## 2.3 C300 Capacity and Performance

### 2.3.1 C300 Configuration Options

| C300 Configuration Options | | |
|---|---|---|
| | **50 ms CEE** | **20 ms CEE[4]** |
| Control Networks Supported | FTE only [1] | FTE only [1] |
| Supported C300 Models [6, 7] | CC-PCNT01<br>CC-PCNT02 | CC-PCNT01<br>CC-PCNT02 |
| Device Index Configuration | Between 1 and 510 | Between 1 and 510 |
| IOTA Size | 6 inches | 6 inches |
| Number of I/O Links Supported | 2 | 2 |
| I/O Link Speeds Available | 375 Kbaud (PMIO Link)<br>750 Kbaud (Series C IO Link) | 750 Kbaud (Series C IO Link)<br>***375 Kbaud (PMIO Link) is not supported*** |
| Base Execution Periods Supported | 50 ms | 20 ms (optional)[4] |
| Redundancy Supported | Yes | Yes |
| Remote – Non-Series C I/O Supported | Yes – PM I/O or Series A I/O [3] | No – Only Series C I/O supported with limited capacities. |
| I/O Module Execution Period | 50 ms | 20 ms |
| Configurable Values for CM/SCM/RCM Execution Periods [5] | 50, 100, 200, 500, 1000, 2000, 5000, 10000, 20000, 300000, 60000 ms. | 20, 40, 80, 200, 400, 800 ms.<br>*CMs Only – SCM/RCM/MR not supported* |
| Configurable Values of Peer Update Rates (period).<br>*Defines the period at which data is updated for all 'pull/get' requests for peer data required by all blocks within a CEE.* | 100, 200, 500, 1000 ms. | 100, 200, 500, 1000 ms. |
| C300 Time Source | SNTP, PTPv2 | SNTP, PTPv2 |
| SNTP Update Period | 1 minute | 1 minute |
| GPS Time Support[2] | No | No |
| PTP Update Period | 30 seconds | 30 seconds |

Note 1 – Currently, every C300 must be connected to a Control Firewall

Note 2 – A GPS connector is available on the IOTA, but it is not supported until a future release.

Note 3 –C300 20ms supports only Series C I/O.

Note 4 – Requires separately loaded Firmware Version and License. C300 20 ms CEE may ONLY be used for Honeywell Turbine Control Solution (TMCS) in R410.1.

Note 5- Slower execution periods are supported for Profit Controller Block only

Note 6- C300 controller CC-PCNT02 replaces CC-PCNT01 for new installations and field replacements.

Note 7- C300 controller must use CC-PCNT02 model with extended functionality firmware image for C300 extended functionalities (EIM, Profit Controller)

### 2.3.2 C300 Redundancy

| C300 Redundancy Specifications | | |
|---|---|---|
| | **50 ms CEE** | **20 ms CEE[4]** |
| C300 Function Block Redundancy Configuration Selection: | "Module is Redundant" | "Module is Redundant" |
| Number of IOTAs used for Redundant C300 | 2 | 2 |
| Redundant Device Index Configuration | Device Index = n, where<br>n is an odd value<br>Partner Device Index = n+1 | Device Index = n, where<br>n is an odd value<br>Partner Device Index = n+1 |
| Redundancy Cable Medium | Ethernet STP | Ethernet STP |
| Redundancy Cable Lengths | 36, 48, 60, 84 inches | 36, 48, 60, 84 inches |
| Control Processing Switchover Interruption Time[1,2] | 500 ms | 200 ms |
| Initial Synchronization Time (from Sync Start to Completion) | 240 seconds | 240 seconds |
| Maximum Elapsed Time Between Commanded Switchover and Completion of Initial Synchronization | 500 seconds | 500 seconds |
| Maximum Elapsed Time Between Switchover Due to Power Cycle of the Primary and Completion of Initial Synchronization | 500 seconds | 500 seconds |
| Maximum OPM Control Freeze time | 20 seconds | 20 seconds |
| Note 1 – Dual I/O Link failures may cause longer interruption times in the order of several seconds.<br>Note 2- With Direct or Through EIM- C300-EtherNet/IP™ configuration, control processing switchover interruption time may go up to 2.5 seconds during C300 Switchover. | | |

