rule\_period | total\_attempts | contact\_type\_rownum |
| 1000020 | 1 | 442086671545 | 2014-01-03 14:55:31 | Busy | f | 10 | 60 | 1 | 1 |
| 1000020 | 3 | 442087749392 | 2014-01-08 15:07:02 | Answering Machine Detected | t | 0 | 0 | 2 | 1 |
| 1000020 | 3 | 442087749392 | 2014-01-07 14:56:52 | Answering Machine Detected | t | 0 | 0 | 2 | 2 |
| 1000020 | 4 | 447577680379 | 2014-01-08 15:07:53 | No Answer | f | 10 | 60 | 2 | 1 |
| 1000020 | 4 | 447577680379 | 2014-01-07 14:57:28 | No Answer | f | 10 | 60 | 2 | 2 |
| 1000804 | 1 | 447932253897 | 2014-02-24 13:23:49 | No Answer | f | 10 | 60 | 3 | 1 |
| 1000804 | 1 | 447932253897 | 2014-02-18 13:24:09 | Answering Machine Detected | t | 0 | 0 | 3 | 2 |
| 1000804 | 1 | 447932253897 | 2014-01-27 11:30:47 | No Answer | f | 10 | 60 | 3 | 3 |
| 1000804 | 3 | 441217112737 | 2014-02-27 13:49:23 | Busy | f | 10 | 60 | 12 | 1 |
| 1000804 | 3 | 441217112737 | 2014-02-26 20:31:36 | No Answer | f | 10 | 60 | 12 | 2 |
| 1000804 | 3 | 441217112737 | 2014-02-24 12:58:21 | Answering Machine Detected | t | 0 | 0 | 12 | 3 |
| 1000804 | 3 | 441217112737 | 2014-02-18 12:52:56 | Answering Machine Detected | t | 0 | 0 | 12 | 4 |
| 1000804 | 3 | 441217112737 | 2014-02-12 12:15:45 | Answering Machine Detected | t | 0 | 0 | 12 | 5 |
| 1000804 | 3 | 441217112737 | 2014-02-10 12:41:20 | Answering Machine Detected | t | 0 | 0 | 12 | 6 |
| 1000804 | 3 | 441217112737 | 2014-02-07 15:57:09 | Answering Machine Detected | t | 0 | 0 | 12 | 7 |
| 1000804 | 3 | 441217112737 | 2014-02-05 15:52:05 | Answering Machine Detected | t | 0 | 0 | 12 | 8 |
| 1000804 | 3 | 441217112737 | 2014-02-04 15:30:30 | Answering Machine Detected | t | 0 | 0 | 12 | 9 |
| 1000804 | 3 | 441217112737 | 2014-01-30 10:34:23 | Answer | t | 0 | 0 | 12 | 10 |
| 1000804 | 3 | 441217112737 | 2014-01-27 08:59:15 | Answering Machine Detected | t | 0 | 0 | 12 | 11 |
| 1000804 | 3 | 441217112737 | 2014-01-23 08:04:48 | No Answer | f | 10 | 60 | 12 | 12 |

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## Output for result\_rownum column

