The Arens multiplication in a unital $f$-ring

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The Dedekind complete abelian $\ell$-group of all order bounded group homomorphisms from an abelian $\ell$-group $G$ to the $\ell$-group $\mathbb{R}$ of all real numbers is denoted by $G^\sim$. Let $R$ be a unital $f$-ring and let $R^\sim$ indicate the Dedekind complete abelian $\ell$-group of all group homomorphisms from $R^\sim$ to $\mathbb{R}$. In this talk, we show that $R^\sim$ is a commutative unital $f$-ring with respect to the so-called Arens multiplication. This work is part of joint research with Jamel Jaber.