

Winning the Race to Revenue

How NFV/Cloud Solutions Drive Revenue Today and Turbocharge Your Path to 5G



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The Race Is On!



The race to digital services revenue is underway, and competition is coming from all sides: not just traditional service providers, but from established cloud providers (Amazon, Google, Microsoft) and over-the-top (OTT) applications you haven't even heard of yet. Consumers and corporations have made it clear that whoever can deliver the next big thing in digital services will win their business, whether it's their mobile service provider or Amazon or some cloud start-up. Instead of the big eating the small, in the new digital services economy, the fast will eat the slow.

OTT competitors have already made an aggressive bid for traditional telco services, with McKinsey & Company predicting that OTT market share for messaging and mobile voice services could reach as high as 60 percent and 25 percent, respectively, by the end of this year.¹ Now, the race is on to win the coveted enterprise and 5G digital services markets that will support next-generation applications such as smart buildings and immersive/augmented gaming experiences.

To compete, communications service providers (CSP) need to transform their networks and transform their business now. Replacing legacy solutions with "lift and shift" virtualized replacements from the same vendors won't win the race. CSPs need a web-scale, cloud-native network architecture that is built to deliver next-gen digital services from the ground up. These networks must deliver ultra-high performance and advanced features such as network slicing, service automation and real-time analytics that can radically accelerate service creation and drive down network costs.

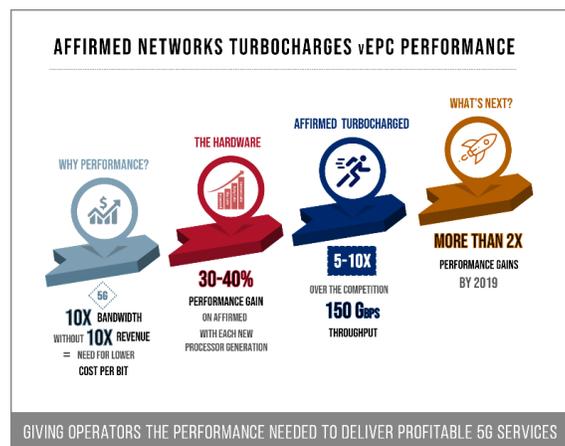
We're not talking about future features on a roadmap. We're talking about technology that is available today from leading vendors and should be implemented by CSPs as soon as possible to compete effectively for digital services revenue. The time for action is now, and the best course of action is to follow the five proven strategies for ensuring the success of your digital services transformation:

The Five Proven Strategies for Winning

1. Maximize your network's speed and performance with network solutions that are architected specifically for an NFV/cloud environment.
 2. Rev up your top-line revenue and bottom-line profitability by accelerating your time to market for new services and lowering your total cost of ownership.
 3. Drive transformation with a complete solution that is already built to win.
 4. Don't get behind the wheel of an unproven concept.
 5. Recognize that you can't win the race alone, team with a proven partner.
-

Strategy #1: Maximize Your Speed and Performance

In the race ahead, network speed and performance will be critical. Mobile traffic growth rates, which currently stand at about 50% year over year, are poised to explode in the next few years as much as 1000%. Mobile service providers need a different model for scaling their networks: one that relies on software rather than hardware to cost-effectively grow the network. Virtualized network functions (VNFs) that are built for cloud/NFV environments, rather than adapted to them, deliver higher levels of speed and performance, which in turn helps mobile service providers scale better while lowering their cost per bit.



Affirmed Networks and Intel have been working closely together to improve the speed and performance of VNFs in the mobile core. As a result of that partnership, Affirmed and Intel recently announced [record-breaking performance benchmarks](#) with Affirmed vEPC that reached speeds 10X higher than competitive alternatives—over 150 Gbps on a single Intel Xeon server and more than 120 Gbps on a single Intel server with 100% DPI utilization.