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| customer\_id | contact\_info\_type\_id | contact\_info | call\_attempted\_at | record\_status | is\_good\_code | rule\_quantity | total\_attempts | contact\_type\_rownum | result\_rownum |
| 1000804 | 1 | 447932253897 | 2014-02-18 13:24:09 | Answering Machine Detected | t | 0 | 3 | 2 | 1 |
| 1000804 | 1 | 447932253897 | 2014-01-27 11:30:47 | No Answer | f | 10 | 3 | 3 | 2 |
| 1000804 | 3 | 441217112737 | 2014-02-27 13:49:23 | Busy | f | 10 | 12 | 1 | 1 |
| 1000804 | 3 | 441217112737 | 2014-02-26 20:31:36 | No Answer | f | 10 | 12 | 2 | 1 |
| 1000804 | 3 | 441217112737 | 2014-02-24 12:58:21 | Answering Machine Detected | t | 0 | 12 | 3 | 1 |
| 1000804 | 3 | 441217112737 | 2014-02-18 12:52:56 | Answering Machine Detected | t | 0 | 12 | 4 | 2 |
| 1000804 | 3 | 441217112737 | 2014-02-12 12:15:45 | Answering Machine Detected | t | 0 | 12 | 5 | 3 |
| 1000804 | 3 | 441217112737 | 2014-02-10 12:41:20 | Answering Machine Detected | t | 0 | 12 | 6 | 4 |
| 1000804 | 3 | 441217112737 | 2014-02-07 15:57:09 | Answering Machine Detected | t | 0 | 12 | 7 | 5 |
| 1000804 | 3 | 441217112737 | 2014-02-05 15:52:05 | Answering Machine Detected | t | 0 | 12 | 8 | 6 |
| 1000804 | 3 | 441217112737 | 2014-02-04 15:30:30 | Answering Machine Detected | t | 0 | 12 | 9 | 7 |
| 1000804 | 3 | 441217112737 | 2014-01-30 10:34:23 | Answer | t | 0 | 12 | 10 | 1 |
| 1000804 | 3 | 441217112737 | 2014-01-27 08:59:15 | Answering Machine Detected | t | 0 | 12 | 11 | 8 |
| 1000804 | 3 | 441217112737 | 2014-01-23 08:04:48 | No Answer | f | 10 | 12 | 12 | 2 |
| 1000804 | 4 | 447920181075 | 2014-02-12 12:31:58 | Busy | f | 10 | 10 | 1 | 1 |
| 1000804 | 4 | 447920181075 | 2014-02-10 13:08:28 | Busy | f | 10 | 10 | 2 | 2 |
| 1000804 | 4 | 447920181075 | 2014-02-07 16:09:06 | Busy | f | 10 | 10 | 3 | 3 |
| 1000804 | 4 | 447920181075 | 2014-02-05 16:20:37 | Busy | f | 10 | 10 | 4 | 4 |
| 1000804 | 4 | 447920181075 | 2014-02-04 16:04:24 | Busy | f | 10 | 10 | 5 | 5 |
| 1000804 | 4 | 447920181075 | 2014-01-27 09:04:29 | Busy | f | 10 | 10 | 6 | 6 |
| 1000804 | 4 | 447920181075 | 2014-01-23 20:42:13 | Busy | f | 10 | 10 | 7 | 7 |
| 1000804 | 4 | 447920181075 | 2014-01-23 18:24:07 | Busy | f | 10 | 10 | 8 | 8 |
| 1000804 | 4 | 447920181075 | 2014-01-23 10:19:57 | Busy | f | 10 | 10 | 9 | 9 |
| 1000804 | 4 | 447920181075 | 2014-01-23 08:06:41 | Busy | f | 10 | 10 | 10 | 10 |

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## Filtered Output

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| customer\_id | contact\_info\_type\_id | contact\_info | record\_status | is\_good\_code | rule\_quantity | rule\_period | total\_attempts | contact\_type\_rownum | result\_rownum |
| 1000804 | 4 | 447920181075 | Busy | f | 10 | 60 | 10 | 10 | 10 |
| 1008995 | 1 | 442082397741 | No Answer | f | 10 | 60 | 13 | 10 | 10 |
| 1028167 | 3 | 447920022586 | Busy | f | 10 | 60 | 11 | 10 | 10 |
| 1037180 | 1 | 441235201021 | No Answer | f | 10 | 60 | 10 | 10 | 10 |
| 1052652 | 3 | 441159576324 | Busy | f | 10 | 60 | 15 | 10 | 10 |

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## Final Query

**WITH record\_status\_window AS**

**(SELECT**

**cr.customer\_id**

**, cr.contact\_info\_type\_id**

**, cr.contact\_info**

**, ca.id AS call\_attempt\_id**

**, ca.record\_id**

**, ca.created\_at AS call\_attempted\_at**

**, ca.call\_result\_id**

**, rs.record\_status**

**/\* to add a new 'bad code', append to the in-list \*/**

**, (CASE WHEN LOWER(rs.record\_status) IN ( 'stale', 'busy', 'fax detected', 'no answer', 'sit detected', 'sit nc(no circuit)', 'sit ic(intercept)', 'sit ro(reorder)', 'sit unknown call state', 'sit vc(vacant code)')**

