

Moving on from open-source ACS

Why, when, and how?



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Introduction: Why Operators Need ACS

Managing telecommunication networks involves an array of processes and software, clearly outlined by the [TM Forum's Enhanced Telecom Operations Map \(eTOM\)](#). This comprehensive framework details the various operational and business processes required to effectively manage and deliver telecommunications services. Within this complex ecosystem, the **Auto Configuration Server (ACS)** plays a small yet crucial role, specifically in the remote management and provisioning of customer premises equipment (CPE).

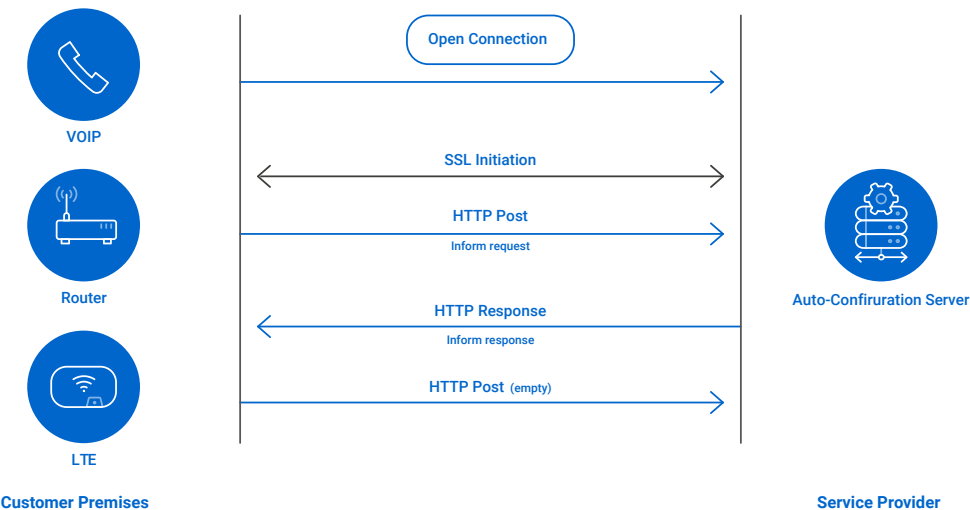


The Role of ACS in Telecom Operations

The ACS is essential for enabling communication service providers (CSPs) to efficiently manage vast networks of devices, such as **modems, routers, and gateways**. By automating the configuration, monitoring, and management of CPEs, ACS solutions help ensure that networks operate smoothly and deliver high-quality service to customers. Key functions of an ACS include:

- ✔ **Remote configuration:** Automatically provisioning and configuring CPEs without the need for manual intervention.

- ✔ **Firmware management:** Updating device firmware remotely to ensure security and functionality.
- ✔ **Diagnostics and monitoring:** Continuously monitoring device performance and diagnosing issues in real-time.
- ✔ **Service activation:** Streamlining the process of activating new services for customers.



While the advantages of implementing an ACS are evident, CSPs must consider various factors when selecting the appropriate solution. During the decision-making process, CPS should take into account:

- ✔ **Scalability:** As the number of connected devices grows, the ACS must be able to scale effectively to manage increased loads without compromising performance.
- ✔ **Security:** Ensuring that all communications between the ACS and CPEs are secure to prevent unauthorized access and data breaches.

- ✔ **Integration:** Seamlessly integrating the ACS with existing network management systems and other operational tools.
- ✔ **Support and maintenance:** Providing continuous support and maintenance to ensure the ACS operates effectively and stays up-to-date with the latest standards and protocols.

Open-Source ACS

Why Service Providers Choose Open-Source Solutions

Open-source ACS solutions are often the first choice for smaller service providers because they are cost-effective and flexible. These solutions usually do not have licensing fees, which is particularly appealing for smaller operators or

those just starting their CPE management journey. In addition, the level of customization that open-source software offers is sufficient for CSPs to tailor the solution to their needs without the restrictions often imposed by proprietary software.

Benefits and Common Problems

Benefits:



Cost-effectiveness:

Open-source ACS solutions require minimal initial financial investment due to the absence of licensing fees, making them an attractive option for CSPs operating on tight budgets.



Flexibility:

The customizable nature of open-source software allows operators to adapt the solution to their needs, which can be crucial for addressing specific operational challenges and integrating with other systems.



