Release Note

Megaplex-4100/4104

Version 4.0

May 19, 2013

Status: BETA

Carrier-Class, High-Capacity Multiservice Access Concentrators

Part of the AXCESS+ portfolio, Megaplex-4100 and Megaplex-4104 transport legacy and next-generation services over any infrastructure. Megaplex-4100/4104 functions as a carrier-class TDM and Ethernet aggregator, as well as a high capacity DS0 cross connect and next generation multiservice access node.

This robust multiservice access node provides carrier-class service reliability that ensures continuous availability and sub-50ms restoration in the event of network outages through system redundancy options, link and path protection schemes and enhanced support for diverse ring topologies.

Version 4.00 introduces new features, such as:

- Distance Teleprotection I/O module (TP)
- Carrier Ethernet
    - Traffic Management
    - Ethernet OAM
    - Ethernet PM
    - Bridging and VLAN editing
- Carrier grade Ethernet – Ethernet Ring Protection Switching (ITU-T G.8032)
- Ethernet I/O module (M-ETH)
- Complete EFM bonding solution with remote power feeding

RAD's AXCESS+ multiservice access and First Mile solutions portfolio offers a wide variety of narrowband and broadband data rates over fiber, copper and wireless infrastructure and a smooth migration path from legacy to Next Generation packet switched networking and services.

Market Segments and Typical Applications

Megaplex-4100/4104 provides a perfect fit for Power Utilities and Transportation, as well as Service Providers Migration Hybrid Access, both solutions requiring an efficient way to transport and provision multiple legacy and next-generation services over their high capacity pipes. Its ability to handle a broad range of Ethernet, data and voice services, as well as a large variety of network technologies in a single compact managed node, makes Megaplex-4100/4104 an ideal core/edge solution for carriers and service providers.

Various users can benefit from this solution:

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- SDH/SONET customers who need to continue using their network while maximizing bandwidth utilization
- Subscribers with hybrid Ethernet and TDM services
- Subscribers looking for a future-proof migration path to IP connectivity
- Dual network owners using SDH/SONET for voice and packet for data.

Megaplex-4100/4104 typical applications include the following:

- Aggregation access solution for carriers and service providers, for transporting TDM and Ethernet traffic over copper and fiber, towards SDH/SONET or packet-switched networks (see *Figure 1*).