**THEN 'false'**

**ELSE 'true'**

**END)::boolean AS is\_good\_code**

**/\* for each bad code, you can configure the minimum quantity of occurrences desired, here ... \*/**

**, (CASE WHEN LOWER(rs.record\_status) = 'stale' THEN 10**

**WHEN LOWER(rs.record\_status) = 'busy' THEN 10**

**WHEN LOWER(rs.record\_status) = 'fax detected' THEN 10**

**WHEN LOWER(rs.record\_status) = 'no answer' THEN 10**

**WHEN LOWER(rs.record\_status) = 'sit detected' THEN 10**

**WHEN LOWER(rs.record\_status) = 'sit nc(no circuit)' THEN 10**

**WHEN LOWER(rs.record\_status) = 'sit ic(intercept)' THEN 10**

**WHEN LOWER(rs.record\_status) = 'sit ro(reorder)' THEN 10**

**WHEN LOWER(rs.record\_status) = 'sit unknown call state' THEN 10**

**WHEN LOWER(rs.record\_status) = 'sit vc(vacant code)' THEN 10**

**ELSE 0**

**END) AS rule\_quantity**

**/\* for each bad code, you can configure the number of days back to require the occurrences to exist, here ... \*/**

**, (CASE WHEN LOWER(rs.record\_status) = 'stale' THEN 60**

**WHEN LOWER(rs.record\_status) = 'busy' THEN 60**

**WHEN LOWER(rs.record\_status) = 'fax detected' THEN 60**

**WHEN LOWER(rs.record\_status) = 'no answer' THEN 60**

**WHEN LOWER(rs.record\_status) = 'sit detected' THEN 60**

**WHEN LOWER(rs.record\_status) = 'sit nc(no circuit)' THEN 60**

**WHEN LOWER(rs.record\_status) = 'sit ic(intercept)' THEN 60**

**WHEN LOWER(rs.record\_status) = 'sit ro(reorder)' THEN 60**

**WHEN LOWER(rs.record\_status) = 'sit unknown call state' THEN 60**

**WHEN LOWER(rs.record\_status) = 'sit vc(vacant code)' THEN 60**

**ELSE 0**

**END) AS rule\_period**

**FROM genesys.campaign\_records cr**

**INNER JOIN genesys.call\_attempts ca ON cr.id = ca.record\_id**

**AND ca.created\_at > NOW() - INTERVAL '60 DAYS'**

**LEFT OUTER JOIN genesys.record\_statuses rs ON ca.call\_result\_id = rs.id**

**)**

**SELECT \***

**FROM**

**( SELECT l.customer\_id**

**, l.contact\_info\_type\_id**

**, l.contact\_info**

**, l.call\_attempted\_at**

**, l.call\_result\_id**

**, l.record\_status**

**, l.is\_good\_code**

**, l.rule\_quantity**

**, l.rule\_period**

**/\* subtotal call\_attempts for this customer and contact type and contact # \*/**

**, count(l.call\_attempt\_id) OVER (PARTITION BY**

**l.customer\_id, l.contact\_info\_type\_id, l.contact\_info) AS total\_attempts**

**/\* number each (good and bad) call attempt by customer and contact type,**

**ordered by descending call time, so most recent attempts sort to top \*/**

**, row\_number() OVER (PARTITION BY**

**l.customer\_id, l.contact\_info\_type\_id, l.contact\_info**

**ORDER BY l.customer\_id, l.contact\_info\_type\_id, l.contact\_info,**

**l.call\_attempted\_at DESC) as contact\_type\_rownum**

**/\* number each call result by customer, contact type and call result**

**ordered by call time descending, so that every different result gets a sequence number \*/**

**, row\_number() OVER (PARTITION BY**

**l.customer\_id, l.contact\_info\_type\_id, l.contact\_info, l.call\_result\_id**

**ORDER BY l.customer\_id, l.contact\_info\_type\_id, l.contact\_info,**

**l.call\_attempted\_at DESC) as result\_rownum**

**FROM record\_status\_window l**

**ORDER BY customer\_id, contact\_info\_type\_id, contact\_info, call\_attempted\_at DESC**

**) AS calc**

**INNER JOIN genesys.phone\_types pt ON pt.id = calc.contact\_info\_type\_id**

**WHERE total\_attempts >= 10 /\* include phone numbers that were attempted at least 10 times \*/**

**AND NOT is\_good\_code /\* include the 'bad' codes \*/**

**AND result\_rownum = rule\_quantity /\* include rows meeting minimum quantity rule of occurrence \*/**

**AND contact\_type\_rownum = rule\_quantity /\* include rows meeting min qty same code occurrences \*/**

**AND call\_attempted\_at >= now()- (rule\_period ||' days')::interval /\* include the calls where**

**the \_x\_th occurrence call time is within timeframe of days defined for the bad code \*/**

**ORDER BY customer\_id, contact\_info\_type\_id, contact\_info, call\_attempted\_at DESC**

**;**

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## Explain Plan

**Nested Loop (cost=3327966.91..3351987.98 rows=1 width=157) (actual time=92290.710..92527.794 rows=3709 loops=1)**

**Join Filter: (calc.contact\_info\_type\_id = pt.id)**

**CTE record\_status\_window**

**-> Hash Left Join (cost=2600705.74..3040378.31 rows=600499 width=51) (actual time=50834.653 ..77585.556 rows=1105538 loops=1)**

