June 28, 2013

Embedding Global Connectivity

Best Practices and Deployment Considerations

White Paper

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Table of Contents

1.   Abstract

The evolution of embedded network connectivity is revolutionizing growth opportunities for connected devices. This spans a number of industries and diverse verticals, such as automotive, agriculture, consumer electronics, electrical appliances, shipping, and supply chain logistics. Consistent and integrated wireless communication increases the potential financial return of connected device products. In addition, significant cost savings can be realized through remote diagnostics and repair, preventive maintenance notifications, and environmental sensor integration.

Increasingly, persistent connectivity enables new revenue generating services. In addition, revenue share business models have emerged, which are made possible through the exposure of application delivery platforms.

While the potential ROI derived from connectivity is substantial, so are the challenges. A number of considerations could impact the potential success or failure of companies pursuing connectivity in their global product lines. This white paper will highlight best practices and demonstrate how AT&T's Global SIM program provides a unique approach to minimizing operational complexity and reducing supply chain and deployment costs.

This white paper addresses cross-functional considerations for companies pursuing global embedded network connectivity into their products and services. As such, the intended audience for this white paper spans CTO, CMO, CIO and CFO stakeholders.

2.   Connected Devices in a Complex & Changing Environment

Embedded, cellular-enabled communication is being rapidly embraced across a wide range of devices, machines, and vehicles. Though many connected device programs are in their infancy, most analysts project robust growth. Pyramid Research[1] forecasts cellular M2M connections will grow over 300% in the next five years, from 143.7 million in 2012 to 478.1 million by 2017. Much of this growth will be fueled by automotive, agricultural, and other manufacturers seeking improved diagnostics, enhanced safety, and compelling user experience advancements.

There are a number of considerations business partners must address when developing an embedded communications strategy.

"The regulatory environment and government-driven operating conditions change over time. OEMs operating alone must continually stay abreast and adjust accordingly. "

— Andrew Apple, Director - Sales Operations, Emerging Enterprises & Partnerships

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[1] Pyramid Research, Cellular M2M Connections: An Analysis of Growth Drivers, Market Segments and Operator Approaches,   January 2013

2.1 Country-specific Regulations and Laws

No unified global regulatory body exists for embedded communications in connected devices.

Each country has its own unique set of laws, regulations and practices governing the implementation of communications services, or may even lack clarifying laws or regulations. While some countries are open and transparent in their oversight, others have more complex and nuanced regulations. Moreover, the regulatory environment can shift over time, compounding the environmental complexity. The communications service requirements in many emerging, high-growth countries are complex, ever-changing and, to some extent, undefined. In even the most developed countries, regulatory dynamics are often slow to change as advanced communications technologies enable increasingly sophisticated business models.

National or regional governmental jurisdictions may regulate the conditions under which communications services may be provided. Such regulations may impact the business partners who purchase such services. Conditions and requirements may include device testing, import/export, safety and emergency procedures, pricing, taxation, roaming parameters, and the extra-territorial transfer of communications and content.

Expertise at the time of market entry does not guarantee success. OEMs operating alone must continually stay abreast and adjust accordingly.

> ### *Markets to Watch*
>
> *Several countries are expected to experience significant growth in the next 5 years. Each country has a unique regulatory climate whereby they will choose to stimulate or control how certain technologies and communication services evolve.*
>
> *China: Rapid proliferation of M2M devices will result in China overtaking the US as the #1 M2M market in 2013. Telematics is a key focus as the government tries to alleviate traffic congestion and to provide insurance and entertainment services in this burgeoning market.*
>
> *Brazil & Russia: Both countries are instituting favorable telematics regulation that will result in 40% CAGR over the next 5 years. Brazil is mandating 100% of new cars be equipped with telematics by August 2017 with similar mandates in Russia.*
>
> *Latin America: Telematics will be a strong driver to reach 36.3M M2M devices by 2017*
>
> *India: Sizeable growth potential for M2M in certain sectors, and agricultural applications, remote monitoring and fleet management have been the first to gain adoption*
>
> *Africa & Middle East: The most under-developed M2M market anticipates strong growth fueled by fleet management and security applications*

AT&T has the resources, capabilities and expertise in this area to develop solutions to adapt to this environment.