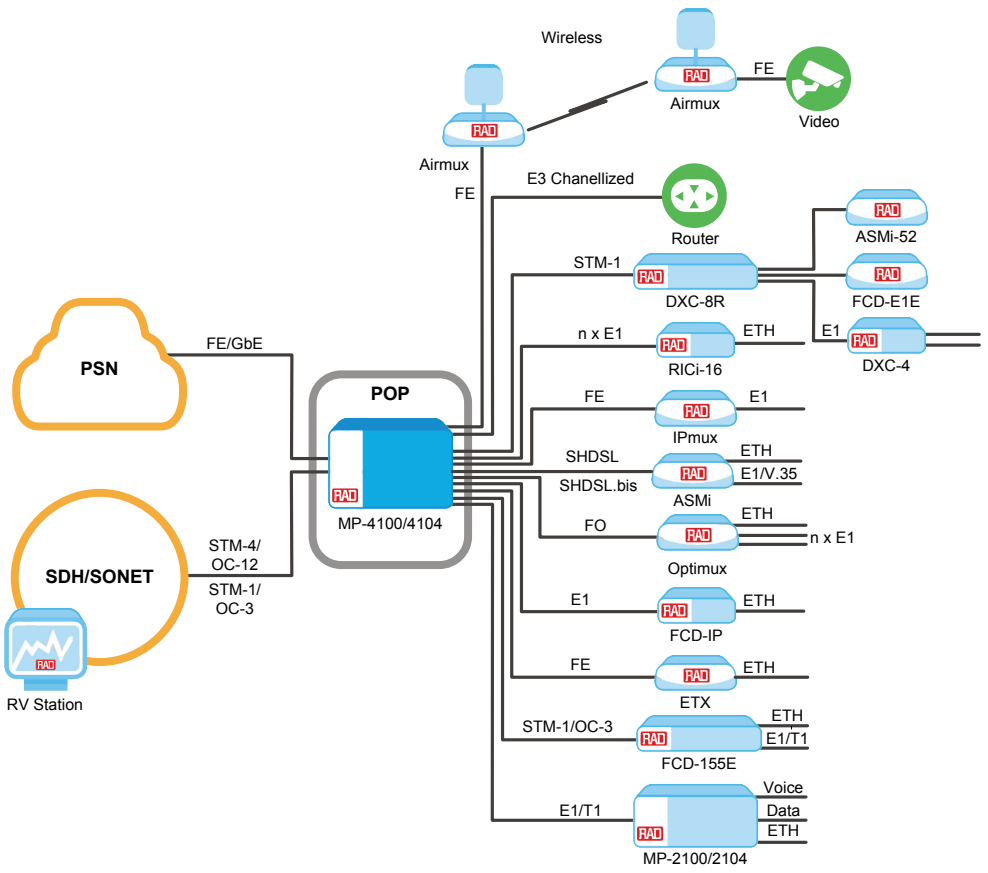

Figure 1. Megaplex-4100 as a Central Site Aggregator for different RAD CPEs and as an Ethernet and TDM Aggregator for SDH/SONET and PSN

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- Multiservice access over SDH/SONET networks by a single box solution for U&T companies (see *Figure 2*).