### 2.3.3 C300 Communication Performance

| C300 Communications Performance | | |
|---|---|---|
| ***Definitions:***<br>*PPS = Average Parameters Per Second*<br>*PPM = Average Parameters Per Minute*<br>*EPS = Average Array Elements Per Second* | **C300** | |
| **Overall Data Access Performance** | **50 ms CEE** | **20 ms CEE** |
| Maximum Total Parameter Access Response Rate<br>*(Includes all Server Data Requests, Console Station Data Requests, and peer communications including other ACEs, C200s, C300s, SIM-C200s, SIM-C300s, SIM-ACEs, and FIMs)* [13] | 2500 PPS | 700 PPS |
| **Display Data Access Capacity** | **50 ms CEE** | **20 ms CEE** |

| C300 Communications Performance | | |
|---|---|---|
| Maximum Total Subscribed Parameters per C300<br>*(Includes all Server Data Requests + Console Station Data Requests))* [13] | 4000 | 4000 |
| **Request/Response Data Access Performance** | **50 ms CEE** | **20 ms CEE** |
| Max Request/Response Parameter Access Rate<br>*(Includes all Slow Server Data Requests, e.g. Greater than 10 sec OPC data, Slow History, Data Writes, etc.)* | 3000 PPM Read<br>1500 PPM Write | 750 PPM Read<br>375 PPM Write |
| **Peer-to-Peer Performance** | **50 ms CEE** | **20 ms CEE** |
| Maximum Initiator Pull/Get Subscribe Rate to all target nodes. (incoming data) [7] | 1000 PPS | 250 PPS |
| Maximum Target Publish Rate to Pull/Get Subscriptions from all initiator nodes. (outgoing data) [8] | 1000 PPS | 250 PPS |
| **Peer-to-Peer Subscription Capacity / Update Rate** | **50 ms CEE** | **20 ms CEE** |
| Total Maximum C300 peer capacity per update rate choices | 100 @ 100 ms<br>200 @ 200 ms<br>500 @ 500 ms<br>1000 @ 1 sec | 25@ 100 ms<br>50 @ 200 ms<br>125 @ 500 ms<br>250 @ 1 sec |
| Maximum C300 peer capacity for non-CEE parameter references<br>(Includes peer references to SM, PMD FC, EHPM, and Server Point parameters and is included in the total limit for the row above) | 500 parameters | NA |
| **Push/Store Request Capacity** | **50 ms CEE** | **20 ms CEE** |
| Maximum number of Push/Store Requests to all target nodes and local IOLink EEs, in progress simultaneously | 800 | 800 |
| Maximum number of Push/Store Requests initiated in a single CEE execution cycle | 200 | 200 |
| **Push/Store Request Performance** | **50 ms CEE** | **20 ms CEE** |
| Maximum Push/Store Request Rate to all target nodes and local IOLink EEs[2] | 50 PPS | 12 PPS |
| Maximum Response Rate to Push/Store Requests from all initiator nodes[2] | 50 PPS | 12 PPS |
| **Whole Array Capacity** | **50 ms CEE** | **20 ms CEE** |
| Max Array Size for Whole Array Transfer | 8K bytes<br>(1000 float64s) | 8K bytes<br>(1000 float64s) |
| Initiator's Max Whole Array Connection References | 25 | 25 |
| Responder's Max Whole Array Connections (from all peers using pub-sub) | 15 | 15 |
| Initiator's Max Whole Array Connection References (to all peers using request/response) | 5 | 5 |