Test Information	Single Data Plane VM - UDP	Two Data Plane VM - HTTP and DPI	Two Data Plane VM - UDP
Number of subscribers	1 million	1 million	1 million
Throughput (Gbps)	75.71	121.18	151.43
Total Packet per Second	13 Mpps	21.27 Mpps	26 Mpps
Packet Size	650 bytes	650 bytes	650 bytes
Max I/O CPU Utilization (%)	82.00	66.71	83.23
Avg. Packet Handler CPU utilization (%)	66.71	73.87	66.62

Test Information	Single Data plane VM - UDP	Two Data Plane VM - HTTP and DPI	Two Data Plane VM - UDP
Number of subscribers	1 million	1 million	1 million
Throughput (Gbps)	49.5	79.77	100.46
Total Packet per Second	8.5Mpps	13.84 Mpps	17.25Mpps
Packet Size	650 bytes	650 bytes	650 bytes
Max I/O CPU Utilization (%)	81.85	70.62	84.25
Avg. Packet Handler CPU utilization (%)	67.8	69.62	70.17

Figure 1. Intel/Affirmed Networks Test Results

Beyond its impressive speed and performance, the Affirmed/Intel solution delivered linear scalability as more servers were added. This is a critical component of a web-scale architecture, as high-bandwidth applications such as augmented/virtual reality and connected cars will require the rapid and efficient scaling of network resources. Affirmed's vEPC solution provides independent scaling of control, management and data planes, so mobile service providers can allocate resources appropriately for different call models such as fixed wireless, enterprise and consumer services, and both low- and high-throughput machine-to-machine (M2M) communications.

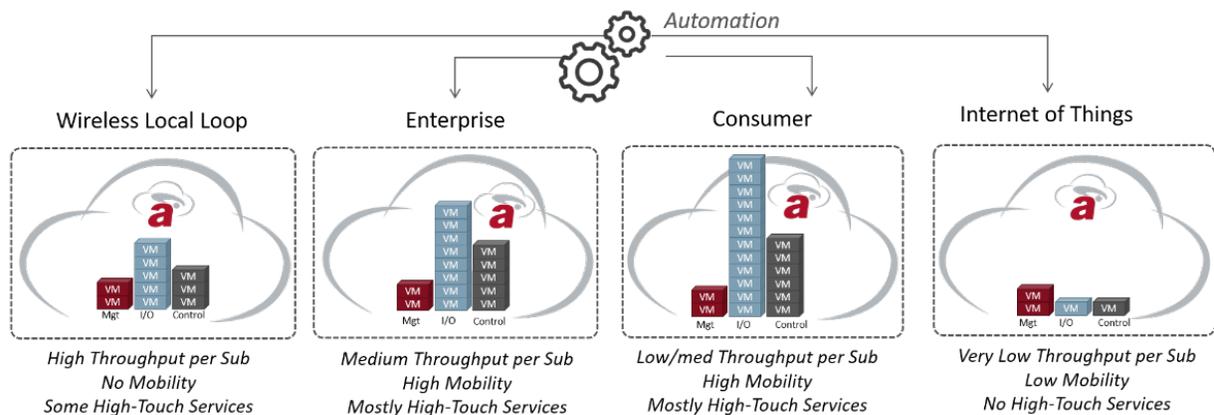


Figure 2. A flexible VM architecture allows for dynamic scaling in many dimensions.

Strategy #2: Rev Up Your Revenue, from Top-Line Growth to Bottom-Line Profitability.

CSPs need to reduce capex and opex to improve their bottom line and increase revenue from new services to grow their top line. In a recent in-depth study, ACG Research compared Affirmed's integrated vEPC solution with a virtualized EPC solution comprised of discrete components from different vendors but with similar features—e.g., DPI, GiLAN services, CGNAT, optimization services and virtual probes. What ACG found was that Affirmed's integrated vEPC solution offered a significant advantage in terms of total cost of ownership (TCO) over a five-year period. In addition, ACG analyzed how CSPs could increase the speed of creating new services while reducing the cost of delivering those services by automating the service provisioning process using platforms such as the [Affirmed's Service Automation Platform, ASAP](#).