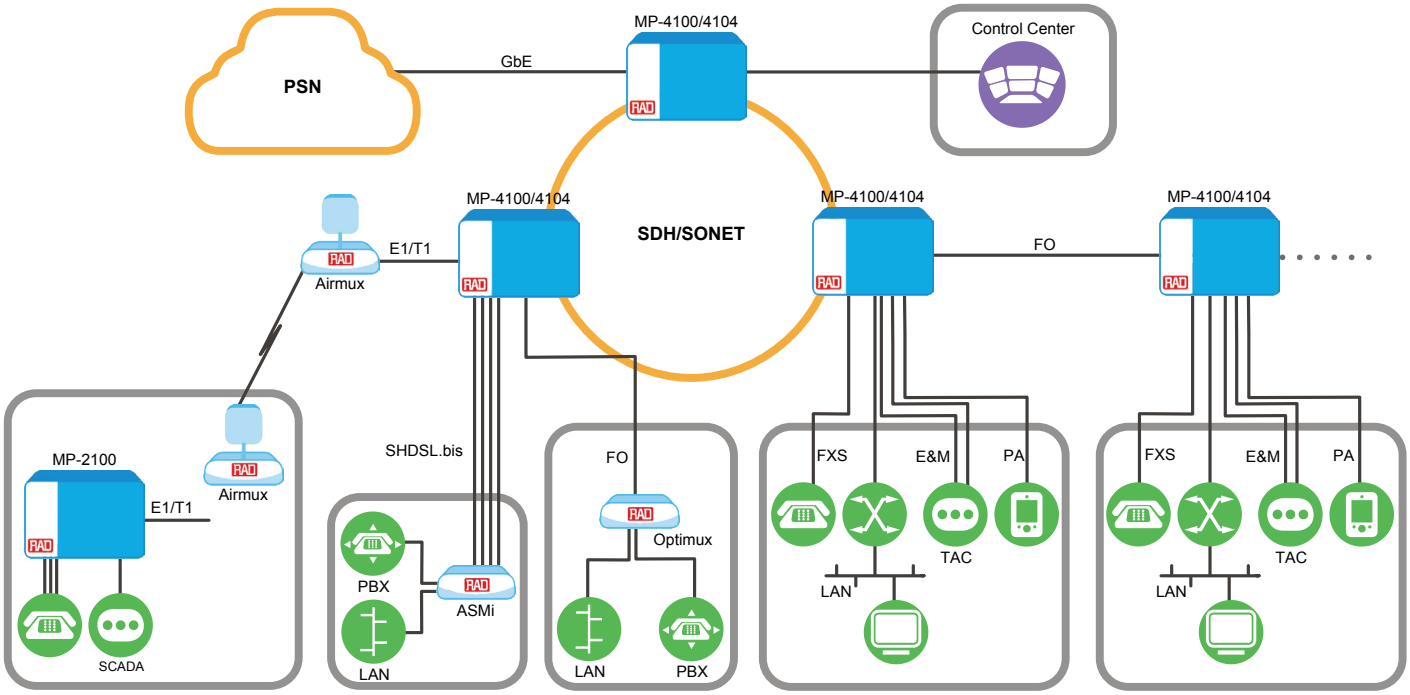

Figure 2. Megaplex-4100/4104 as Multiservice Platform with Diverged Interfaces and Access Topologies for U&T Market Segment

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Main Features

Features	Description	Customer Benefits
New: **CMD In/Out Teleprotection module (TP)**	- Input control voltage: 110 VDC or 220 VDC - 4 input commands - 8 output commands (4 primary, 4 secondary) - Event time stamping based on IEC-60870-5-104 - Event reporting: commands, automation, end-to-end delay, violations, bit error rate	• Robust and reliable communication channel through multiple levels of protection • Single box solution with direct end-to-end relay transport • Enhancing RAD's teleprotection solution
New: **Traffic Management**	- Traffic management functionality includes classification, metering, marking, policing, queuing, scheduling and shaping - Metering, marking and policing are using trTCM marking based on the dual leaky bucket algorithm - Queueing towards the CL.2/A GbE ports supports hierarchical scheduling - Scheduling supports configurable strict priority and WFQ	• Increased revenues using 'intelligent' over-subscription • Maintaining customer satisfaction with differentiated services • Reduce churn by ensuring SLA
New: **Ethernet OAM**	- Hardware-based OAM processing - Complies with IEEE 802.1ag Ethernet service OAM continuity check (CCM), loopback and link trace - Complies with IEEE 802.3-2005 (formerly 802.3ah) Ethernet link OAM discovery, link monitoring, remote failure indication and remote loopback	• Avoid expensive truck rolls to locate and contain faults thereby facilitating reduction of maintenance costs • Scalable, flow-level monitoring, where dozens of OAM sessions can be monitored concurrently • Immediate detection of loss of continuity (LOC), ensuring rapid service repair • Highly accurate frame loss measurements with live traffic testing • Loopback testing at line rate

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Features	Description	Customer Benefits
New: **Ethernet PM**	- Supports PM for Frame-Loss, Frame-Delay (2-way), Frame-Delay Variation and availability - Complies with ITU-T Y.1731 - Traps upon SLA objectives crossing (threshold-crossing alarms)	• Enables identification of problems before they escalate so that users are not impacted by network defects • Packaged with Ethernet traffic management and OAM - allows the operators to offer binding SLAs and generate new revenues from rate- and performance-guaranteed service packages that are tailored to the specific needs of their customers • On-going monitoring of critical service level agreement (SLA) attributes.
New: **Ethernet Ring Protection Switching (ERPS)**	- Complies with ITU-T G.8032 - Resilient topology with sub-50ms protection switching similar to SDH/SONET rings	• Migration path enabler • Higher network availability through improved network resiliency • 3rd party interoperability • Supports topology of shared LAN over SDH/SONET with optional bandwidth optimization
New: **Bridging (E-LAN, E-TREE services)**	- Frame forwarding based on VLAN, VLAN+MAC or MAC. - The bridge caters for Ethernet traffic from Ethernet ports on I/O modules as well as Ethernet traffic over SHDSL, fiber optic and other CPEs connected to the Megaplex device - Sophisticated VLAN editing functionality - System-wide single bridge connectivity	• Opens up new revenue opportunities with E-LAN and E-TREE services • Extends Ethernet services over various media types. • Reduced TCO – No need for an external switch • Integrated management