Community support:

Many open-source projects benefit from a community of users and developers who contribute to troubleshooting, enhancements, and the development of new features.

Common Problems:

- ✔ **Limited support:** Unlike proprietary solutions, open-source ACS solutions often rely on community forums and have limited (or non-existent) official support, which can pose challenges when complex issues require timely and expert assistance.
- ✔ **Security vulnerabilities:** Open-source software can be more susceptible to security vulnerabilities due to the lack of dedicated security updates and patches. Service providers using open-source solutions must be vigilant in monitoring and addressing potential security risks.
- ✔ **Scalability issues:** As the network grows, open-source ACS solutions may struggle to scale effectively, leading to performance bottlenecks and increased operational complexity.
- ✔ **Maintenance and operational costs:** While the initial cost of open-source software is low, ongoing maintenance and operational costs can be significant. Operators may need to invest in specialized skills and resources to keep the software up-to-date and functioning smoothly.
- ✔ **Compatibility challenges:** Integrating open-source ACS solutions with other systems and technologies can be challenging, requiring additional effort and resources to resolve compatibility issues.

Statistics and Trends

Global trends show diverse adoption of ACS solutions (including open-source), with varying levels of popularity across different regions and technological contexts. According to recent data, the market for network management solutions, including ACS, is projected to grow significantly. The unified network management market is expected to reach USD 21.63 billion by 2026, growing at a CAGR of 18% from 2020 to 2026 ([Mordor Intelli](#)).

Moreover, the telecom network management system market is anticipated to continue its strong growth, driven by the increasing need for in-depth visibility in network infrastructure and the adoption of cloud-based solutions ([Business Wire](#)).

This indicates a growing preference for more sophisticated, scalable solutions as CSPs expand their operations and face increased complexity in managing their networks.

Geographically, the adoption of open-source ACS solutions varies, with higher usage in regions where cost constraints are a significant factor. For instance, in developing markets, the lower initial cost of open-source software makes it a popular choice. However, in more developed markets, the focus is shifting towards solutions that offer better support, security, and scalability, driving the adoption of proprietary ACS solutions like Cloud ACS.

When to Migrate from Open-Source ACS

As CSPs grow and their networks become more complex, they often encounter various challenges that indicate it's time to migrate from an open-source ACS to a more robust solution. Recognizing these signs early can help CSPs avoid potential operational inefficiencies, security risks, and scalability issues. Migrating to a more advanced ACS solution like our [Cloud ACS](#) can provide enhanced capabilities, better support, and improved overall performance. Here are some of the key indicators that it might be time to consider this migration:

Signs you've outgrown open-source ACS:

- 1. Limited system capacity:** As the number of connected devices increases, open-source ACS solutions may struggle to handle the load, leading to performance bottlenecks and operational inefficiencies.
- 2. Complex device onboarding:** Difficulty in efficiently onboarding new devices can hinder the ability to scale operations.
- 3. Inability to reflect business processes:** Lack of customization options to align the ACS with specific business processes.
- 4. Auxiliary services required for provisioning:** Dependence on additional services for zero-touch provisioning can complicate the management process.
- 5. No option to integrate with external systems:** Difficulty in integrating the ACS with other essential systems such as CRM or billing platforms.
- 6. Insufficient bulk management capabilities:** Challenges in managing large numbers of devices simultaneously.
- 7. Lack of subscribers' Wi-Fi experience monitoring:** Inability to monitor and improve Wi-Fi performance for end users.
- 8. No dedicated GUI for Customer Care:** Absence of a user-friendly interface for customer support teams.
- 9. Multitenancy and data separation not supported:** Inability to support multiple tenants and ensure data separation, which is crucial for large-scale operations.
- 10. No access differentiation per user roles:** Lack of granular access controls to differentiate user roles and permissions.
- 11. Need for advanced access security:** Inadequate security features to protect against modern threats.
- 12. No customer support or professional services:** Limited support options can result in prolonged downtime and unresolved issues.