Best practices would dictate a flexible platform that can dynamically adapt to a changing business environment, while minimizing disruption to embedded equipment and the end user experience. This is important for companies who manufacture products with embedded communications or have products with long life cycles. The capability to rapidly adapt with minimal operational or financial disruption is imperative. Therefore, the best platform would encompass both advanced technical capabilities and well-established commercial arrangements.

For example, if business, regulatory, technical, or other conditions require a change to the underlying communications delivery method, the capability to make required changes over-the-air (OTA) would help to avoid costly equipment servicing and customer inconvenience.

Business partners would benefit from a communications partner that offers global service yet has finely-tuned abilities to "localize" for changing regulatory environments or business models. Localization might include networking capabilities, subscriber equipment registration, and authentication facilities.

2.2 Choices in Communications Technologies

While simple in theory, changing communications dynamics demand careful thought regarding the choice of cellular technology. Business partners should carefully consider the alignment of technology with their global expansion plans. For example, some CDMA technologies still present in the U.S. and Korea have not been adopted by the global community. However, GSM-based technology has been widely adopted globally and will not pose limits to future success as a company's global aspirations grow.

Furthermore, early versions of GSM technologies (i.e. 2G and 2.5G variants such as GPRS and EDGE) are widespread in the global arena. While they may offer the lowest cost, it would be prudent to take a longer term view. It is vital that the technology support evolving business models and higher bandwidths. In addition, many operators around the world are beginning to "sunset" 2G networks in order to re-farm scarce spectrum for use in more advanced cellular technologies. Business partners should take precautions to avoid prematurely "stranding" their connected device modules.

On the opposite end is LTE, a more advanced option. While attractive in terms of eventual speeds and improved latency, this path presents potential implementation hurdles due to global fragmentation. Deployment rates from country to country vary significantly, and the LTE radio bands deployed from operator to operator, even in the same country, are highly fragmented. This can result in very expensive and physically unacceptable form factors. Or, it can require multiple SKUs for each operator and the associated handling and logistics costs, which is equally unattractive.

While the barriers associated with global deployment of LTE will lessen over time, business partners in pursuit of best practices would be well-advised to pursue GSM-based modules, such as HSPA and HSPA+. This provides global ubiquity, reasonable costs and attractive form factors, as well as the ability to span both low- and high-bandwidth requirements.

2.3 Choices in SIM Technology and Specifications

After communications technology, the next big decision is to select SIM card technology and specifications.

SIM cards, otherwise known as Subscriber Identification Modules, contain integrated circuitry and software that securely stores the international mobile subscriber identity (IMSI) and the related keys used to identify and authenticate subscribers. Most SIM cards are tightly integrated into the manufacturing process, as opposed to aftermarket insertion, to ensure the desired operational capability.

SIM strategy becomes a significant choice on multiple fronts. Business partners should consider a communications provider with a single SKU that is adaptable across multiple countries. Obviously, maintaining multiple SIM SKUs would greatly increase operational costs and supply chain complexity to any global deployment.

Another consideration is the "pre-certified" status of the SIM card. This is a very important cost avoidance strategy that will be discussed in Section 4 of this paper which covers best practices in equipment certification.

An additional, but equally important, overarching consideration is the capability of the chosen SIM (and communications provider) to handle OTA provisioning and/or SIM re-imaging, if changing regulatory conditions dictate. This involves the physical characteristics of the SIM relative to ROM, RAM, and EEPROM size, as well as provisioning options. The physical characteristics drive the extent to which communications services could evolve as business partners' products mature and advanced business models are deployed.

Best practice business partners, particularly those with long life cycle products and integrated manufacturing processes, plan ahead.

2.4 Local Communications and Commercial Licensing Requirements and Options

In order for OEMs, automotive companies or other enterprises to enable embedded communications in their products and services, commercial agreements with cellular operators are needed for each country where products will be in transit or deployed.

"Most countries have between 3-7 mobile operators. Europe alone has over 180."