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New: **LACP**	- Fail-over when a link fails and there is (for example) a media converter between the devices which means that the peer will not see the link down. - The device can confirm that the configuration at the other end can handle link aggregation, preventing cabling or configuration mistake - LACP is part of LAG implementation per IEEE 802.1AX-2008	• Higher service availability
New: **Ethernet I/O module**	- 8 copper (RJ-45; 10/100/1000) or fiber (SFP; 100/1000) ports - Local switching	• Enhancing the Megpalex multiservice access node capabilities by adding a dedicated Ethernet I/O • Reduced TCO – no need for an external switch • Integrated management
New: **Ethernet/DS0 Common Logic Module**	- Price-optimized common logic module without SDH/SONET ports for Ethernet and DS0 cross-connect applications	• Improved price/performance solution for Carrier Ethernet functionality and DS0 cross-connect applications
New: **S-RPT Integration**	- Fully regenerates the received SHDSL signal - Enables EFM encapsulated data regeneration - Optionally - Power is supplied via SHDSL (remote power feeding)	• Extends the range between SHDSL equipment • Longer distances and variable data rates • Remote power feeding via SHDSL: ▪ Eliminates the need for the local power source ▪ Lower construction expenses ▪ Uninterruptable power supply
New: **SFTP**	- Secure access through encryption, including connection setup, to file downloads/uploads, such as software download and database backup	• Hardening of the Megaplex cyber security making the management data secure and the management session private

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Features	Description	Customer Benefits
New: **SNTP**	- Receiving date and time from an NTP server. - Complies with IETF RFC 5905	• All nodes are locked to the same date-and-time source. • All alarms and time stamped information in the network are synchronised to the same date-and-time source. • Improves the timekeeping quality of the network by using redundant reference sources and diverse paths for time distribution
Smooth migration from TDM to PSN	- Multi-standard TDM Pseudowire: TDMoIP, CESoPSN, SAToP	• Balanced migration path to packet switched networks ensuring TDM service quality • Standards-based, enhanced pseudowire performance with minimal processing delay
Carrier class service reliability	- Hot-swappable modules, Common Logic and power supply redundancy - Link and hardware redundancy (GbE, SDH/SONET, E1/T1, Fiber, xDSL) - Path protection for E1/T1, VC12, VT1.5 - Ring support: E1/T1, Ethernet over xDSL, TDM over Fiber, Ethernet over fiber	• Minimum service downtime • Carrier-class service reliability with no single point of failure
Central solution for CPE devices	- Interoperability with MAP and First Mile products: MP-210x, ASMi, and Optimux; as well as ETX, RICi, IPmux DXC, and FCD	• Complete solution with unified management platform

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Compatibility

SW/HW Compatibility

The new CL.2 SW version (4.00.xx) is backward compatible with all previous versions of I/O modules.

The following new modules are supported starting from the HW revisions in the table below:

- CMD In/Out Teleprotection module (TP)
- M-ETH Ethernet I/O module

The following new features are supported only with the CL.2/A module assembly:

- Traffic management
- Ethernet OAM
- Ethernet PM
- Ethernet Ring Protection Switching
- Bridging and VLAN editing
- LACP
- Ethernet/DS0 Common Logic Module.

The following CL and I/O modules have been upgraded in the current version. For a complete list of the supported modules and their software versions please contact RAD Technical Support.

Module	HW Rev	SW Rev	Current CSL
System Modules			
CL.2	0.1	4.00.01	C
CL.2/A	1.00	4.00.01	B
I/O Modules			
TP	0	1.00.5	B
M-ETH	0	1.00A2	A

For details on upgrading the software, refer to the Software Upgrade and License Key Activation sections of the Installation and Operation manual.

Management Compatibility

This version is compatible with the RADview-EMS ver 3.4 (Jar version 03.10.01) network management application.

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Interoperability

Megaplex-4100/4104 is interoperable with Megaplex-2100/2104, Megaplex-4100 ver 2.x/3.x, ASMi, Optimux, ETX, RICi, IPMUX, DXC and FCD devices, and can interwork with third-party devices or networks, complying with PDH/SDH/SONET, Ethernet and SHDSL standards.