Considerations for Choosing Your Next Solution

When choosing a new ACS solution, service providers should consider several critical factors to ensure they select the best fit for their operational needs and future growth:

- ✔ **Scalability and flexibility:** The ability of the ACS to scale with the growth of your network and adapt to evolving business needs.
- ✔ **Comprehensive support:** Availability of dedicated support and professional services to assist with implementation and ongoing management.
- ✔ **Security:** Advanced security features to protect against cyber threats and ensure compliance with industry standards.
- ✔ **Integration capabilities:** Ease of integrating the ACS with existing systems such as CRM, billing, and network management tools.
- ✔ **Customization options:** Flexibility to customize the ACS to meet specific operational requirements.
- ✔ **Cost-effectiveness:** Evaluation of the total cost of ownership, including licensing, maintenance, and operational costs.
- ✔ **User-friendly interface:** A straightforward and intuitive interface for both administrators and customer support teams.

Time and Resource Requirements for Migration

Migrating from an open-source ACS to a more advanced solution like Cloud ACS requires some planning and resource allocation. Typical timelines and resource requirements include:

- ✔ **Planning and assessment:** 2-3 weeks for evaluating current systems, identifying requirements, and creating a migration plan.
- ✔ **Resource allocation:** Technical personnel for system integration, financial resources for licensing and deployment, and time for staff training.

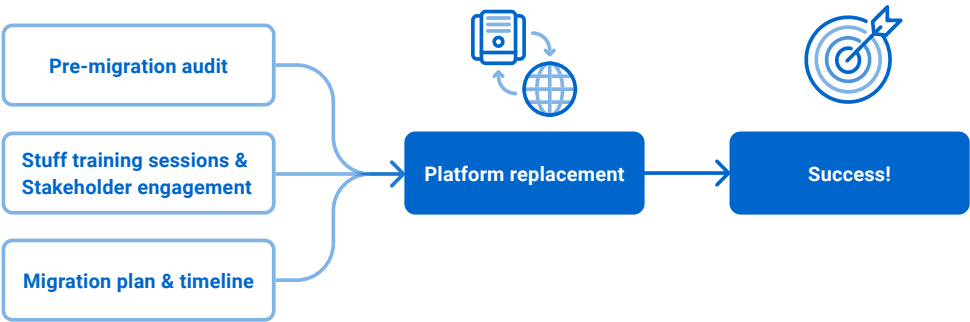
- ✔ **Implementation:** 2-3 weeks for configuring the new ACS, testing integrations, and migrating data.
- ✔ **Post-migration support:** Ongoing support and maintenance to ensure smooth operation and address any issues that arise.

Preparation for Migration

Effective preparation is essential for a successful migration. Key steps involve:

- ✔ **Pre-migration audit and assessment:** Conduct a thorough audit of your current ACS setup to identify strengths, weaknesses, and areas for improvement. This involves documenting existing configurations, understanding current performance metrics, and evaluating compatibility with the new system.
- ✔ **Staff training and development:** Plan training programs to ensure your team is proficient in using the new ACS. This can include formal training sessions, hands-on workshops, and ongoing learning opportunities.

- ✔ **Establishing a migration plan and timeline:** Develop a detailed migration plan outlining key milestones, timelines, and responsibilities. This plan should include a risk management strategy to address potential challenges and ensure minimal disruption to operations.
- ✔ **Stakeholder engagement:** Engage all relevant stakeholders early in the process to align goals and expectations. Establish clear communication channels to keep everyone informed and involved throughout the migration process.



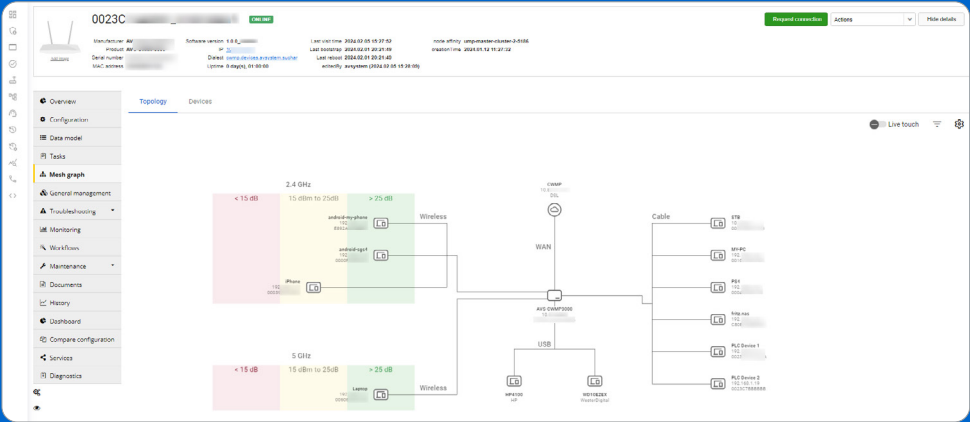
Migration from Open-Source ACS to Cloud ACS