| C300 Communications Performance | | |
|---|---|---|
| Responder's Max Whole Array Connections (to all peers using request/response) | 5 | 5 |
| **Peer-Peer Whole Array Transfer Performance** | **50 ms CEE** | **20 ms CEE** |
| Max Initiator Whole Array Request Rate (to all peers) | 2500 EPS | 600 EPS |
| Max Target Node Response Rate to Whole Array Pull/Get Requests<br>*(from all initiator nodes)* | 1500 EPS | 350 EPS |
| Initiator Whole Array Push/Store Rate | 1000 EPS | 250 EPS |
| Target Node Whole Array Response Rate to Push/Store Requests<br>*(from all initiator nodes)* | 1000 EPS | 250 EPS |
| **Peer-to-Peer Capacity** | **50 ms CEE** | **20 ms CEE** |
| Peer Connection Units (PCUs) [2, 9]<br>*(Number of remote CEEs that this C300 can initiate a peer connection with)* | 30[3]<br>*(Includes total of all other UOC/vUOC, ACEs, SIM-ACEs, C200s, C200Es, C300s, LIOMs, SIM-CXXXs, IOLIMs, Server Peers, SMs, WDMs, and/or Primary FIMs)* | 5[3]<br>*(Includes total of other UOC/vUOC,ACEs, SIM-ACEs, C200s, C200Es, C300s, SIM-C200s, SIM-C200Es, SIM-C300s)* |
| **Peer-to-Peer Capacity using Exchange FB** | **50 ms CEE** | **20 ms CEE** |
| Maximum Number of REQUEST blocks per C300 | 32 | Not Supported |
| Maximum Number of RESPONSE blocks per C300 | 32 | Not Supported |
| Maximum Number of Target Devices for REQUEST blocks per C300 [4] | 8 | Not Supported |
| Maximum Number of Remote Initiating Devices for RESPONSE block data per C300 | 8 | Not Supported |
| Maximum Request Rate using Exchange blocks to all target nodes[11] | 500 PPS | Not Supported |
| Maximum Response Rate to Exchange Requests from all initiator nodes [11] | 500 PPS | Not Supported |
| **PCDI Capacity and Performance** | **50 ms CEE** | **20 ms CEE** |
| Maximum Number of Modbus TCP devices [5,10]<br>(represented by PCDI Master blocks) | 8 | 3 |
| Maximum Number of Serial Modbus Devices per Gateway | 16 | 3 |
| Maximum Number of Serial Modbus Devices per C300<br>(8 * 16 of above two specifications) | 128 | 3 |
| Maximum Number of PCDI Request blocks assigned to a PCDI Master block | 64 | 8 |

| C300 Communications Performance | | |
|---|---|---|
| Maximum Number of PCDI Request block messages per second – includes both Reads and Write [6] (maximum size 256 byte messages assumed) | 250 | 30 |
| **Process Data Access (PDA) Capacity and Performance** | **50 ms CEE** | **20 ms CEE** |
| Maximum number of PGM PDA connections per C300 | 4 | Not Supported |
| Maximum number of Decentralized Periphery (DP) networks per C300 | 8 | Not Supported |
| Maximum number of PIOMB blocks per C300 Controller [12] | 640 Decentralized Periphery (DP) devices | Not Supported |
| Maximum number of Process Data Collection (PDC) messages per second – includes both Reads and Write (maximum size 256 byte messages assumed) | 2500 PDC messages per second | |

Note 2 – Exchange Peer-Peer does not count against this limit.

Note 3 – There are 31 connections reserved for Peer-Peer in the C300. 1 connection is reserved for Internal C300 use-only, leaving 30 connections available for User P2P configurations.

Note 4 – 1 DHRIO Module only counts as 1 Target Device even when communicating with multiple PLCs on either of the two DH+ networks per DHRIO.

Note 5 – Redundant devices that use two PCDI Master blocks count as only one device. Secondary test messages do count in the messages per second for C300 performance estimation.

Note 6 – PCDI impact on C300 performance can be estimated with the C300 Performance Model worksheet (see section 2.3.4); important factors are number of PCDI Master blocks, number of PCDI Request block messages per second, and message data size.

Note 7 – Incoming peer data benefits from the RBE (Report by Exception) comparisons done at the data source, so only changed parameters contribute to the incoming PPS load.

Note 8 – Outgoing peer data capacity is defined/measured before the RBE (Report by Exception) comparisons are done, so all parameters requested as peer data contribute to the outgoing PPS load, whether they are changing or not and sent over the network or not.

Note 9 – CDA Peer connection to a redundant SM consumes 2 PCUs.

Note 10 – PCDI Licenses per Server is limited to 256 total PCDI Device Blocks for all C300s and ACEs combined.

Note 11 - Float, integer, or BOOLEAN values configured constitute one parameter

Note 12- Number of PIOMB blocks that can be instantiated or loaded to the C300 is limited by the C300 CEE memory, and CPU.

Note 13- Overlap between controller CDA peer and display responder requests was removed for C300v2 and C300E in R510 release to prevent loss of peer communication during high display subscriptions from process operational displays.