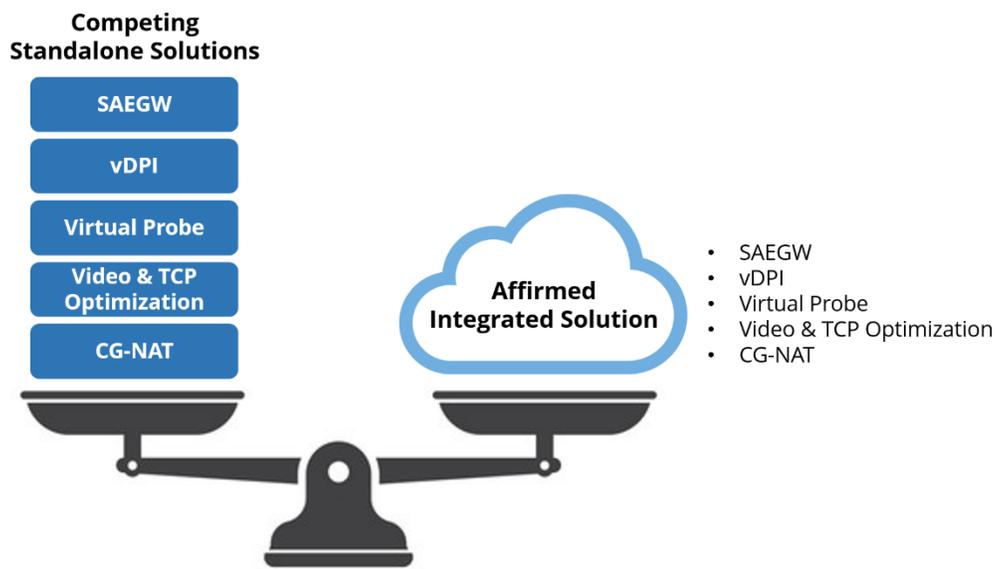


Figure 3. Affirmed's integrated vEPC vs. discrete multivendor vEPC

ACG's study concluded that:

- Over a five-year period, Affirmed's vEPC solution demonstrated a 70 percent lower total cost of ownership, including a 70 percent savings in capex and a 90 percent savings in opex
- A discrete multivendor vEPC would require 10X more servers than Affirmed's vEPC
- CSPs can reduce opex costs of creating and delivering a new services by as much as 80 percent with automated service provisioning
- Automation can reduce the time to deliver a service by one third and increase revenue from new services (because you are launching more of them) by as much as 300%

Strategy #3: Have a Solution That's Built to Win.

Traditional network equipment vendors would have you believe that strapping a rocket onto a minivan will transform it into a race car. In reality, their virtualized solutions are simply the same old software in a cheaper chassis. What CSPs need instead is a network designed for the race of the future, that combines the speed and agility required to outmaneuver cloud-based competitors, accelerate innovation and capture both emerging and niche markets.

What does this network of the future look like? It's not just virtualized but cloud-native, scaling to serve thousands of enterprise customers while offering granular customization of services. It introduces unique capabilities (e.g., automation, real-time network intelligence, microservices-based architecture) to drive disruption, while embracing an open architecture and APIs to easily integrate with partners and third-party applications. It's not just cheaper and faster than what you have today, but 10X faster than your competitors and 70% less expensive to operate than competitive offerings.