Switching from an open-source ACS to a more advanced solution such as Cloud ACS can greatly **improve your network management capabilities, enhance operational efficiency, and offer better support and security.** The migration process

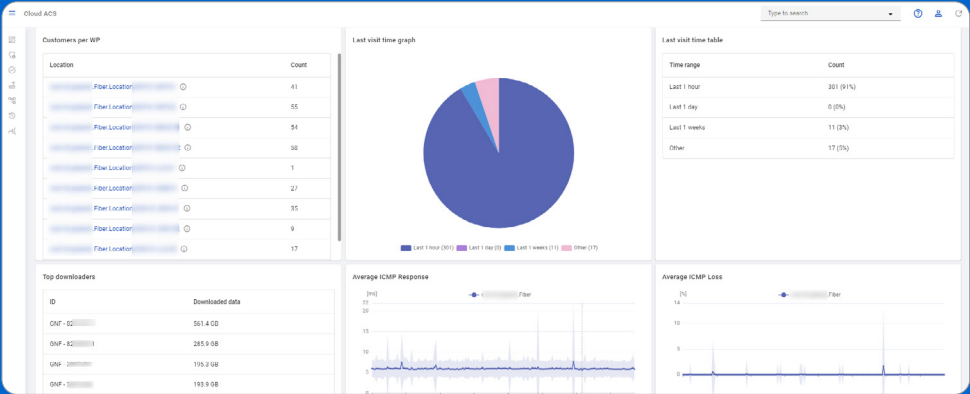
consists of several key steps designed to ensure a seamless transition with minimal disruption to your operations. Here's a comprehensive guide to help you understand our process and what to expect.

Cloud ACS is an auto-configuration server for managing CPEs, supporting both TR-069 (CWMP) and TR-369 (USP) with dual-stack capabilities. It includes features like zero-touch provisioning, remote bulk management, and advanced monitoring, available for a 14-day free trial with

the full support of our experts. After the trial, our customers can benefit from the pay-as-you-grow pricing model, allowing them to scale up without upfront costs. Cloud ACS is the perfect next step for operators switching from open-source ACS.



[Learn more about Cloud ACS](#)



Pre-migration process

Before the actual migration begins, it's crucial to engage in a thorough pre-migration process to

ensure that everything is in place for a successful transition. This stage includes:

Initial consultations and meetings

- ✔ **Expert assignment:** As soon as you contact us, we assign a dedicated expert to your project. This expert will be your primary point of contact throughout the implementation process, ensuring that all your needs are met and that the migration proceeds smoothly.
- ✔ **Team introduction:** Meet the team members who will be supporting you during the migration. This includes professionals with extensive experience in ACS implementations, who will provide guidance and support at every step.

Assessment of current infrastructure

- ✔ **Comprehensive audit:** We will conduct a thorough assessment of your current ACS setup to evaluate its compatibility with Cloud ACS. This involves documenting existing configurations, understanding current performance metrics, and identifying any potential challenges.
- ✔ **Infrastructure compatibility check:** Our team will ensure that your current infrastructure is compatible with Cloud ACS and identify any modifications or upgrades that may be necessary. This is usually just a formality, as our system is vendor-agnostic and supports both TR-069 and TR-369.
- ✔ **Select a migration strategy:** Choose a migration approach that aligns with your goals. Options include rehosting (lift and shift), re-platforming, refactoring, or even replacing legacy systems with our cloud-native solution.

Step-by-step migration

The migration process from an open-source ACS to Cloud ACS involves several stages. Here is a typical step-by-step overview of this process:

1. Development of implementation plan

- Detailed plan: Preparation of a detailed implementation plan that includes key milestones, timelines, steps for configuration, testing protocols, and validation processes.

2. Configuration and customization

- System configuration: We offer Cloud ACS configuration tailored to your specific needs for seamless integration with existing systems. We will customize settings and parameters to enhance performance and user experience.
- Customization options: We provide flexible customization options using XML language for custom scripts to accommodate unique provisioning processes and other specific requirements.