Limitations

Subject	Description	Status
Ethernet	Clearing MAC table is possible per VLAN only.	Clearing MAC table per entire bridge will be available in the ver 4.00 GA release TRS 13645
	ERPS can be configured between GBE.A/1 and GBE.B/1 only. Other configurations are not supported.	Will be solved in the ver 4.00 GA release TRS 13649
	The bridge functionality does not work with Ethernet group protection.	TRS 13650
	The CL bridge supports up to 40 ports providing E-LAN services or 64 ports that are part of E-TREE services.	Support of up to 80 ports providing E-LAN services will be available in the ver 4.00 GA release. TRS 13651
	Only 100 first entries of the MAC address table are displayed.	TRS 13652
	Ethernet BERT is not supported on CL.2/A assemblies.	Will be solved in the ver 4.00 GA release TRS 13653
	Up to 5 different VLAN editing functions can be configured per E-LAN instead of 10 (same VLAN editing function can be applied to multiple flows).	TRS 13654

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Subject	Description	Status
QoS	MEP is not supported on flows terminating on bridge ports	TRS 13655
	After changing the "ethertype" value for a port, the MEP enters into the "fail" status and the Ethernet OAM&P functionality stops working.	Workaround: Reconfigure the relevant port and flows TRS 13656
Clock Domain	When the SDH/SONET clock is used, all the DS0 cross-connect services must be locked to this clock.	Workaround: Use transparent E1/T1 over SDH/SONET for clock transparency. TRS 11739
	Connecting/disconnecting the station clock sometimes causes data errors in services	TRS 13469
	The following trap variables are missing in the trap for "clockDomainSystemSrcClockChange " alarm: • 2863.ifAlias • rad.csmSourceQL • rad.csmDomainLastSystemSrcClkSwitchReason	TRS 13475
	Stopping to transmit SSM messages to the Megaplex station port has no effect on the station clock status: it still displays the last quality value	TRS 13470
	Transmitting an SSM message to the Megaplex station port with "ST4" quality results in displaying "SMC" quality	TRS 13470

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Subject	Description	Status
	SNTP is working with a single server; the CL Module gets stuck if more than one NTP server is defined.	TRS 13657 Workaround: If the Megaplex gets stuck, perform the following: 1. Reset the Megaplex, using the supervision terminal 2. Immediately remove all NTP servers except one. 3. Reset the Megaplex.
SDH/SONET	Path protection on VC-4/STS-3C and VC-3/STS-1 is not supported.	TRS 11761
	When mapping VC-3/STS-1 over SDH/SONET, the first TUG-3 cannot remain free.	Workaround: Always start the VC-3/STS-1 mapping on the first TUG-3. TRS 11784
	Local Loop on the SDH/SONET port level is not supported.	Workaround: Perform data path loop (VC/VT at Low/High order) for transparent E1/T1 service or loop per timeslot for framed E1/T1 service. TRS 11752
	EED response does not work (No RDI is set when reaching the EED threshold)	TRS 12680
	T1-i statistics are not copied to the standby CL module	TRS 13197
	No statistics are collected on T1-i standby link participating in TDM protection group	TRS 13198

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Subject	Description	Status
	When the working CL module is configured as SONET, inserting a new CL module for protection requires configuration steps as described in the workaround.	Workaround: Prior to configuring the protection CL, do the following: 1. Retreive the "startup-config" file. 2. Add the protection CL to the retreived "startup-config" script. 3. Copy the new script to the database. 4. Save the changes. Reboot the device. TRS 13471
Management	Megaplex cannot be managed over VCG. An error message should be displayed when the user tries to set a management VLAN via VCG.	Workaround: For SDH/SONET applications, use management over DCC TRS 11755, 12032
	The trap is always sent with the first IP in the manager list (instead of the Megaplex host IP).	TRS 13472
Protection	The ERP (G.8032) protection time might take longer than 50 ms.	Will be solved in the ver 4.00 GA release TRS 13694
Pseudowire	Unframed T1 traffic cannot be transferred over TDM pseudowire.	Workaround: Use framed T1 pseudowire with CESoPSN encapsulation. TRS 11758
M-ETH Module	Bridge functionality is not supported in the module.	TRS 13659 Workaround: For bridging functionality, use the common logic modules (CL.2/A assembly).
MPW-1 Module	In a chassis equipped with CL.2/A assembly, MPW-1 module does not work.	CL.2/A with MPW-1 will be supported in the ver 4.00 GA release TRS 13660
ASMi-54C, ASMi-54C/N Modules	The sw-pack for ASMi-54C/ETH ver. 2.86 fails to be installed. This problem is relevant to MP-4100/4104 with CL redundancy only.	Workaround: Ask RAD for a sw-pack including both ASMi-54C ver. 2.86 and the relevant CL.2 installation software. TRS 12771