— *Michael Kirk, Director - Interconnection Agreements, International Alliances & Integrations*

Most countries have between 3 and 7 operators (licensed cellular communications companies). Europe alone has over 180. Some cellular companies have regional licenses within a country, while others have national rights.

Each "in country" operator's technology and radio bands will vary. This may affect quality of coverage and, therefore, the end user experience. The country-specific legal and regulatory framework will vary from country to country and the

commercial options and terms will vary from operator to operator. Plus, a variety of commercial agreements are possible. The options may depend on the anticipated duration of the product in country as well as how the communications services will be used (i.e., low vs. high bandwidth). As a result, multiple factors must be taken into account when negotiating desired service delivery and how associated charges will be incurred.

2.4.1 Different Business Models

Depending upon business objectives, there are a variety of potential commercial agreements available to enable wireless connectivity in any given country. A wide range of pricing is available, with rates highly dependent on the reciprocity of the negotiating party. Lower cost options exist for low-bandwidth applications and more sophisticated tiered pricing is available for OEMs with the need to accommodate both low-and high-bandwidth applications.

Business partners pursuing best practices have an eye on the future, and fully understand the need for future pricing flexibility as business models and end user needs evolve. For example, automotive OEMs may have plans to expand beyond diagnostics and safety to include security, voice, multi-media content, augmented reality navigation services, and streaming "infotainment." The goal is to future proof now, rather than face additional complexity and time delays if all contracts have to be re-negotiated later in the product life cycle.

In addition, strong centralized commercial agreements bring added value. It is certainly possible for corporations with established global operations to have the skills and "in-country" assets to negotiate separate commercial agreements with multiple operators in each country. However, in practice, this leads to much higher costs than centralized negotiations by a global communications partner. Very few OEMs, manufacturing entities or transit specialists have the volumes in any specific country to obtain a highly favored customer status. Cost considerations also include the need to establish points of interconnection and billing interfaces.

As companies pursue multi-country communications capabilities, it is important to consider product lifecycle factors. This includes pricing that is tiered or structured to align with what the industry terms as "SIM Status" or "SIM states." The process should allow the most attractive pricing tier to be easily and quickly applied as the product moves through various stages of manufacturing, shipping, and deployment. This requires platform support of multiple and customized SIM states and inventory models.

For example, many Enterprise customers prefer to install and ship "warm" SIMs. These have already been activated to support testing states and can be instantly activated upon customer delivery and power up. Intermittent SIM states also accommodate seasonality for industries like agriculture.

Most OEMs demand flexible pricing based on SIM status. In fact, it is not unusual for a best practice OEMs to manage as many as six SIM states. In the automotive industry, variably priced SIM inventory states include:

- At supplier
- On the manufacturing line
- Received on shore
- Arrived at dealer
- Test drive state until final sale
- Activation by the consumer

Best practice dictates a platform which allows the business partner to execute their specific business rules governing SIM status changes. As an example, OEMs may want the system to automatically change SIM status based on changes in the product's location (for example, a border crossing). The robustness of any given platform depends on the capabilities of its rules engine. The ability to dynamically adjust "SIM state" provisioning is an important factor in minimizing costs and simplifying operational and supply chain complexity.

2.4.2 Product Certification Complexities

Equipment with embedded communications capabilities must typically go through external testing and certification processes prior to activating communications services on a live network. Certification requirements vary according to governmental jurisdiction, country regulation, and specific operator requirements.

At the highest level are certifications to comply with regional North or South American, European, or Asian standards bodies. These product certification guidelines are intended to ensure equipment with embedded communications comply with the uniform protocols of the member organizations. Adhering to these standards generally assures the device will perform as expected within specific environments and with the desired end user experience. Two of the more important standards certification processes include PTCRB (http://ww.ptcrb.com) and Global Certification Forum (GCF) http://www.globalcertificationforum.org.

In addition to standards compliance, individual country governments often mandate additional levels of certification to prevent negative effects of technology to public health or the environment.

For example, many countries require tests to ensure there will be no interference with other communications and radio technologies deployed in the country. Tests also ensure all components meet a minimal level of government standards.