3. CPEs migration

- Device migration method: The process of migrating your device may appear challenging, especially if you don't have access to custom firmware from CPE vendors. Fortunately, we have experience dealing with such scenarios. Depending on your specific situation, you can select one of the following migration methods (all of which are supported by our solution):
 - Manually reconfiguring the ACS URL in the device's graphical user interface (GUI).
 - Changing the ACS URL in the existing ACS through data model parameter reconfiguration or config file upload.
 - Using firmware with a pre-configured ACS URL.
 - Utilizing DHCP option 43.
 - Using DNS.

4. Testing and validation

- Comprehensive testing: Our experts will conduct thorough tests to ensure the system operates as expected under various conditions. This will include functionality testing, performance testing, and security testing based on real-world scenarios.

5. Training and support

- Staff Training: Your teams will receive training sessions to ensure they are proficient in using the Cloud ACS. This will include hands-on workshops, formal training sessions, and ongoing learning opportunities.
- Ongoing Support: We will continue to support you and perform troubleshooting to address any issues post-implementation. This will

ensure that your team can effectively manage the new system and resolve any problems that may arise.

6. Go-live and monitoring

- Official launch: Cloud ACS is ready to go live! We'll monitor the system closely to ensure optimal performance and quickly resolve any problems.
- Continuous monitoring: Implement continuous monitoring to track system performance, identify potential issues early, and ensure that the ACS operates smoothly.

[Curious about how to migrate your devices? Contact us to explore your options](#)

Post-Migration Review

After completing the migration, it's time for a post-migration review. The goal is to assess the project's success and pinpoint areas for improvement. Gather feedback from users and stakeholders to understand their experiences and identify any issues that need to be addressed. Also, analyze performance metrics to evaluate the impact

of the migration on network performance and operational efficiency. This approach will enable continuous improvement by refining processes and enhancing system functionality, ensuring that the ACS continues to meet evolving needs and support operational goals.



Post-Migration: Immediate Effects and Long-Term Benefits

Migrating from an open-source ACS to Cloud ACS can significantly improve your network management capabilities. This will lead to immediate operational efficiencies as well as long-term strategic

advantages. In this section, we will discuss the immediate effects post-migration, the enduring benefits for your business, and the return on investment (ROI) that supports this transition.

Immediate effects

Migrating to Cloud ACS delivers several immediate benefits that streamline operations and improve

service delivery. Here's what you can expect right from the start:



Enhanced remote management

With Cloud ACS, operators gain the ability to manage TR-069/TR-369 devices remotely, which eliminates the need for on-site interventions. This capability enhances operational efficiency and allows for quicker resolution of issues.



Automated service activation

automation of service activation and configuration processes minimizes manual labor and accelerates service delivery. This results in a more streamlined and efficient operational workflow, reducing the time and effort required for service deployment.



Zero-touch provisioning

The solution supports zero-touch provisioning, enabling automatic configuration and activation of devices without manual intervention. This reduces deployment times and operational costs, facilitating faster service rollouts.



Comprehensive performance insights

Cloud ACS provides real-time insights into CPE performance, allowing providers to monitor key metrics and quickly address any performance issues. This proactive approach helps maintain high service quality and reliability, ensuring that any potential problems are detected and resolved promptly.



Improved Wi-Fi management

Advanced Wi-Fi management features allow CSPs to monitor and optimize Wi-Fi performance for end users. This includes detailed network mapping and Wi-Fi experience monitoring, which leads to better customer satisfaction by ensuring a high-quality Wi-Fi experience.

Long-term benefits

Beyond the immediate operational improvements, migrating to Cloud ACS offers substantial long-

term benefits that support sustained growth and competitive advantage:



Optimized network performance

Continuous monitoring and proactive diagnostics help maintain optimal network performance. This reduces downtime and improves overall network reliability, ensuring a consistently high quality of service for customers.



Scalability

Cloud ACS is designed to scale with your network growth. Its flexible architecture supports the addition of new devices and services without compromising performance, making it ideal for expanding operations and adapting to increasing demands.



Enhanced security

Our solution includes robust security features such as end-to-end encryption, secure firmware updates, and advanced authentication protocols. This ensures the integrity and security of your network, protecting against cyber threats and ensuring compliance with industry standards.