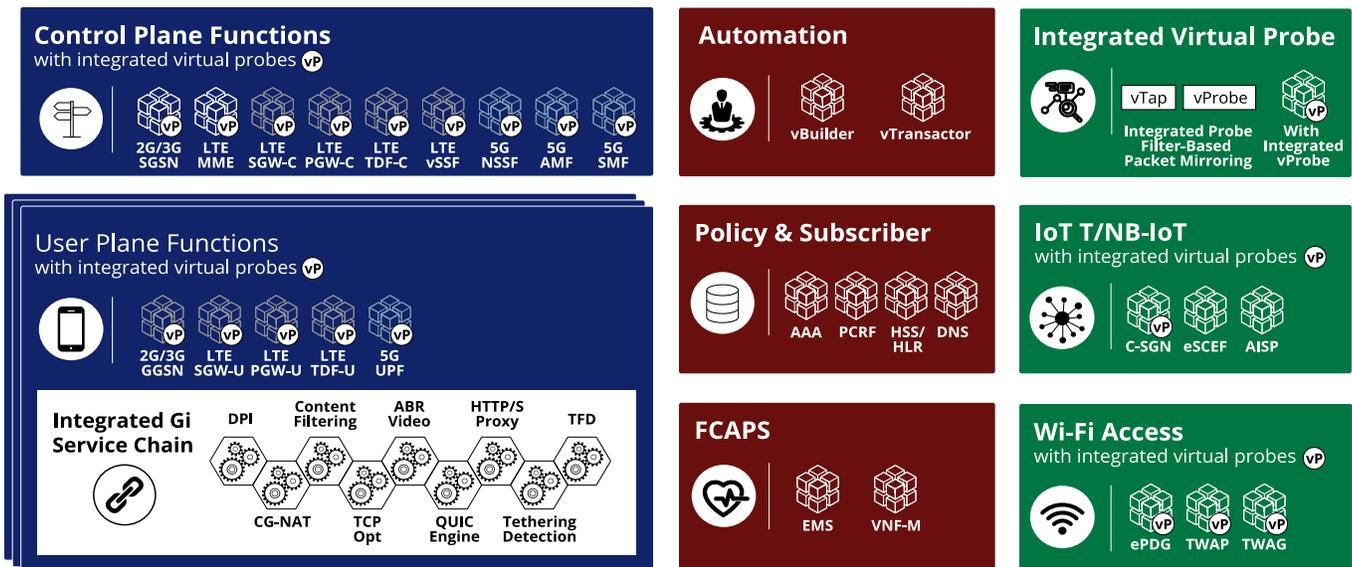


Figure 4. Affirmed's webscale 5G solution provides a robust set of virtualized capabilities that reduces costs and accelerates revenue opportunities.

Where can you find this network of the future? It's the cloud-based mobile core solution that Affirmed delivers today.

- **Virtualized Mobile Core.** Affirmed's vEPC platform transforms the mobile core network into a fully virtualized environment that can deliver 2G through 5G services on a web-scale, cloud-native architecture.

- **“Mobile Core as a Service”—Hosted vEPC in AWS.** As a unique value-added feature, mobile service providers can host some or all Affirmed vEPC functions in Amazon’s cloud. Benefits include near-limitless scalability, reduced up-front costs and significantly faster time-to-market, essentially enabling MNOs and MVNOs to deploy mobile services anywhere that AWS is deployed around the world.

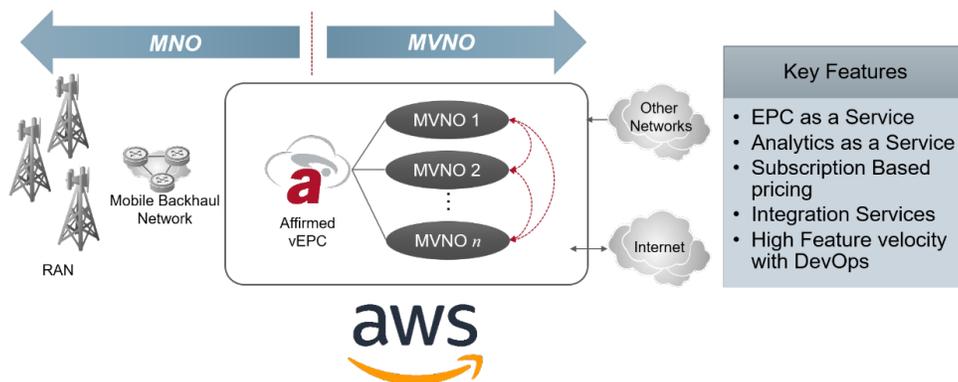


Figure 5. MNOs and MVNOs can opt to deploy some or all Affirmed vEPC functions in Amazon’s cloud.

