

Vanu Innovation Challenges

Global Solutions Summit

June 4, 2018

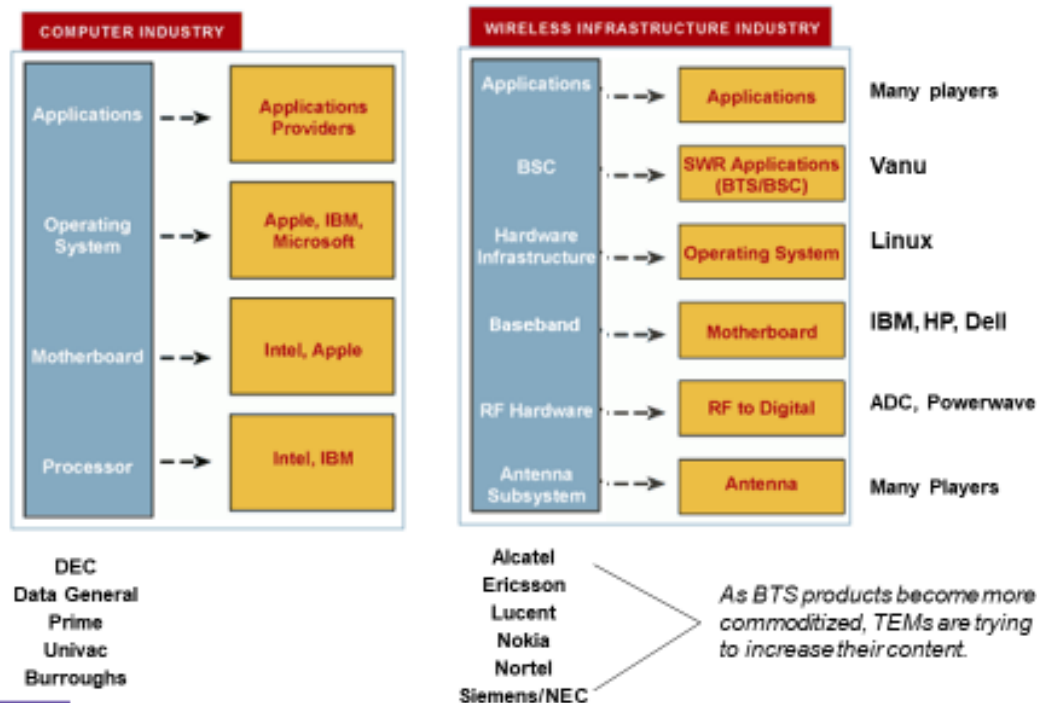
About Vanu

- *Pioneers in Software Defined Radio (SDR)*
 - *First FCC certified SDR (November, 2004!)*
- *We help mobile network operators increase profits and create new revenue streams by providing products and services to efficiently serve unconnected rural markets*
 - *SDR reduces power and backhaul expense*
 - *Small cell architecture focuses coverage where people live and work*
 - *Wholesale business model reduces costs and increases addressable market*
- *But that's not how we started*

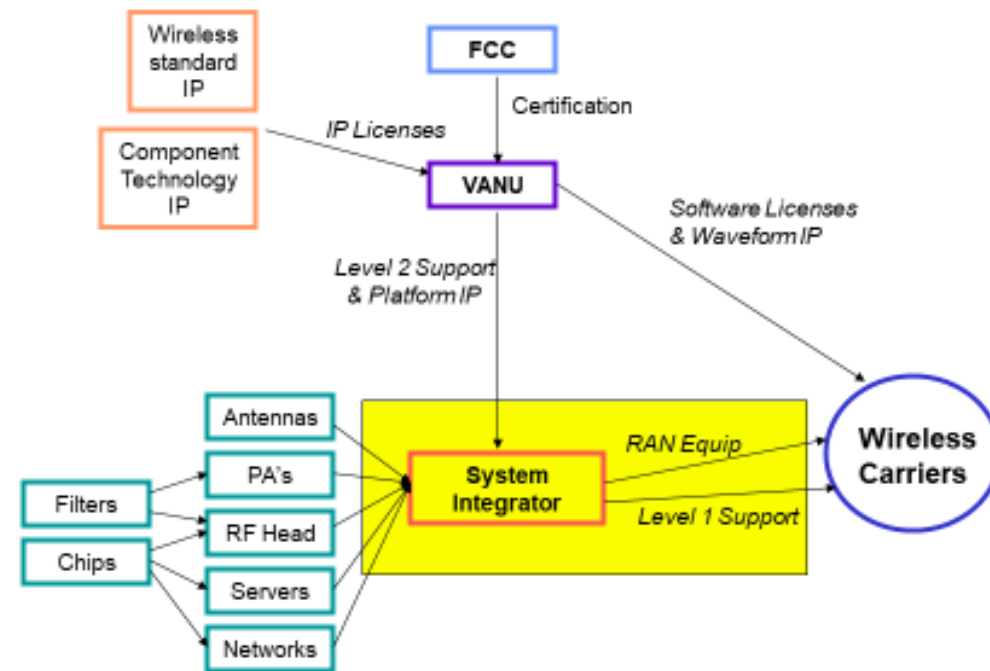


The Software in Software Radio - 2006

Anywave® Implications for Industry Structure



Vanu Supply Chain



Ecosystem Creation is Essential

- *Innovators are trying to solve a problem others have not solved*
- *Innovators do things differently than those who have preceded them because what preceded them did not solve the problem*

Therefore

- *It should be no surprise that complementary technologies, service organizations, business practices, and knowledge base (the ecosystem) do yet not exist!*

For Vanu in 2006, the SDR Ecosystem was lacking/non-existent

- *No System Integrator to deliver integrated systems to customers*
- *No RF to digital subsystem vendors*
- *No impetus from customers to change buying or other behaviors*

Integration Forward

- *Clay Christensen, former Vanu director, uses “integration Forward” to describe what disruptors need to do when faced with an ecosystem inadequate to deliver what the customer needs in the form they can use it*
- *Vanu built, integrated and supported the “whole product” –*
 - *Software*
 - *Radio subsystem*
 - *Processing subsystem*
 - *Power Amplifiers, antennas, etc.*



Sometimes, even a “whole product” isn’t enough

- *Mobile Network Operators know where they obtain the maximum return on investment*
 - *Skeptical about realizing savings*
 - *Even if rural markets can be profitable, why operate there if you can get a higher ROI in an urban market investment?*
- *Coverage as a service:*
 - *We build, own and operate rural networks*
 - *No capital risk or allocation for mobile network operator*
 - *Charge mobile network operators for usage by their subscribers*
 - *Mobile network operator only pays us when they are getting paid by their customer*
 - *Required us to become a mobile network operator – we created our own customer*

Scaling Deployments

We are now deployed in rural markets in India, Cameroon, Democratic Republic of Congo, Ghana, Guinea, Mauritania, Rwanda, United States, Canada, Zambia, and more with more deployments coming in 2018

We use 2 models:

- *Coverage as a Service*
 - *where mobile network operators do not wish to deploy in rural areas*
- *Equipment Sales*
 - *where mobile network operators do wish to deploy*
 - *This is the exception, not the rule*

Lessons Learned

- *It is hard to create new solutions to long-standing problems*
- *It is harder to build an ecosystem of organizations that offer complementary technologies and services to deliver these solutions*
- *We believe the best way to quickly and reliably scale the delivery of innovative solutions is to ensure*
 - *A complete ecosystem exists*
 - *Each participant in that ecosystem makes more money by participating in the ecosystem than they would by investing the same resources (time, money, ...) elsewhere*

***Thank
you!***