**Hash Cond: (ca.call\_result\_id = rs.id)**

**-> Hash Join (cost=2600703.52..2960059.35 rows=600499 width=38) (actual time=50834.409 ..68247.829 rows=1105538 loops=1)**

**Hash Cond: (ca.record\_id = cr.id)**

**-> Index Scan using call\_attempts\_\_created\_at on call\_attempts ca (cost=0.00..25603.65 rows=600499 width=18) (actual time=15.752..2099.666 rows=1105538 loops=1)**

**Index Cond: (created\_at > (now() - '60 days'::interval))**

**-> Hash (cost=1713414.12..1713414.12 rows=48328912 width=24) (actual time=50785.215 ..50785.215 rows=51349107 loops=1)**

**Buckets: 2097152 Batches: 4 Memory Usage: 752407kB**

**-> Seq Scan on campaign\_records cr (cost=0.00..1713414.12 rows=48328912 width=24) (actual time=0.085..32222.028 rows=51349107 loops=1)**

**-> Hash (cost=1.54..1.54 rows=54 width=15) (actual time=0.052..0.052 rows=54 loops=1)**

**Buckets: 1024 Batches: 1 Memory Usage: 3kB**

**-> Seq Scan on record\_statuses rs (cost=0.00..1.54 rows=54 width=15) (actual time=0.032..0.039 rows=54 loops=1)**

**-> Subquery Scan on calc (cost=287588.61..311608.57 rows=1 width=115) (actual time=92274.131 ..92500.646 rows=3709 loops=1)**

**Filter: ((NOT calc.is\_good\_code) AND (calc.total\_attempts >= 10) AND (calc.result\_rownum = calc.rule\_quantity) AND (calc.rule\_quantity = calc.contact\_type\_rownum) AND (calc.call\_attempted\_at >= (now() - (((calc.rule\_period)::text || ' days'::text))::interval)))**

**-> Sort (cost=287588.61..289089.85 rows=600499 width=95) (actual time=92274.022..92345.472 rows=1105538 loops=1)**

**Sort Key: l.customer\_id, l.contact\_info\_type\_id, l.contact\_info, l.call\_attempted\_at**

**Sort Method: quicksort Memory: 204619kB**

**-> WindowAgg (cost=213439.58..229953.31 rows=600499 width=95) (actual time=88489.178 ..89180.660 rows=1105538 loops=1)**

**-> Sort (cost=213439.58..214940.83 rows=600499 width=95) (actual time=88489.168 ..88566.617 rows=1105538 loops=1)**

**Sort Key: l.customer\_id, l.contact\_info\_type\_id, l.contact\_info, l.call\_result\_id, l.call\_attempted\_at**

**Sort Method: quicksort Memory: 204619kB**

**-> WindowAgg (cost=140791.81..155804.28 rows=600499 width=95) (actual time=84489.140..85180.682 rows=1105538 loops=1)**

**-> Sort (cost=140791.81..142293.06 rows=600499 width=95) (actual time=84489.124..84583.647 rows=1105538 loops=1)**

**Sort Key: l.customer\_id, l.contact\_info\_type\_id, l.contact\_info, l.call\_attempted\_at**

**Sort Method: quicksort Memory: 204619kB**

**-> WindowAgg (cost=69645.28..83156.51 rows=600499 width=95) (actual time=80249.804..81424.942 rows=1105538 loops=1)**

**-> Sort (cost=69645.28..71146.53 rows=600499 width=95) (actual time=80249.779..80547.524 rows=1105538 loops=1)**

**Sort Key: l.customer\_id, l.contact\_info\_type\_id, l.contact\_info**

**Sort Method: quicksort Memory: 204619kB**

**-> CTE Scan on record\_status\_window l (cost=0.00 ..12009.98 rows=600499 width=95) (actual time=50834.658..78471.122 rows=1105538 loops=1)**

**-> Seq Scan on phone\_types pt (cost=0.00..1.05 rows=5 width=42) (actual time=0.006..0.006 rows=5 loops=3709)**

**Total runtime: 92624.339 ms**

**(35 rows)**

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