> *"Certification requirements vary according to governmental jurisdiction, country regulation and specific operator requirements."*
>
> — *Stephanie Ellenberg, AVP - Product Marketing Management , Emerging Enterprises & Partnerships*

Lastly, each operator within any given country may have their own set of certification standards. Testing requirements vary widely

across cellular operators. Procedures are subject to change as the technology and device sophistication in each country evolves. The focus of most operator certification testing is to ensure the embedded communications capabilities do not harm their network through excessive network signaling or interference.

Certification can involve both lab and field performance testing (in country). Depending on the results, multiple phases and re-testing processes may be required, particularly if a product evolves after initial certification or if regulations change.

Without a centralized strategy for efficient and parallel product certification, business partners may face onerous, repetitive, and costly ($200-500K USD) certification requirements which can delay time to market by months.

Best practice business partners will pursue a certification program that will balance time to market, cost, and commercial partnering requirements while ensuring end user quality of experience (QoE). The latter is important for communication reception, performance and usage costs if these services involve an end user subscription.

Businesses will want a partner that can "pre-certify" SIMs across devices, and should consider a provider with global scale, comprehensive RF prowess and strong multi-carrier relationships. An alignment of this nature can significantly speed testing through expert guidance and the elimination of redundancy.

Finally, to speed time to market, consider a partner with priority access to globally recognized certification centers with comprehensive, parallel testing expertise and extensive regional knowledge.

2.5 Platform Considerations

2.5.1 Communications Activation and Provisioning

As mentioned previously, it is important that business partners secure appropriate SIM state pricing for each country in which products will be manufactured, tested, transited, or deployed. Best practice would involve a streamlined, centralized provisioning platform to ensure the lowest possible prices will be applied at the earliest possible time as the product transitions through inventory stages.

Each operator has its own procedures and processes for service activation. Even multi-country operators often have fragmented systems due to legacy components in many countries. Business partners attempting to navigate the coordination of SIM activation and provisioning across multiple operators will face significant cost and operational complexity.

Business partners would benefit from a 24x7 centralized platform with global reach that will enable instantaneous provisioning, activation, and changes to SIM States. Intuitive, self-service features will maximize OEM operational savings.

2.5.2 Diagnostics and Reporting

Given all this complexity, the depth and breadth of "real time" diagnostics and reporting is paramount. In multi-country, multi-carrier global deployments of communications services, anomalies can and will occur. Diagnostics that can narrow trouble reporting to a single SIM, provide proactive alerts and remotely remediate issues greatly reduce operational costs and ensure high QoE for end users.

2.5.3 Billing and Invoicing

Another key success factor involves centralized billing capabilities and localized invoicing competencies. Companies pursuing direct relationships with a variety of operators, on a country-by-country basis, face different billing cycles, invoice formats, resolution procedures, currency translation costs and payment terms. For many business partners, best practices would provide a single platform that can offer 24x7 views into a "drill down" centralized billing database, robust analytics, and detailed reporting.

A robust platform will have the flexibility, capabilities, and in-country assets to meet regulatory requirements for billing and invoicing in specific countries. For example, certain countries require locally printed paper invoices. Others have specific regulations concerning the way communication charges must physically appear, as well as native language requirements. For companies with extensive global ambitions, having flexible and local capabilities is critical when choosing partnerships.

Business partners must consider the ability to adapt their business model for embedded communications. For example, an automotive OEM may wish to absorb the costs of some communications services as part of their advanced diagnostics and services programs. Other communications services, such as in-vehicle voice calling, could be part of a subscription or government mandated service, while discretionary streaming infotainment services could be directly billed to the end user as part of a third party subscription service. The latter may or may not have revenue share implications for the OEM. A business partner implementing more advanced business models may need split rating, billing, invoicing, and reporting capabilities.

2.5.4 Customer Service

A single point of contact for end-to-end service offers operational efficiency and lower cost. This requires a platform with one centralized 24x7 point of contact with multiple levels of specialized support, established response parameters, responsive and knowledgeable customer service, and a variety of contact methods (ticketing, email, and live support).

Companies who choose alternative strategies often find themselves struggling with inconsistent response and support parameters across multiple operators, time zones, and language barriers. Also consider the leverage the chosen platform provider will have with specific operators.