“The Affirmed decision to offer their virtual EPC on AWS could be a step toward a true virtual mobile infrastructure.” –Tom Nolle, president and founder of CIMI Corporation

- **Network Slicing.** Network slicing enables operators to configure virtual network instances that are optimized for a specific customer or service more quickly and at a lower cost. [Affirmed’s virtual Slice Selection Function \(vSSF\)](#) creates finely grained slices of network traffic across virtualized and legacy network elements without heavy provisioning or configuration changes.
- **Virtual Probes and Real-Time Network Analytics.** Probe-based network intelligence isn’t a new concept, but Affirmed is the only company to offer a [fully virtualized network probe](#) integrated within the VNF, providing real-time network intelligence *without* impacting the performance of the VNF. It’s a revolutionary approach to network intelligence that can save service providers an additional 50% in capex and opex costs, by eliminating the need for additional probe-based appliances.
- **Automated Service Provisioning.** The [Affirmed Service Automation Platform \(ASAP\)](#) automates the creation, provisioning, modification and deployment of services, reducing the time-to-market for new services from years or months to just days. ASAP includes open northbound APIs to simplify integration with OSS/BSS systems and a customizable southbound interface to deliver services to any device in your network. Using Affirmed’s real-time analytics tools, CSPs can quickly identify and create

profitable, new services by anticipating market opportunities well before their competition.

- **Integrated DPI and GiLAN Services.** The Affirmed vEPC platform includes deep packet inspection (DPI) and GiLAN services to create new services and policies. The [GiLAN services](#) features a comprehensive set of capabilities such as proxy, video optimization, TCP acceleration, CGNAT, data plane visibility and analytics that can be chained together to create new policy-driven services in minutes.
- **IoT Applications.** Machine-to-machine (M2M) communications represent a multibillion-dollar opportunity for CSPs. Affirmed's vEPC architecture is optimized to support [IoT applications](#), with features such as:
 - Network slicing to support traffic segregation, with each slice capable of being optimized for a particular service;
 - Separation of control and user plane to support critical IoT applications (e.g., healthcare, emergency services);
 - Support of both wideband LTE-M and narrowband IoT (NB-IoT) services and support for Non-IP Data Delivery (NIDD) with enhanced Service Capability Exposure Function (eSCEF).
- **Multi-Access Architecture with Virtualized Wi-Fi.** Affirmed's [Wi-Fi solutions](#) provide operators with an inexpensive way to offload the growing volumes of mobile data traffic while improving indoor coverage and the overall subscriber experience. Affirmed offers the only fully virtualized ePDG and TWAG/TWAP functions that perform all IPsec encryption in software.
- **Control and User Plane Separation (CUPS).** As operators move to 5G, they will have to accommodate a wider variety of applications from a centralized mobile core architecture. CUPS provides independent scaling and placement of data plane and control plane functionality, avoiding wasteful overprovisioning of VNFs and allowing for placement of the user-plane VNFs closer to the edge of the network to support low-latency, high-bandwidth applications and Mobile Edge Computing (MEC).
- **Support for 5G New Radio (NR) Standard.** Affirmed's vEPC supports 5G NR, which provides major improvements in performance, cost and efficiency when compared to legacy wireless technology.
- **Cloud-Native Microservices Architecture.** Microservices enable CSPs to quickly and cost-effectively deliver customized network slices to their customer base. Using open-source technologies such as Kubernetes and Prometheus, the cloud-native solution can drive down network operational costs by delivering a standardized tool set for network monitoring, API management and orchestration.



A history of disruption and innovation
A proven track record with a graceful path to 5G

Affirmed Inception 2010	Industry's First vEPC & GI LAN 2013	Industry's First Virtual Wi-Fi 2015	Service Automation 2016	Industry's First vSlicing 2017	Industry's First 5G NG Core 2018
VNF Architecture				5G Webscale Microservices	
NFV Started 2012	Named AT&T D2 Supplier 2014	Industry's First Virtual Probe 2016	Industry's First vNB-IoT 2017	Industry's First 150G/Server 2018	

Figure 6. Affirmed's history of innovation and disruption is marked with important milestones.

