5G Cellular Networks

A Systems Approach

Larry Peterson and Oguz Sunay

Version 1.0

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README

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Build the Book

To build a web-viewable version, you first need to install a couple packages:

- Gitbook Toolchain
- Node.js Package Manager

Then do the following to download the source:

```
mkdir ~/5G
cd ~/5G
git clone https://github.com/llpeterson/5g.git
cd 5G
```

To build a web version of the book, simply type:

```
make
```

If all goes well, you will be able to view the book in your browser at `localhost:4000`. (If all doesn't go well, you might try typing `make` a second time.)

Preface

The transition to 5G is happening, and unless you've been living under a rock, you've been bombarded by the hype. But if you are like 99% of the systems-oriented, CS-trained, cloud-savvy, IETF-participating, people in the world, the cellular network is largely a mystery. You know it's an important technology used in the last mile to connect people to the Interent, but otherwise you've largely abstracted it out of your scope-of-concerns.

The main thing to understand about 5G is that it implies much more than yet another upgrade in bandwidth. It involves transformative changes that blur the line between the access network and the cloud. And it will embody so much value that it has the potential to turn the "Access-as-part-of-Internet" perspective on it's head. We will just as likely be talking about "Internet-as-backend-to-Access" ten years from now.

This book is written for someone that has a working understanding of the Internet and Cloud, but has had limited success penetrating the myriad of acronyms that dominate the cellular domain. In fairness, the Interent has its share acronyms, but it also comes with a sufficient set of abstractions to help manage the complexity. It's hard to say the same for the cellular network, where pulling on one thread seemingly unravels the entire space. It has also been the case that the cellular network had been largely hidden inside proprietary devices, which has made it impossible to figure it out for yourself.

This book is the result of a cellular networking expert teaching a systems person about 5G as we've collaborated to build an open source 5G system. The material has been used to train other non-expert software developers, and we are hopeful it will be useful to others that want a deeper understanding of 5G and the opportunity for innovation it provides. Readers that want hands-on experience can also access the open source software introduced in the book.

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