2.5.5 API Extensions

Business partners should consider a provisioning, billing, and servicing platform with robust exposure of APIs. This will enable seamless integration into back office systems. The most forward thinking companies will choose a platform with well documented REST APIs that extend all functions of the platform.

3. How AT&T can help Business Partners implement Best Practices

AT&T is a world leader in the deployment of connected devices. The recently announced Global SIM program, which builds upon a ten year history in pioneering global deployments of connected devices, can take multi-national business partners to the next level of product and service evolution. The AT&T Global SIM enables ordering and provisioning service in multiple countries through a single platform.

Persistent communications capabilities are creating the potential for new and exciting business models and the opportunity to transform multiple industries including automotive, agriculture, and transportation.

The AT&T Global SIM program provides OEMs with a "one stop shop" for embedded communications deployment.

AT&T Global SIM solves the biggest global deployment issues:

1. Single SIM SKU
2. Singular APN
3. Expertise & supply chain simplicity

Key components:

- ***One SIM SKU:***
  - For Global GSM Deployment (4G/3G/2G)

Solving global deployment issues

1. *A single SIM SKU that is localized to the specific country and operator and flexible enough to change over time.*
2. *A single APN to ensure persistent and secure connectivity between the local operator and the enterprise application server.*
3. *The expertise to help the OEM think through an end to end operational model to ensure execution and supply chain simplicity.*

— *Made possible through AT&T Control Center, powered by Jasper Wireless, and AirOn by G&D*

- o "Pre-certified" for activation across over 600 operators in 200+ countries
- o "Future Proof" physical characteristics for long product life cycle
- o "No Touch" OTA provisioning through a single global APN

- **One Simple Global Contract for Voice, SMS and Data**
  - o Favorable pricing across 600 operators in 200+ countries based on AT&T's ability to procure attractive reciprocal commercial arrangements
  - o Pre negotiated provisions for use of local communications infrastructure for roaming
  - o Variable pricing for multiple SIM states and inventory stages
  - o Potential to change commercial models

- **AT&T Control Center for one stop shop for Provisioning, Billing, and Service**
  - o 24 / 7 Single point of contact for billing, provisioning and service
  - o Intuitive, web based GUI for instant self service capabilities
  - o Real time diagnostics and reporting
  - o Extensive exposure of well documented REST APIs for seamless platform extension from OEM back office systems

- **Proven expertise**
  - o Comprehensive knowledge and experience in navigating the operational complexities of the global communications arena
  - o Extensive certification management experience backed by best in class ecosystem of expertise and testing facilities access

To further strengthen, future proof, and streamline its Global SIM program, AT&T has built a best-in-breed, end-to-end ecosystem that leverages expertise and IP from a diverse group of companies including Jasper Wireless, Giesecke & Devrient, and Ericsson.

3.1   Single Global SIM SKU

Where available, AT&T delivers a single, technically advanced SIM SKU that may be localized to the operator, and that is intended to be flexible enough to respond as devices move, inventory statuses change, partners shift, and regulations are modified.

One of the most important and unique aspects of the program is the fact that AT&T has eliminated the need to physically modify the SIM hardware if commercial or regulatory conditions change because the vital elements of the SIM are securely controlled in the cloud.

Through a well-established ecosystem that includes expertise from Giesecke & Devrient (G&D), AT&T can make real time changes to millions of devices through seamless integration of the AT&T Control Center to G&D's AirOn platform. This integration enables AT&T to offer nearly instantaneous over-the-air provisioning with minimal (if any) product or customer disruption.

The need to localize a SIM can arise with a changing regulatory environment or an evolving business model.

AT&T's Control Center platform enables the end-to-end management of SIMs that is critical for operator authentication, service provisioning, maintenance, and deactivation. The lifecycle of the SIM can be managed from a single, easy-to-use interface which ensures better security, more reliable access, and multi-level support for cross-carrier commercial agreements.

3.2   Single Point of Contact for SIM Provisioning, Billing and Service

AT&T's Control Center, powered by Jasper Wireless, is a "one stop shop" for business partners to receive unparalleled access to a robust set of "instant on" self-provisioning options.