Integration capabilities

Cloud ACS supports integration with a variety of systems, including CRM, billing, and network management tools. This seamless integration enhances operational efficiency and provides a unified view of network operations, allowing for better decision-making and streamlined workflows.



Cost efficiency

By automating routine tasks and reducing the need for on-site maintenance, Cloud ACS significantly lowers operational costs. Additionally, the pay-as-you-grow pricing model allows operators to manage costs effectively as their network expands, making it a financially sustainable choice.



Future-proofing your network

The ACS's support for the latest standards like TR-369 (USP) ensures that your network is future-proof. This prepares your network for the adoption of emerging technologies such as IoT and 5G, ensuring long-term operational viability and competitiveness.

Return on Investment (ROI)

Investing in Cloud ACS offers substantial returns by enhancing operational efficiency, reducing costs, and improving customer satisfaction. Understanding the ROI is crucial for justifying the transition and realizing the long-term benefits.

One of the key success indicators is **cost savings**. The automation and remote management capabilities of Cloud ACS reduce the need for manual interventions and on-site maintenance, resulting in significant cost savings. Operational expenses are minimized as tasks become more streamlined and efficient.

The migration will positively affect not only your employees but your customers as well. Enhanced service quality and reliability lead to **higher customer satisfaction and retention**. Customers benefit from quicker service activations, fewer

disruptions, and better overall service, which strengthens loyalty and reduces churn.

Finally, Cloud ACS will help your **business grow**. Enhanced operational capabilities and scalability support business expansion into new markets. By effectively managing a growing network and seamlessly integrating with other systems, CSPs can concentrate on strategic initiatives and innovation, driving long-term growth.

By transitioning to Cloud ACS, operators can not only address the limitations of open-source solutions but also gain a competitive edge in the market. The immediate and long-term benefits of Cloud ACS ensure a robust, scalable, and efficient network management system that meets the evolving demands of modern telecommunications.

Conclusion

The transition from open-source ACS to Cloud ACS marks a significant step forward for service providers aiming to enhance their network management capabilities and operational efficiency. The immediate benefits, such as enhanced remote management, zero-touch provisioning, and comprehensive performance insights, ensure that operators can quickly improve their service delivery and customer satisfaction. Over the long term, Cloud ACS provides robust scalability, cost efficiency, enhanced security, and integration capabilities, ensuring that your network remains future-proof and competitive in an ever-evolving technological landscape.

By investing in Cloud ACS, operators can realize substantial returns through cost savings, increased customer satisfaction, and support for business growth. The seamless migration process, supported by detailed planning, expert guidance, and comprehensive training, guarantees that the transition is smooth and effective, minimizing any potential disruptions to your operations.

If you're ready to take your network management to the next level, Cloud ACS offers the tools and support needed to ensure success. Take the first step towards transforming your network management capabilities. Reach out to us today, and let us help you build a more efficient, scalable, and secure network with Cloud ACS.

[Contact us to transform your operations!](#)

Customer Experience Management (CEM) Platform

In-home Wi-Fi experience and access layer performance monitoring. Built on top of AVSystem ACS, helps Communication Service Providers (CSPs) enhance customer satisfaction and reduce churn by proactively addressing both access network and in-home factors affecting customer experience. Unlike solutions that focus on only one aspect or require costly software agents, our open standards-based (TR-069/TR-369) solution delivers comprehensive visibility, identifying root causes before customers are impacted.

CEM integrates proactive monitoring, smart Wi-Fi management, speed tests, troubleshooting tools, and self-management APIs. This empowers customers to diagnose issues independently, reducing support calls and truck rolls. Agent dashboards provide first-line support with analytics and automated workflows, while managerial tools offer second-line supervisors system-wide insights for root cause analysis and outage detection. REST API integration connects seamlessly with customer applications, enabling agents to provide efficient, structured support.

[Learn more about CEM](#)



AVSystem

Broadband services management and assurance on truly open standards.

AVSystem was founded in 2006 with a focus on providing automation solutions for connected device ecosystems. The CSP product portfolio covers end-to-end broadband services management, from service activation, through assurance, to in-home WiFi experience monitoring. With clients ranging from local internet service providers to multinational telco operators, utilizing all access technologies and multiple vendors, we know how much openness matters. Our goal is to create flexible and dynamic technology based on truly open standards: TR-069, TR-369, and LwM2M, accessible to everyone.

[Contact us](#)

avsystem.com