NFV, cloud and 5G are all about *openness*, and the solutions that support these initiatives are only as good as the sum of their parts and their partners. At Affirmed, we understand that meaningful disruption rarely happens in isolation. Instead, it's a collaborative effort that leverages the latest innovations from chipset manufacturers, virtualization experts and other IT leaders. Today, companies such as Intel, VMware, RedHat, Juniper, Dell and HPE play an important part in the development and improvement of our NFV/cloud solutions. In addition, we pay close attention to emerging 5G and cloud standards—many of which we anticipated in our own design efforts—to ensure that our solutions are fully compliant.

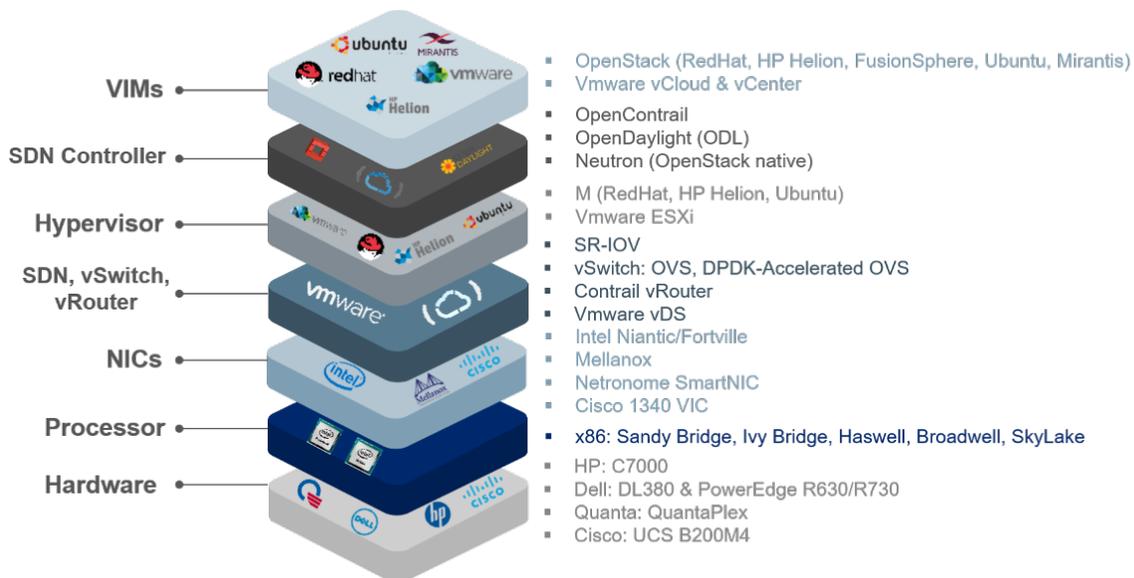


Figure 7. Affirmed solutions support best-of-breed solutions across the entire stack.

Strategy #4: Don't Get Behind the Wheel of an Unproven Solution

Today, of course, every vendor claims to have a product roadmap to 5G that includes virtualization and the cloud. But a roadmap is just a piece of paper, not a proven path to success. Results are what matter, particularly when those results will shape the winners and the losers in the race for mobile digital services revenue.

Affirmed Networks' webscale mobile core solution has over 85 carrier customers worldwide. Our proven solution and track record has also been honored by the industry's leading analysts and media experts.



"Industry disruptor"



"The next billion-dollar startup"



"Private company of the year"



"Cool vendor in communications service provider infrastructure"

Where are the New Revenue Opportunities? Follow our Customers.

See what our customers are doing today with Affirmed's vEPC solution.