A variety of customizable SIM states can be managed through a comprehensive set of "drop down" or "point and click" business rules which are then implemented through the AT&T Control Center's Automation Engine.

Real time diagnostics, proactive alerts, and a comprehensive analytics reporting suite help customers stay on top of their operations with minimal effort.
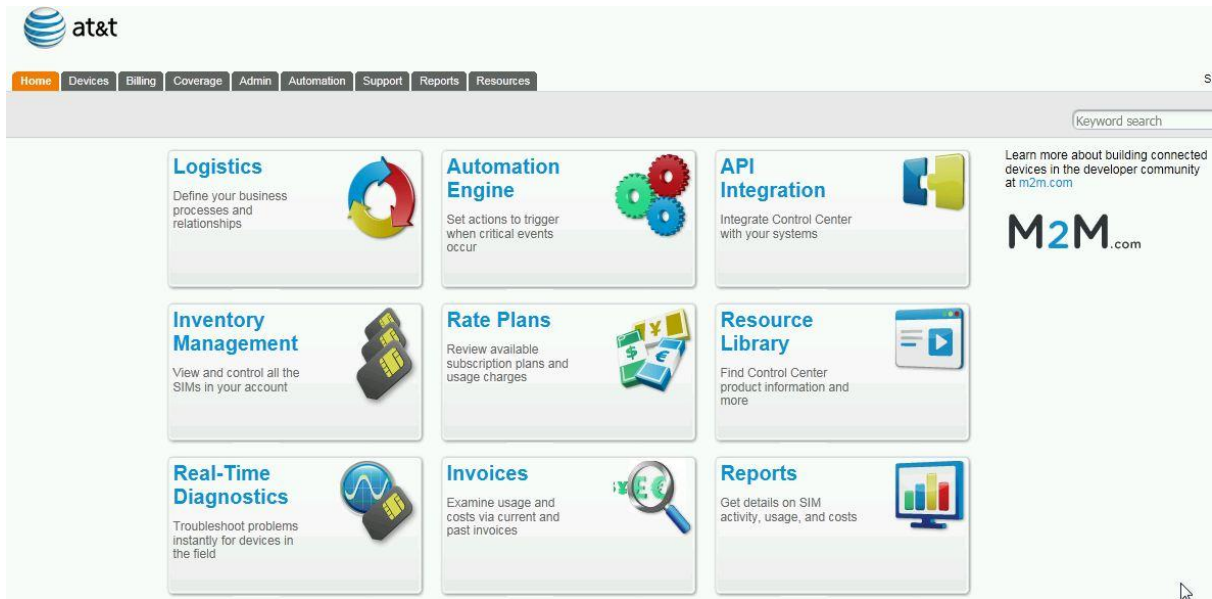
24x7 Customer Service, including on-line forms, e-mail, live response, and high priority ticketing options based on customer preference, is provided by highly skilled network and product engineers and backed by AT&T's industry leading expertise and customer service.

AT&T Control Center
— **"One Stop Shop"**
— **Self-provisioning options**
— **Customizable SIM states**
— **Highly intuitive GUI**
— **Business rules automation**
— **Real-time diagnostics**
— **Proactive alerts**
— **Analytics & reporting suite**
— **24x7 customer service**
— **Highly skilled support staff**

The highly intuitive, web-based GUI is simple to use.

AT&T Control Center Home Screen

Billing records are centralized through the AT&T Control Center. Detailed and comprehensive electronic views are available 24x7 through a web enabled portal. Invoices can be easily sorted and analyzed down to the individual SIM.

AT&T has developed advanced capabilities that can support OEMs in meeting language, format, or local printing requirements. Capabilities exist to assist OEMs with country-specific bill generation and account receivables reporting and the ability to bill and book revenue by entity.

Capabilities supporting advanced business models (split rating and billing competencies) will continue to be developed and refined over time.

The AT&T Control Center was built to be scalable. The system currently monitors over two billion network events per month and can manage millions of devices worldwide. Many automated rules can be set up and supported within the system.

For even more operational simplicity, back office integrated access to all AT&T Control Center functions is available to business partners through a comprehensive library of over 150 well documented REST APIs.