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Subject	Description	Status
	E1 CAS over SHDSL does not operate with an odd number of timeslots in ASMi-54C/N Modules.	Workaround: When working with E1 CAS, configure even number of timeslots. TRS 12221
	Rate limitation is not supported in the ASMi-54C/N/E1/ETH module.	Workaround: Set the rate limitation parameter in the CPE or use ASMi-54C module TRS 11787
	In 4W mode, ASMi-54C/ETH modules do not support rates in the range of 17024 kbps to 18432 kbps.	TRS 12677
	In a chassis equipped with CL.2/A assembly, local cross-connect on ASMI-54C/N module between the physical E1 and the E1-I port does not work.	Will be solved in the ver 4.00 GA release TRS 13661
M8E1/M8T1 Modules	HDLC ports of the M8E1, M8T1 and M8SL modules cannot be bound to E1-i/T1-i ports of CL-B.	Workaround: Bind the HDLC ports to the E1-i/T1-i ports of CL-A. TRS 11765
M16E1/M16T1 Modules	In the CL.2/DS0 assembly with Megaplex-4104 chassis occasionally errors are observed on E1/T1s originating from the M16E1/M16T1 module	TRS 13612 Will be solved in the ver 4.00 GA release
RV-EMS	After communication with the unit has been lost and recovered, the DB change flag in Agent view indicates as if the DB was changed.	TRS 12678 Workaround: Perform "Read" operation in RADview.
	"Read"operations from [A] to [E] start at [E.N] (N is the database number: 1...10), but always finish at [E.1]	TRS 13200
	Local loop on VC-12/VT-1.5 for E1-i/T1-i does not work	Workaround: Perform a loop on the relevant E1-i/T1-i port. TRS 13225

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Subject	Description	Status
	When performing "Install sw-pack" action from the Job application, the entire chassis reboots	Workaround: If sub-50 msec traffic hit is required, manually reset the CL modules one by one (before resetting the second CL wait till the first one is up and the sync process is completed) TRS 13201
	Classification profile can be configured with only up to 5 VLANs/VLAN ranges (up to 10 VLANs/VLAN ranges are supported by the CLI).	Workaround: When more than 5 VLANs/VLAN ranges are needed, use the CLI. TRS 13665
	S-RPT/EFM power-feed forwarding cannot be configured via RV.	Workaround: configure this feature via CLI. Will be solved in the next release TRS 13695
SW Upgrade	Occasionally, upgrade from ver 3.07 to ver 4.0 with CL.2/A does not succeed.	Workaround: Test the application after the upgrade in a lab prior to field deployment. TRS 13667
	In case that Bridge is configured in Phase 3.0, the database is not loaded.	Workaround: perform the following procedure (before or after the upgrade): 1. Retrieve the configuration 2. Remove the SVI port from the configuration 3. Reload the database to the Megaplex TRS 13668

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Solved Limitations

Subject	Description	Comment
Protection	After resetting the standby CL module, its part of the LAG traffic is dropped until it resumes operation (approximately 30 seconds). This limitation applies only to CL reset operation. In case of CL extraction or link failure the traffic interruption is sub-50 ms.	TRS 13579
SDH/SONET	T1 signaling on T1-i ports of CL-B was not processed for TS21 – TS24	TRS 13611
	Ethernet over E1/T1 in HDLC mode was not supported	Will be solved in the next release TRS 13587
CL Options	CL.2/622GBEA option was not suported with SW release 03.07.74	TRS 13644

The full list of limitations can be found on the eSupport site.

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