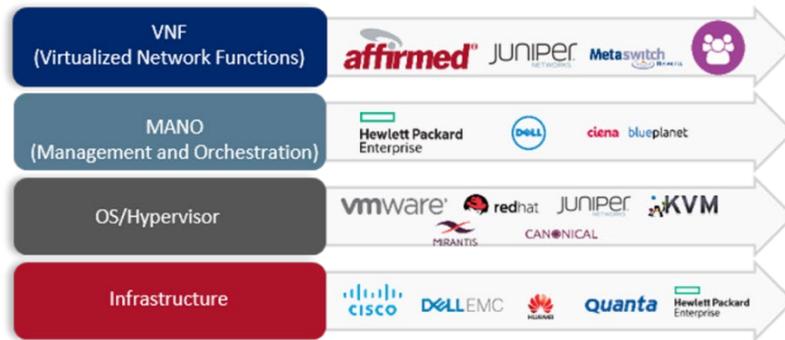
	<p>In February 2014, AT&T named Affirmed Networks as one of its first Domain 2.0 vendors supporting a new software-defined architecture for deploying new hardware, software and services.</p>
	<p>Etisalat has deployed Affirmed's vEPC to deliver broadband data/video and voice services to its mobile and fixed subscribers around the world. Etisalat can now quickly and cost-effectively spin up new mobile services in different regions to support various initiatives such as IoT, Wi-Fi, smart city and consumer digital services.</p>
	<p>Vodafone is using Affirmed Networks' vEPC solution to deliver M2M communications and connected-car services over their global network infrastructure.</p>
	<p>UAE-based telco operator du is using Affirmed's NB-IoT mobile core to deliver a wide range of smart city applications. The virtualized mobile core provides a state of the art 5G ready core network with network slicing to serve enterprise as well as consumer use cases. Du will also deploy Affirmed's virtualized Wi-Fi gateway services to deliver VoWi-Fi services.</p>

	<p>Japan's SoftBank is using Affirmed vEPC to deliver IoT services and mobile connectivity to enterprise customers over its nationwide network. This network transformation will enable SoftBank to rapidly deploy and customize new digital services using their existing, shared network infrastructure.</p>
	<p>UK-based Three is using Affirmed's cloud-based solutions for Service Awareness, GiLAN services and virtual probe and analytics to deliver the best possible mobile experience to their customers and be more responsive to their needs.</p>
	<p>Mobile virtual network enabler (MVNE) Transatel has launched an embedded connectivity service for laptops and tablets across the U.S. with Affirmed's vEPC as its virtual mobile core platform. Transatel is looking at deploying Affirmed's vEPC solution on Amazon's cloud service, AWS, to help them quickly penetrate U.S. markets and deploy new services faster.</p>

Strategy #5: You Won't Win the Race Alone. Start with a Proven Team.

A cloud-based NFV architecture is a new paradigm for networks, with its own unique set of requirements around integration, operation and performance. CSPs need expert guidance, broad systems integration and operational support from an experienced team to ensure their network transformation stays on track and delivers results. A well-implemented architecture can be a disruptive engine and a competitive advantage, powering speed and efficiency across the entire business.

Affirmed is the only network vendor that is 100% committed to NFV and the cloud. More importantly, we have successfully migrated operators to a fully virtualized, web-scale architecture: from design and implementation to validation and post-production managed services. Our ability to lead your virtualization efforts is unrivalled, with over 85 customers to date and the proven expertise to help operators transition to cloud-based, virtualized architectures.



- Experience in virtualization at scale, mobility, IP, security, NFVi, VNFs, MANOs
- Hands on NFV with multiple commercial deployments at scale with major tier 1 companies
- Affirmed applications are agonistic to NFVi, MANOs and any 3rd party VNFs

Figure 8. Affirmed is “open” to help you create the best virtualized environment for your business.

The Race Is On, Get Moving.

CSPs are racing to deliver 5G services and beat their competitors to market. We know this because we’re helping them do it. Don’t set your hopes on a “concept car” that won’t be roadworthy for years. Get behind the driver’s seat and start up immediately with an industry-proven solution from Affirmed. We have everything you need to get into the race and win: an experienced team, an integrated solution with proven capabilities and a fast track to revenue from new digital services.

When you’re ready to get started on the racetrack to success please visit us at affirmednetworks.com/race-to-revenue.

Footnotes

1. Meffert, Jürgen and Niko Mohr. “Overwhelming OTT: Telco’s Growth Strategy in a Digital World.” McKinsey & Company. January 2017. <https://www.mckinsey.com/industries/telecommunications/our-insights/overwhelming-ott-telcos-growth-strategy-in-a-digital-world> (accessed September 24, 2018).