Regardless of the size and complexity of the deployment, this single-point-of-contact solution provides comprehensive supply chain, unparalleled network coverage, rate plan flexibility, and on-going billing and lifecycle management.

AT&T can also help customers navigate through the process globally, including certification testing, that is required to support the connected device deployments.

4. AT&T Can Help Streamline & Accelerate Certification

Depending upon arrangements made between AT&T and our business partners, AT&T may assist in the certification process. The details will vary from client-to-client and depend on customer-specific needs. The description below demonstrates AT&T's certification capabilities.

For device certification, AT&T offers professional guidance and assistance to help business partners minimize cost and maximize time to market as they navigate the sometimes complex and multi- dimensional world of connected device certification.

As a pioneer in global deployment of connected devices, AT&T has developed well- honed certification processes and best practices. In addition, AT&T has built an end to end ecosystem consisting of a direct association with strategically located certification labs and underpinned by Ericsson's significant expertise in radio design and extensive localized certification knowledge.

AT&T is directly associated with multiple and strategically located labs that are equipped to test and certify equipment based on PTCRB and GCF standards. The facilities and services offered by this network of labs can help to eliminate redundant testing and accelerate parallel testing.

Through tight coordination across facilities and test teams, updates and results can be sent directly to AT&T's subject matter experts in order to take appropriate action to speed the approval process.

In instances where business partners desire to fully optimize the front end process and minimize risk of certification failure through pre-certification testing, Ericsson's expertise and extensive global network of lab facilities can be brought to bear.

Business partners can also benefit from the ongoing and close working relationships both AT&T and Ericsson continually nurture with operators around the world. These relationships can help ensure guidance around certification is in synch with each local operator's programs, processes, and requirements.

AT&T's extensive certification program and the strength of their certification ecosystem can help minimize the costs and resources required to navigate the various required certification processes and, more importantly, speed time to market.
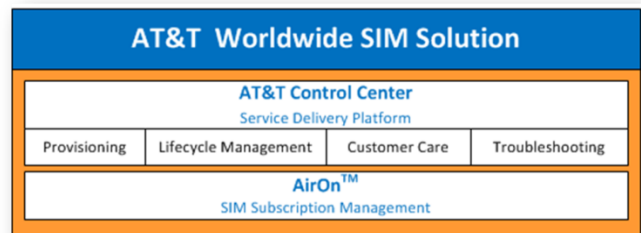
4.1   Local Breakout Capabilities

AT&T will attempt to customize a solution, if feasible, in those cases where local containment of data is required. AT&T's existing commercial arrangements with a wide network of operators can be leveraged to help OEMs evolve their business models over time as embedded communications become an ever-increasing part of their product and service offer. These capabilities are part of AT&T's "future proof" value proposition and can help OEMs maintain alignment between evolving end user expectations and customer QoE.

5.   Conclusion

AT&T is a one-stop-shop for global M2M deployments with the ability to manage the entire process from end to end, offering a future-proof, highly scalable solution. AT&T simplifies an otherwise complicated business on behalf of multi-national corporations.

AT&T does this through:

- **Expansive Deployment Capabilities**
- **Single SIM SKU**
- **Device Certification Assistance**
- **Single Service Delivery Platform**
- **Simplified Billing**
- **Single Point of Contact**

6.   Engaging AT&T

To learn more about the AT&T Global SIM program and to engage with AT&T as a business partner, please fill out the partner engagement form at http://www.att.com/edo/pef/partner-engagement-form.jsp.

Appendix A — AT&T's Global SIM Solution

Streamlined supply chain via single SIM

- Default AT&T bootstrap subscription
- Installed/shipped in test mode (restricted use)

Sale to customer activates profile
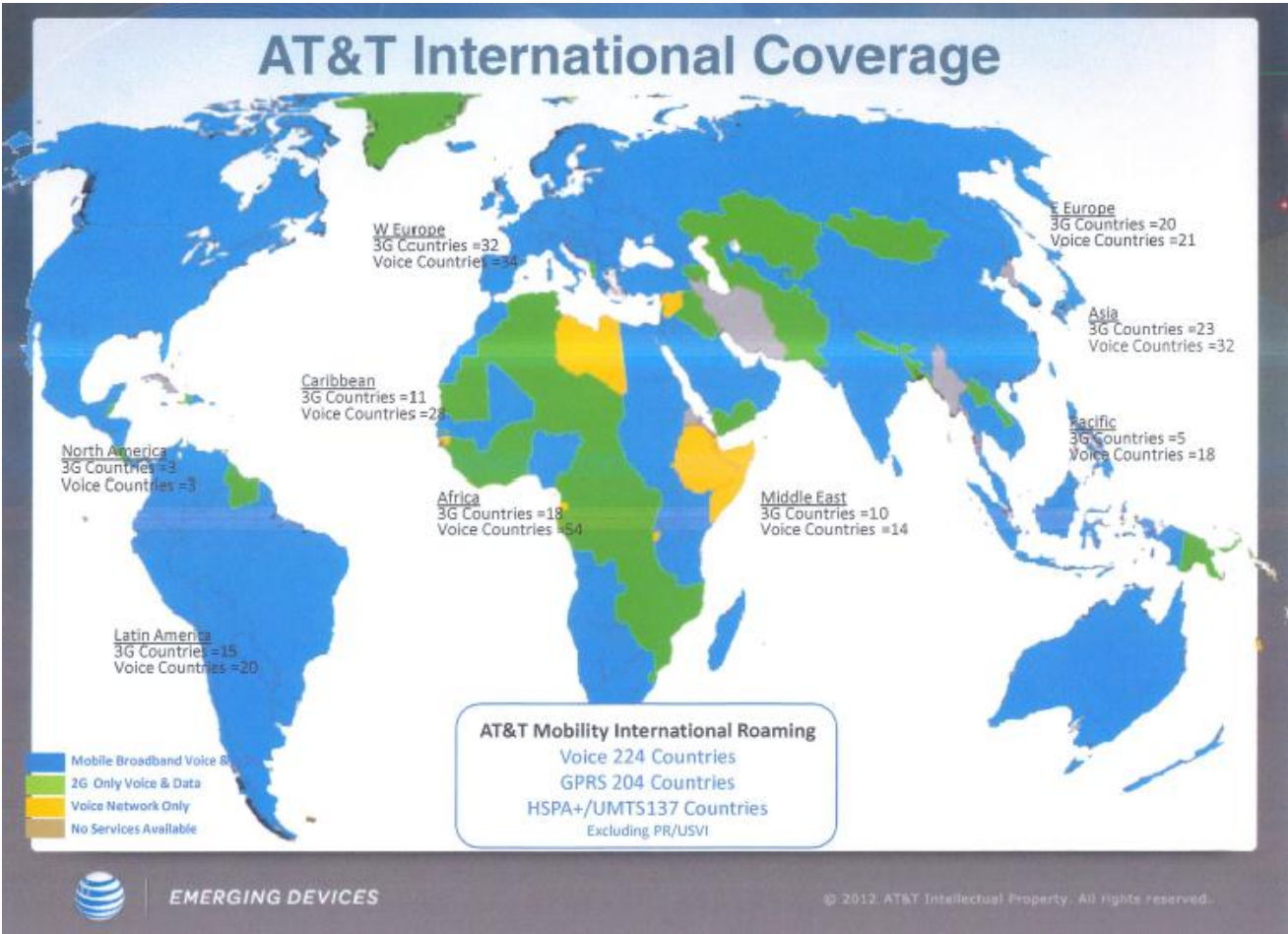
AT&T provides lifecycle management

- Subscription change when necessary to meet commercial scenarios
- Revert to bootstrap profile for inactive/EOL
- Where available, AT&T-controlled re-IMSI/re-credential capabilities as agreed with local carriers

Solution elements

- SIM is unique to AT&T Control Center Platform, powered by Jasper Wireless
- Support 'Single SIM' solution
- Roaming supported in more than 220 countries
- G&D subscription manager
- AT&T billing systems Enterprise On Demand (EOD) and Universal Biller (UB

Appendix B — AT&T International Roaming Coverage

Note: Roaming services are provided to qualified U.S. customers in the United States for use when roaming outside the U.S.